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May 22, 2013

EDI Job Number: 13-Y-0167

Assessment and Abandoned Mines Branch (AAM) K-149
Department of Energy, Mines and Resources, Yukon Government
Room 2C Royal Center, 4114-4th Avenue
PO 2703, Whitehorse, YT, Y1A 2C6

Attention: Adrienne Turcotte, Mount Nansen Project Officer

Re: Mount Nansen Surface Water Quality Field Memo: May 15-17, 2013

Trip Dates:	May 15 to 17, 2013
EDI Field Staff:	Joel MacFabe, Caleb Light, and Danny Skookum
Tasks:	Hydrology and Water Quality

Field Summary

EDI completed the surface water quality sampling and hydrometric monitoring at the Mount Nansen site from May 15 through 17, 2013. EDI visited all water quality sites and hydrometric stations. When possible, EDI made hydrometric measurements and collected water quality samples at respective monitoring stations.

The EDI field staff initially attempted to access the site on May 13, 2013 according to the original sampling schedule. However, multiple washouts on the Mount Nansen Road prevented access. These washouts included a large impassible washout at the Victoria Creek crossing (Photo 1). Helicopter access was coordinated by AAM to fly EDI field staff to the Site on the evening of May 14, 2013. EDI staff completed all field activities with site transportation provided by Denison Environmental Services (DES) care and maintenance staff. Return helicopter transport on Friday, May 17th transported field staff and water quality samples to the Trans North Helicopter pad in Carmacks.

Stream flow conditions at many monitoring stations had increased from the previous site visit. Increased stream flows are attributed to the warm ambient air temperatures, enhanced solar insolation and snow and ice melt. Water levels were near bankfull at lower elevation hydrometric stations.

All river ice on Victoria Creek had melted, with the exception of channel reaches immediately upstream of the culvert where stream water is was flowing on top of overflow ice. Thick ice deposits remain on Dome

Creek stations, with water flowing through and over top of ice in multiple, braided channels. Some ice and snow remains on the creek margins within Pony Creek. Back Creek was open with very turbid water and high suspended sediment load. Minnesota Creek was flowing over ice which is frozen to substrate along the length of the creek. Each section below details additional station and site-specific information for Hydrology (Section 1) and Water Quality (Section 2) programs. Included in the Water Quality section is an appendix of water quality parameters that exceeded guidelines and/or the Mount Nansen Effluent Quality Standards from the previous sampling trip (May 6 through 8, 2013), as well as copies of the ALS lab and Yukon Government (YG) Environmental Health Services analysis reports. Section 3 contains relevant photos of field sites. Section 4 details additional monitoring program comments, noteworthy observations, and any changes to budget or scope moving forward.

1. Hydrology

The Victoria Creek stations were all ice-free, from the most upstream station at H-VC-REF to the most downstream station at H-VC-R (Photos 2 through 4). Water was moderately turbid and stage elevations near bankfull. Discharge was measured at each station using the cross sectional area – velocity method. Point velocities were measured using an acoustic doppler velocimeter (ADV). A salt slug tracer measurement was also used at the H-VC-UMN. Water level data loggers were re-deployed at H-VC-UMN and H-VC-REF stations. Integrity of remaining Victoria Creek stations were assessed for integrity and repaired or adjusted as required.

Due to the road washout upstream of the H-VC-R station, water had flooded the parking area on the right downstream bank of the creek. Flood water was discharging into Victoria creek immediately at the stilling well (Photo 2). High flows in Victoria Creek at the road (H-VC-R) also eroded stream banks shifted the stilling well position. EDI field crews installed a temporary brace for the stilling well until proper anchors can be constructed during the next field visit.

Greater flows were noticeable at various locations on Dome Creek as ice and snow continues to melt within the valley. Dome creek stations H-DC-R, H-DC-U1, H-DC-U2, and H-DC-D1b have significant ice remaining frozen to bed. Stream channels are present flowing in various configurations on the surface of the ice as well as within layers of ice (Photo 9). Therefore, conditions were not suitable for hydrometric gauging. Stations H-DC-DX+105 and H-DC-DX remained open with higher flows. Some snow and ice remain on the channel and margins. A volumetric measurement was collected from the culvert between the two stations. A salt tracer was completed at the H-DC-DX+105 station. Dome creek at the H-DC-M station was mostly ice free with a well-defined channel. However, the data logger remained frozen to bed within the stilling well (Photo 10). The salt tracer method was used to measure discharge at H-DC-M.

Pony Creek was nearly ice-free at the H-PC-U and H-PC-DSP stations (Photo 6). A salt tracer was used to measure discharge at both stations. A volumetric and weir head measurement was collected at the H-PC-U station, however a significant portion of stream flow was observed to be bypassing the weir upstream at several locations. The stilling well at H-PC-DSP was ice free and a water level logger was re-deployed. The station at H-PC-U was frozen to bed and data logger could be deployed.

Back Creek was ice-free at station H-BC. Flowing water was turbid and near bankfull conditions (Photo 7). The salt tracer method and midsection method was used to measure discharge at H-BC. A water level logger was deployed in the stilling well.

Ice remains frozen to the channel bed in Minnesota Creek at station H-MN. A well-defined channel has been formed and is flowing over the surface of the ice. The stilling well at H-MN remains frozen and completely submerged in ice and water. No water level logger was deployed at H-MN due to the frozen state (Photo 8). Despite the presence of ice on the channel bed, Minnesota Creek discharge was measured using a salt tracers and the midsection method.

The following table summarizes the conditions and measurements conducted at each station.

Hydrology program dates:	May 15 to 16, 2013
Weather at time of monitoring:	Weather conditions ranged from sunny to overcast, with light snow. Air temperatures ranged from -1 °C to +12 °C.

Site	Hydrometric Measurement (Y/N)	Notes & Comments
ATM-DC2/DC4	Yes	Both atmospheric barologgers downloaded.
H-DC-DX	Yes	Water flowing in multiple & braided channels. Ice and snow remains present along upper reaches of Dome Creek. A volumetric measurement was taken from the culvert between stations H-DC-DX and H-DC-DX+105.
H-DC-DX+105	Yes	Channel mostly open, with ice and snow on the banks. Salt tracer conducted in addition to volumetric measurement at culvert upstream.
H-DC-D1b	No	Creek remains frozen to substrate at this location. Flowing channels are developing on the surface of the ice and are highly braided and complex networks not suitable for gauging.
H-DC-U1	No	Creek remains frozen to substrate at this location. Complex braided channels are developing on and within the ice. Conditions are not suitable for gauging.
H-DC-U2	No	Creek is frozen to substrate with water flowing on the surface and within the ice via complex networks. Conditions were not suitable for stream gauging (Photo 9).
H-DC-B	Yes	Stream channel was free of ice and flowing rapidly with a high suspended sediment load. Salt tracer method used to estimate discharge.
H-DC-M	Yes	Dome Creek no longer frozen to bed at the stilling well location (Photo 10). Some ice present on margins and across channel in various locations. Salt tracer used to measure discharge.
H-DC-R	No	Water flowing across the Mount Nansen Road and on the surface and through the ice within the channel. Conditions not suitable for a discharge measurement due to the absence of a well-defined channel. Significant quantities of overflow ice remain covering the channel downstream of road up to approximately 1 m thick.

Site	Hydrometric Measurement (Y/N)	Notes & Comments
H-VC-REF	Yes	Victoria Creek at REF station is mostly ice free with small quantities of ice remaining on the creek margins. Water levels were near bankfull (Photo 4). Re-deployed a water level data logger and completed a discharge measurement using the mid-section method.
H-VC-U	Yes	Station location is completely free of ice. Water levels near bankfull conditions. Discharge measurement completed using the mid-section method.
H-BC	Yes	Station location is open with high discharge. Bed and suspended sediment load is high (Photo 7). ADV and salt tracer measurements conducted. Hobo logger was re-deployed for open water season.
H-VC-DBC	Yes	Stream channel open with high suspended sediment load. Stage elevation near bankfull (Photo 3). Midsection method used to measure discharge.
H-VC-UMN	Yes	Channel was open and ice free. Water levels close to bankfull elevations. Mid-section and salt tracer methods used to measure discharge. Re-deployed water level logger.
H-MN	Yes	Overflow ice remains in creek valley at station. Water flowing over ice in a well-defined channel (Photo 8). Both the mid-section and salt tracer methods were used to measure discharge. Ice remains covering the stilling well. Conditions not suitable for level logger re-deployment.
H-VC-R	Yes	Stream channel open downstream of culvert while significant overflow ice remains on upstream side of culvert. The parking area at H-VC-R was flooded by overflow waters from the road washout and draining into Victoria Creek immediately at the stilling well. High and sustained flows dislodged the stilling well and required temporary repairs (Photo 2). Stream discharge was measured using the cross-sectional area method.
H-SEEP	Yes	A volumetric measurement was completed at the pipe discharge. Flow rate and total volume was recorded from the flow meter. No staff gauge reading was obtained due to ice conditions.
H-TP	No	Tailings pond remains ice covered. No staff gauge reading during ice conditions.
H-PC-U	Yes	Ice and snow remains in the Pony Creek channel at the stilling well. A level logger could not be installed due to the frozen conditions. Salt tracer, volumetric and weir measurements were taken. Total flow for Pony Creek is not being captured by the weir structure due to significant flow observed diverted around the structure.
H-PC-DSP	Yes	Station location was almost ice free, with trace amounts of snow and ice present in the ditch adjacent to the road (Photo 6). The salt tracer method was used to calculate discharge. A level logger was re-deployed at this location.

2. Water Quality

Spring conditions are progressing from the previous week. Warmer ambient air temperatures and increased solar insolation is enhancing ice and snow melt. Many hydrometric and water quality stations are ice free with water stage elevations near bankfull. Water quality samples were collected at all Victoria Creek stations. Thick overflow ice and unsuitable sampling locations at the WQ-VC-R station prevented sample collection

at the open-water location. The winter WQ-VC-R sampling station located 100 m downstream was used instead.

Dome Creek samples were collected from stations WQ-DC-DX, WQ-DC-DX+105, and WQ-DC-M (Photo 10). Ice remained on the channel margins at each station, with completely covered channels some locations. Significant overflow ice remained at the WQ-DC-R location upstream of the road crossing. Water was observed flowing over the ice surface and through snow cover (Photo 5). Overflow ice remains at the upper Dome Creek sites (WQ-DC-D1b, WQ-DC-U1, and WQ-DC-U2). Complex channels have developed within this reach of Dome Creek, with water flowing over and under the ice surface in multiple branches. Conditions were not suitable for the collection of water quality samples (Photo 9).

Water quality samples were collected from Pony Creek stations at the respective sampling locations. Pony Creek is mostly ice-free and suitable for regular sampling (Photo 11). Back Creek was ice free with high suspended and bed sediment load (Photo 7). Minnesota Creek still has overflow ice to the bed, however, a well-defined channel is incising into the ice. Water quality samples were collected from the WQ-BC and WQ-MN stations.

The WQ-SEEP station was sampled from the outflow pipe, including enough sample water for LT50 analysis. The tailings pond is ice covered, with open water observed along the pond margins. A sample for WQ-TP was collected from the margins of the tailings pond. The Brown-McDade pit lake was not sampled during this trip. Only one sampling event for the Brown-McDade pit is required for May 2013.

The WQ-MS-S-03 site was mostly ice free with sufficient water for sampling. The WQ-MS-S-08 site had standing water at the sampling location and not suitable for sampling. A sample was collected from the WQ-ADIT-SEEP locations as it was no longer frozen to substrate and seeping through the rocks into Pony Creek upstream of the WQ-PC-D site. Drinking water quality samples and a bacteriological sample were collected from the pump house well (WQ-PW) discharge line.

All water samples were delivered to ALS on Friday, May 17, 2013. The bacteriological sample collected from the pump house well could not be analyzed because Yukon Government (YG) Environmental Health Services does not accept samples on Fridays.

The following table summarizes the site conditions and samples collected at each station. Water quality guideline exceedances from the May 6-8, 2013 trip are provided in Appendix A. Copies of the ALS Certificate of Analysis and the YG Environmental Health Services results are attached in Appendix B and C, respectively.

WQ Sampling dates:	May 16-17, 2013
Weather at time of sampling:	Conditions ranged from 2 °C to 12 °C, with periods of sun and overcast skies.

Site	Sampled? (Yes/No)	Notes / Explanations
WQ-PIT1	No	Sampling not required on this trip.
WQ-PIT2	No	Sampling not required on this trip.
WQ-PIT3	No	Sampling not required on this trip.
WQ-SEEP	Yes	Site conditions normal for time of year. LT50 sample collected.
WQ-TP	Yes	Ice remains over pond, sample collected from open water on edge of pond (Photo 12).
WQ-DC-DX	Yes	Creek is open and flowing, with some ice cover remaining over the channel. Water was very clear (<1 NTU).
WQ-DC-DX+105	Yes	Channel mostly open, high flows and moderate turbidity levels.
WQ-D1b	No	Channel remains glaciated, water seeping through multiple layers of ice, not suitable for sampling at this time.
WQ-DC-U1	No	Significant overflow ice remains at this location. Some water flowing over top of ice, but highly braided channels and sub-surface flow observed. Not suitable for sampling.
WQ-DC-U2	No	Creek remains glaciated at this location. Some water flowing over top of ice, but multiple branches with some water going over the surface and beneath the ice surface (Photo 9). Not suitable for sampling at this time.
WQ-DC-U	Yes	Channel open to substrate, with ice remaining only on banks (Photo 10). Moderate to low turbidity levels.
WQ-DC-R	No	Channel remains glaciated upstream of road crossing, water flowing through ice and snow (Photo 5). Not suitable for sampling at this time.
WQ-VC-REF	Yes	Channel mostly ice free, some ice/snow remaining on some portions of the creek (Photo 4). Water level was near bankfull.
WQ-VC-U	Yes	Channel is ice free. Water levels were near highest elevations. Moderate turbidity levels.
WQ-BC	Yes	Channel open, very turbid (783 NTU) and high flows (Photo 7).
WQ-VC-DBC	Yes	Channel was open with high suspended sediments (102 NTU), likely attributed to inputs from Back Creek. Water levels were high.
WQ-VC-UMN	Yes	Channel was open and ice free. Water levels were close to bankfull elevations and turbidity levels were moderate (20.2 NTU).
WQ-MN	Yes	Water was flowing on surface of overflow ice in a well-defined channel. Ice still remains within actual channel to the substrate (Photo 8).
WQ-VC-R	Yes	Samples were collected 100 m downstream of the road crossing at the winter sampling location. Water course was mostly open on downstream side of culvert. Overflow ice remains on upstream side of culvert where water is

Site	Sampled? (Yes/No)	Notes / Explanations
		flowing over top of ice surface and through riparian vegetation.
WQ-PW	Yes	Bacteriological and drinking water samples collected from discharge line. Bacteriological sample not be submitted for analysis at YG Environmental Health Services due to receiving office closure. All other sample bottles were submitted to ALS.
WQ-PC-U	Yes	Sampled from regular location where channel enters small pond. Pond had thin layer of ice present.
WQ-PC-D	Yes	Channel open and flowing with small amounts of ice along the margins of the channel (Photo 10).
WQ-ADIT-SEEP	Yes	Water seeping through rocks and into Pony Creek upstream of the WQ-PC-D site.
WQ-MS-08	No	Standing water with no flow apparent. Not suitable for sampling at this time.
WQ-MS-03	Yes	Some ice still remaining in portions of channel. But sufficient flow for sampling.
Quality Assurance/Quality Control Samples		
Field Replicate A	Yes	Collected from WQ-VC-DBC
Field Replicate B	No	Collected from WQ-SEEP
Field Blank	Yes	Field blank samples prepared with laboratory-supplied de-ionized water on site.
Trip Blank	Yes	Samples provided by lab and were transported to and from site

3. Trip Photographs

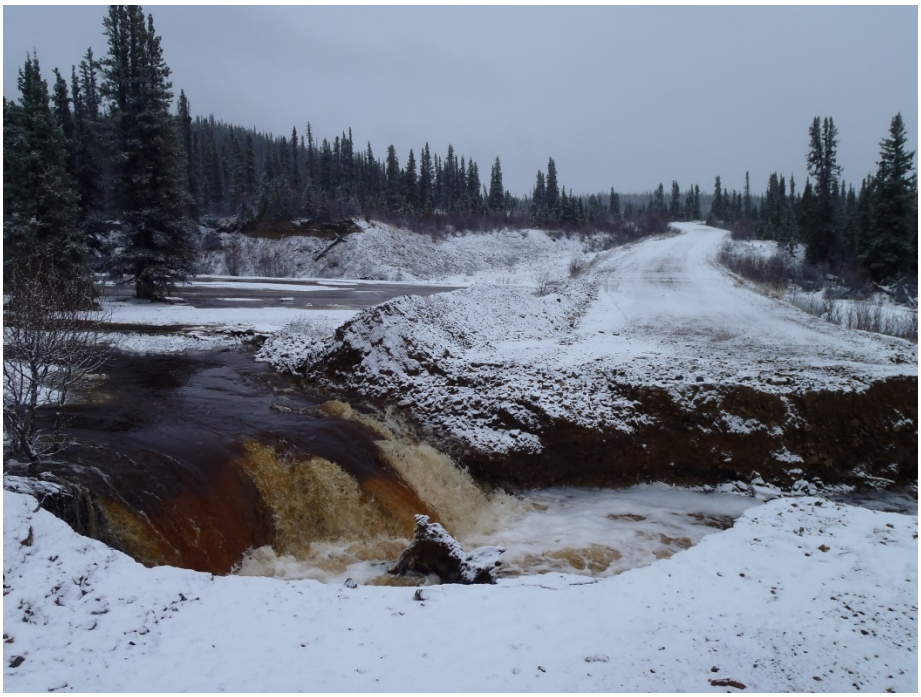

Photo 1. Victoria Creek washout, viewed looking east.

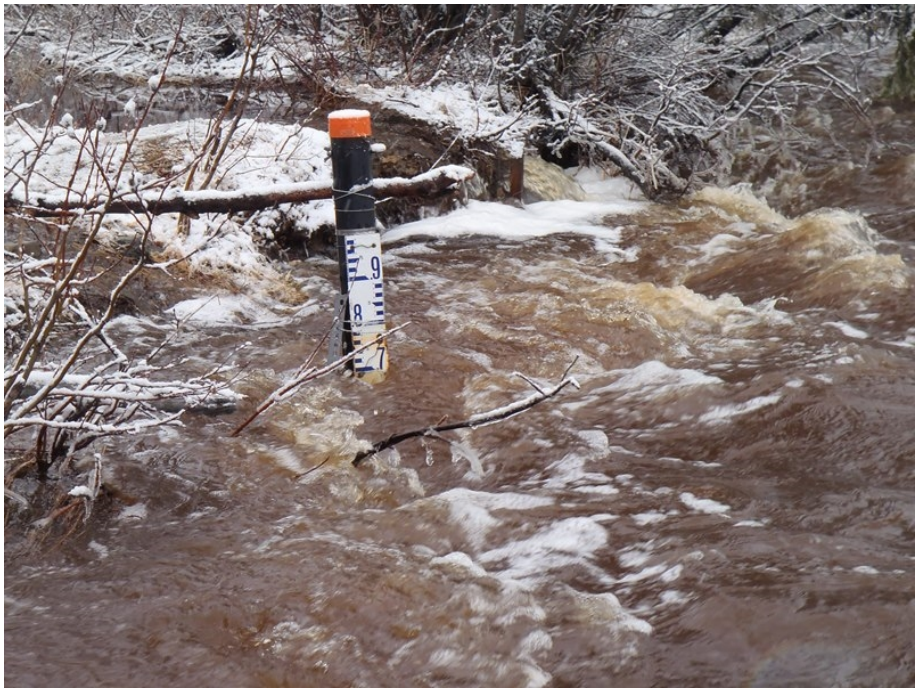

Photo 2. H-VC-R stilling well and right, downstream bank,

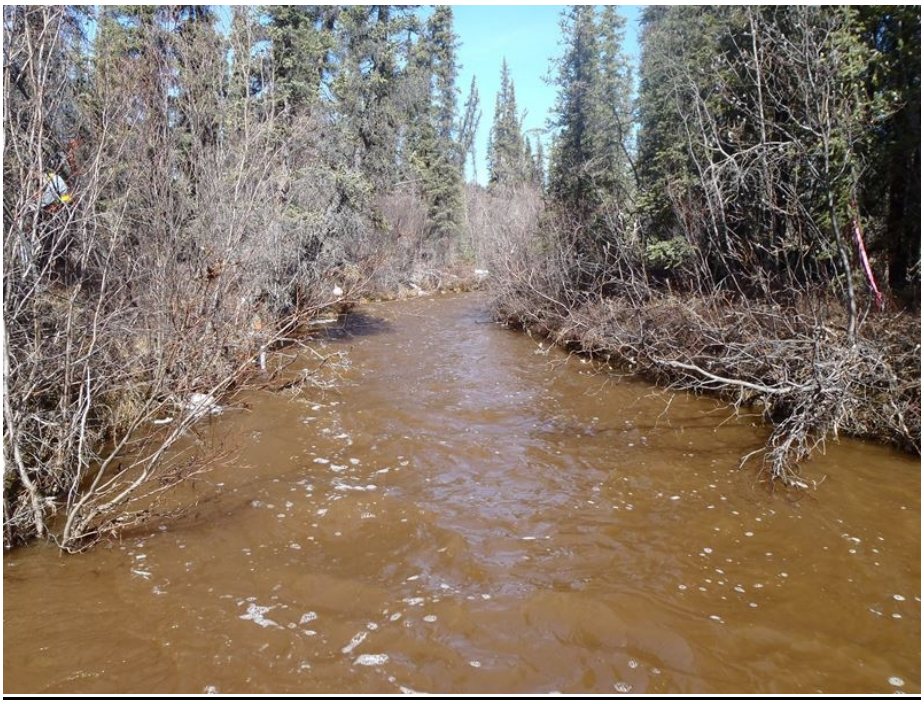

Photo 3. H-VC-DBC station looking upstream. Near bankfull and turbid conditions.

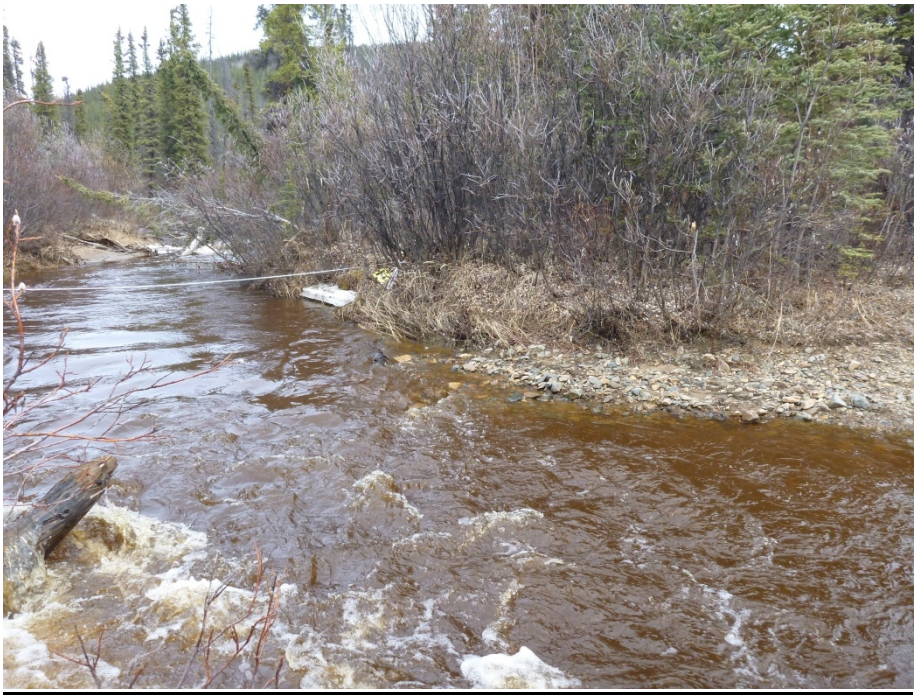

Photo 4. H/WQ-VC-REF looking upstream. Ice-free conditions and stage levels near bankfull.

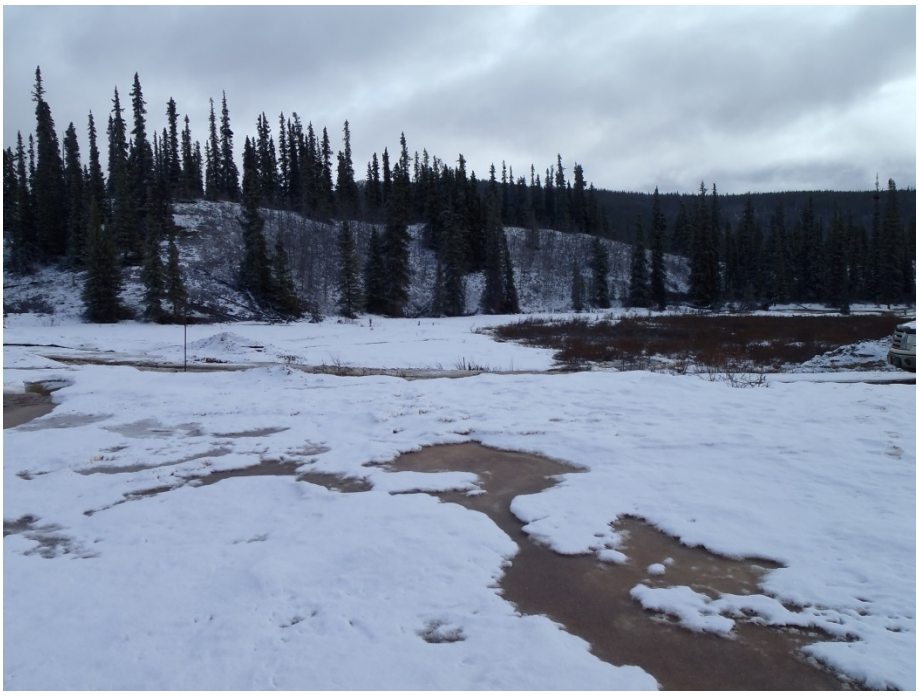

Photo 5. WQ-DC-R site looking downstream towards Nansen access road. Small quantities of water flowing through snow and ice.

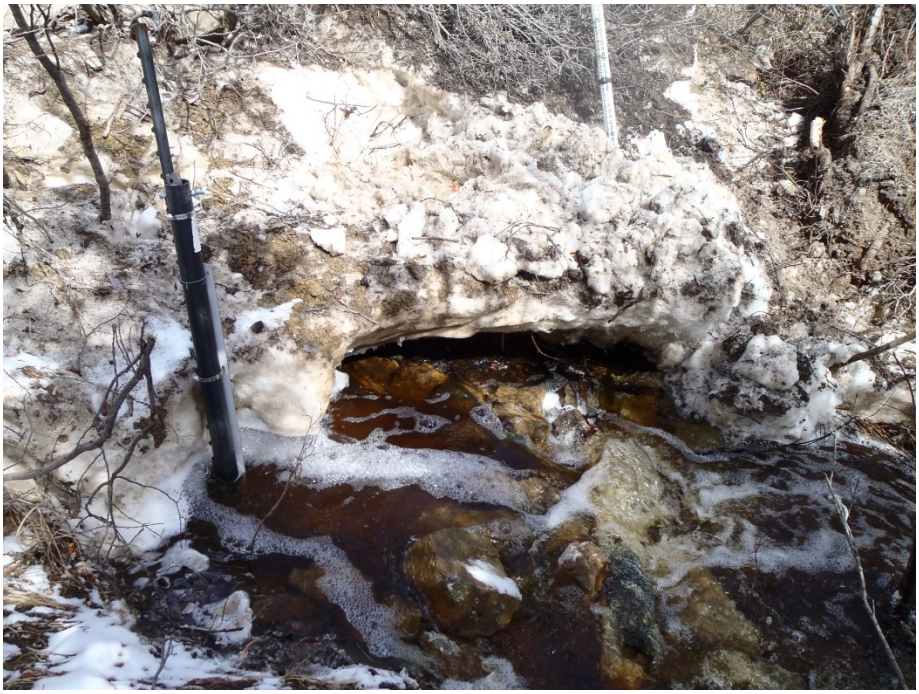

Photo 6. The H-PC-DSP station left bank and stilling well. Snow and ice along ditch below culvert at left. Open water flowing downstream of stilling well.

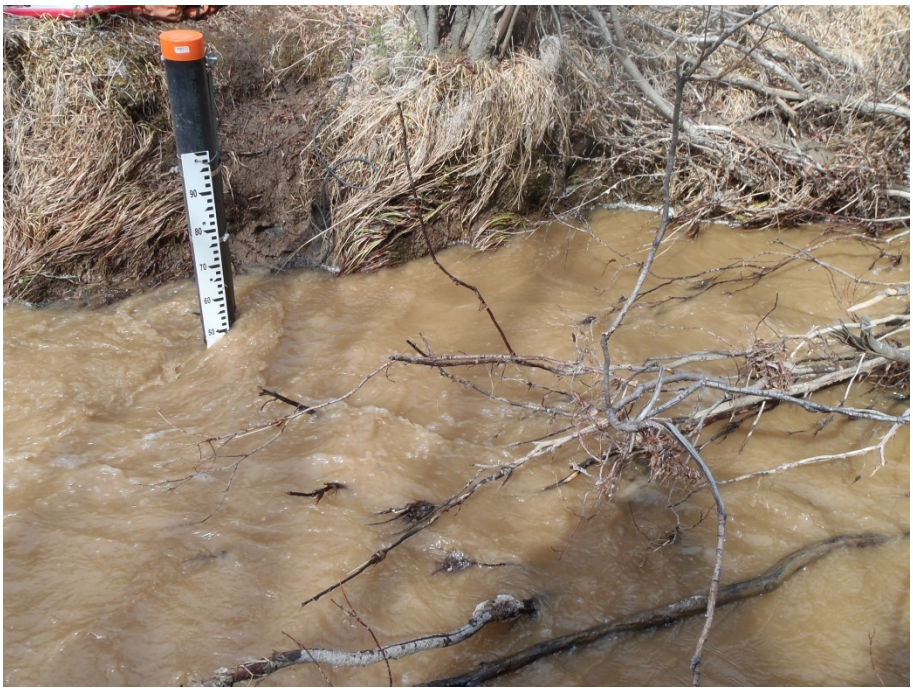

Photo 7. H/WQ-BC **stilling well and** right, downstream bank**. Ice-free, turbid and near bankfull stage apparent.**

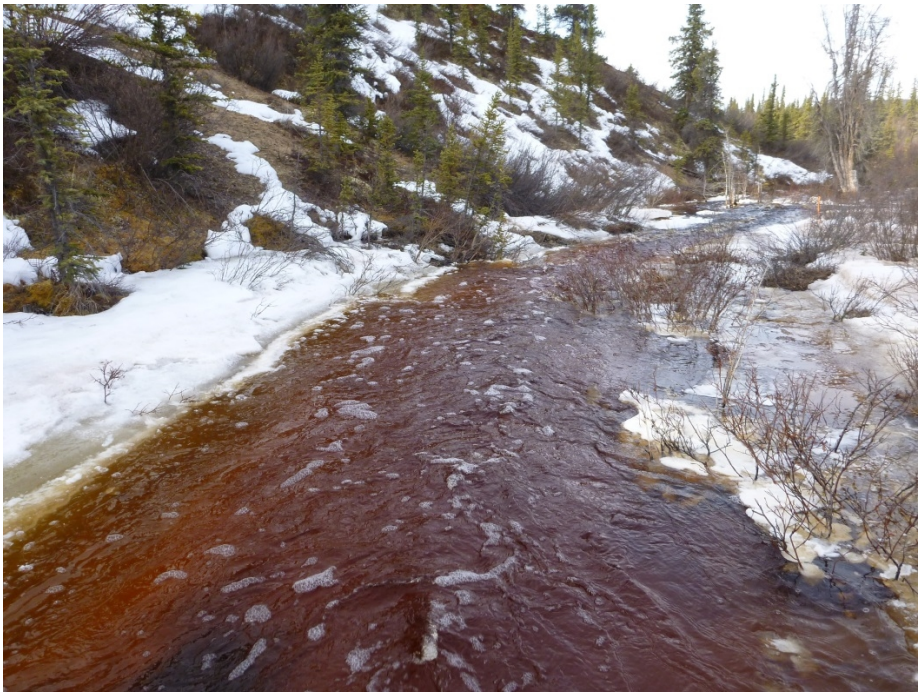

Photo 8. H/WQ-MN viewed downstream with well-defined channel incising overflow ice frozen to substrate.

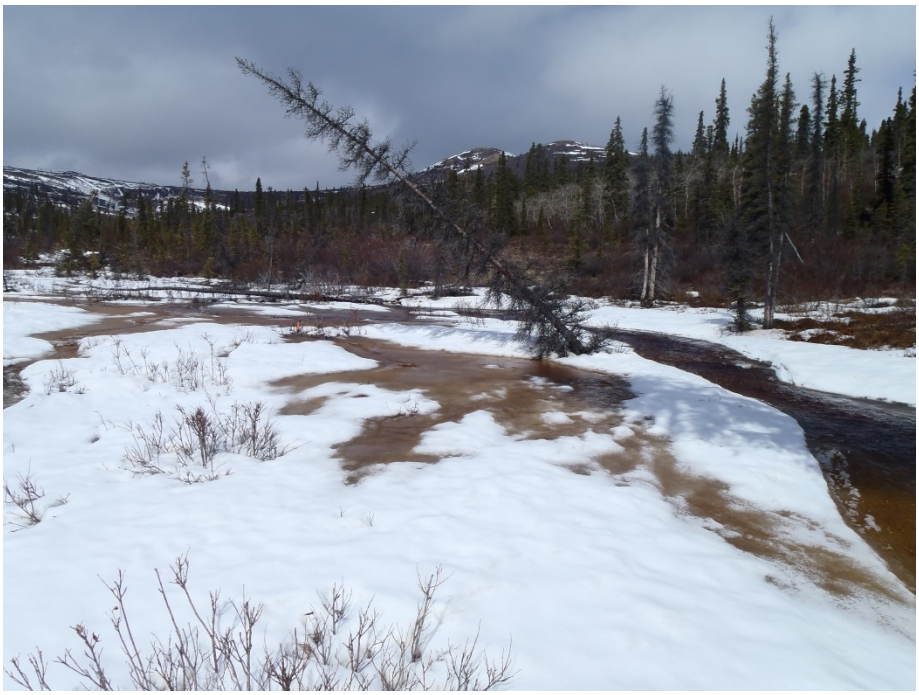

Photo 9. Dome Creek valley near H/WQ-DC-U2 looking upstream (west).

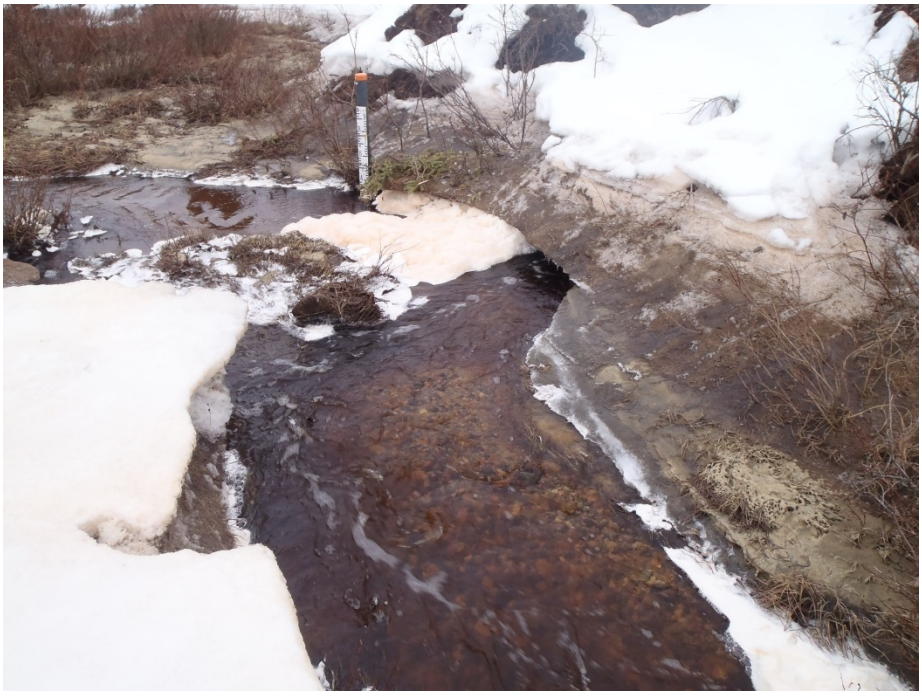

Photo 10. Open water conditions at H-DC-M and WQ-DC-U, viewed downstream.

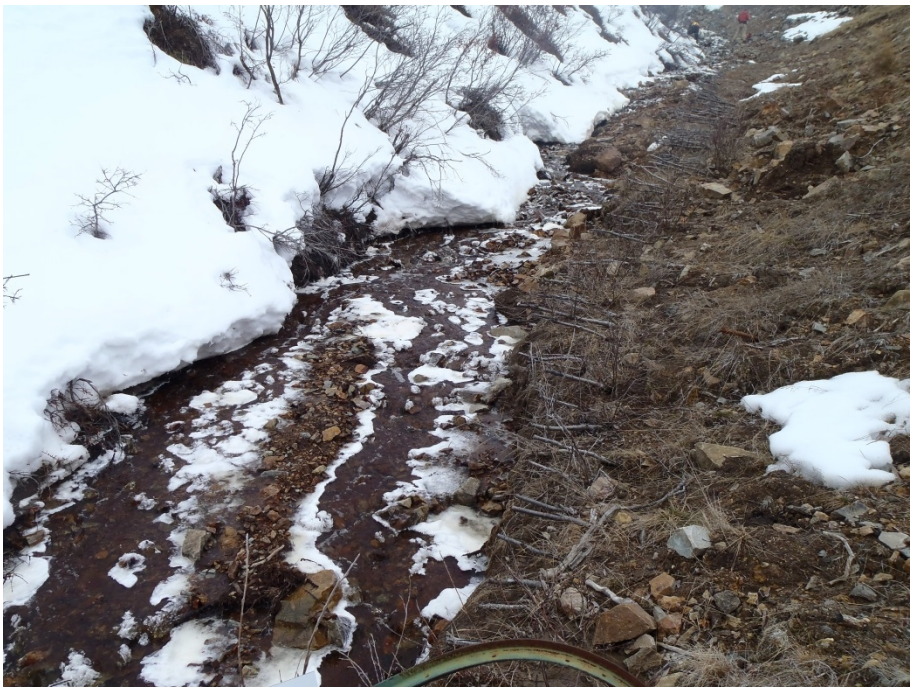

Photo 11. WQ-PC-D site looking upstream, showing mostly open water conditions.

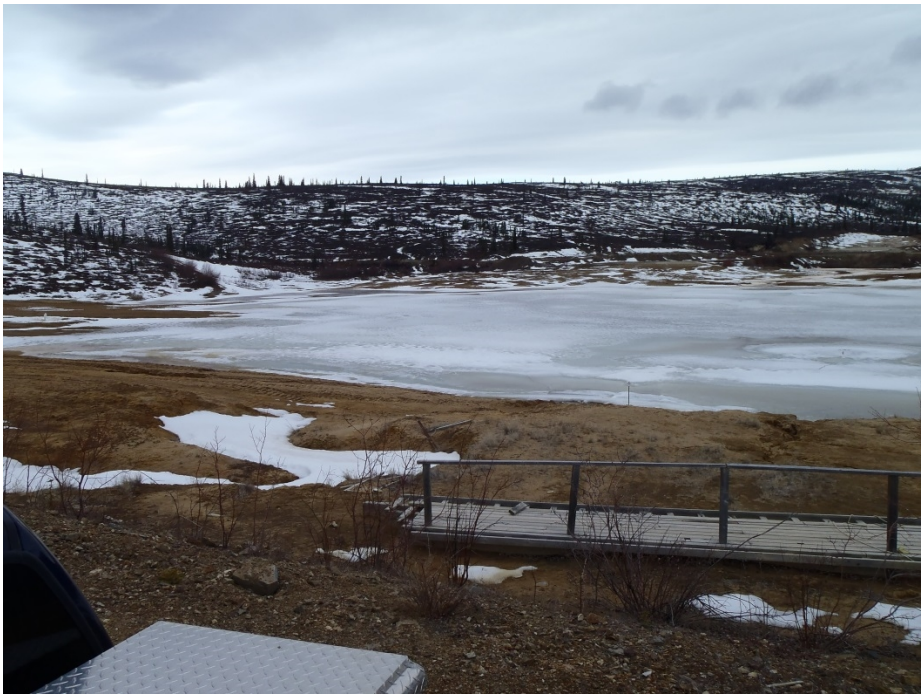

Photo 12. WQ-TP site still ice covered with open water along pond edges.

4. Additional Trip Information/Comments

Any changes to project scope (i.e. additional sites sampled):	None
Any alterations to sample scheduling:	The sampling schedule was delayed by two days due to limited access caused by road washouts. Helicopter transport was required for access to the mine site. Due to field work delays, water quality samples were returned to Whitehorse on Friday May 17, 2013. YG Environmental Health Services office does not accept microbiological samples on Fridays in order to meet sample holding times. Therefore, the biological sample collected at the pump house well (WQ-PW) on May 17, 2013 could not be submitted for analysis by YG Environmental Health Services.
Any events resulting in changes to budget:	Helicopter access required for the monitoring trip was arranged by AAM and will not be reflected in the EDI contract budget. Additional time was encountered during site access attempts on May 13, 2013.
Additional Comments:	None
Wildlife Sightings:	Several Ptarmigan.
Site concerns including safety concerns	None
Any additional notes/concerns	None

Appendix A:

Water Quality Parameter Guideline Exceedances – May 6-8, 2013

Table A-1. Water Quality Parameter Guideline Exceedances; May 7, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-001 WQ-VC-UMN 05/07/2013	0167-130507-003 WQ-VC-DBC 05/07/2013	0167-130507-007 WQ-VC-REF 05/07/2013	0167-130507-002 WQ-VC-U 05/07/2013	0167-130507-008 WQ-PC-U 05/07/2013	0167-130507-010 WQ-DC-U 05/07/2013	0167-130507-012 WQ-TP 05/07/2013
Temperature (in-situ)	°C	-	-	-	0	0	0	0	0	0	0.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	486.9	211.5	207	207.6	265.9	1594	2190
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.95	7.22	7.28	7.2	7.27	8	6.74
Turbidity (in-situ)	NTU	-	-	-	2.46	3.1	1.52	1.63	157	25.7	26.1
Colour, True	CU	15	-	5							
Conductivity	µS/cm	-	-	2	478	211	211	205	259	1550	1990
Hardness (as CaCO3)	mg/L	-	-	0.5	245	104	106	104	121	993	1290
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8	8	8.03	7.97	7.61	8.16	7.88
Total Suspended Solids	mg/L	-	50	3	<3.0	5.4	<3.0	4.6	38.2	15.7	17.7
Total Dissolved Solids	mg/L	-	-	10	325	127	128	125	204	1280	1690
Turbidity	NTU	-	-	0.1							
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	115	98.7	102	98.4	40.8	232	199
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	115	98.7	102	98.4	40.8	232	199
Ammonia, Total (as N)	mg/L	-	-	0.005	0.0962	<0.0050	<0.0050	<0.0050	<0.0050	0.122	1.2
Chloride (Cl)	mg/L	-	-	0.5	0.51	<0.50	<0.50	<0.50	1.01	<5.0	<10
Fluoride (F)	mg/L	0.12	-	0.02	0.039	0.035	0.034	0.032	0.03	<0.20	<0.40
Nitrate (as N)	mg/L	3	-	0.005	0.133	0.0827	0.079	0.0786	0.0573	<0.050	0.15
Nitrite (as N)	mg/L	0.06	-	0.001	0.0021	<0.0010	<0.0010	<0.0010	<0.0010	<0.010	<0.020
Sulfate (SO4)	mg/L	-	-	0.5	141	17.9	15.4	15.5	83.5	737	1090
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	0.2	0.66
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0527***	***0.105***	***0.054***	***0.0992***	***5.44***	***0.263***	***0.255***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00042	<0.00010	<0.00010	<0.00010	0.00202	0.00227	0.0545
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00423	0.00062	0.00045	0.00051	***0.0273***	***0.0103***	***0.318***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.074	0.0721	0.0698	0.0721	0.0921	0.0586	0.0281
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00020
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.126
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	***0.000119***	***0.000057***	***0.000031***	***0.000075***	***0.000575***	***0.000159***	***0.00417***
Calcium (Ca)-Total	mg/L	-	-	0.05	63.5	26.5	26.4	25.7	32.8	224	352
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.00015	0.00022	0.00016	0.00022	***0.00485***	0.00058	0.00063
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00046	0.00012	<0.00010	0.00011	0.00162	0.0009	0.00295
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00127	0.00127	0.0011	0.00126	***0.00824***	0.00144	***0.0277***
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.171	0.174	0.116	0.175	***5.66***	***2.28***	***1.76***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000163	0.000174	0.000072	0.000218	***0.0126***	***0.00191***	***0.00408***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00115	0.0009	0.00103	0.00087	0.00376	0.00542	0.0107
Magnesium (Mg)-Total	mg/L	-	-	0.1	21.7	9.75	10.1	9.86	9.62	98.4	76.7
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.316	0.0842	0.0537	0.0676	0.225	***1.28***	***5.61***

Table A-1. Water Quality Parameter Guideline Exceedances; May 7, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-001 WQ-VC-UMN 05/07/2013	0167-130507-003 WQ-VC-DBC 05/07/2013	0167-130507-007 WQ-VC-REF 05/07/2013	0167-130507-002 WQ-VC-U 05/07/2013	0167-130507-008 WQ-PC-U 05/07/2013	0167-130507-010 WQ-DC-U 05/07/2013	0167-130507-012 WQ-TP 05/07/2013
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.000453	0.000427	0.000413	0.000396	0.0004	0.000347	0.0043
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.0006	<0.00050	<0.00050	<0.00050	0.00316	0.00125	0.0045
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	0.139	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	2.36	1.5	1.34	1.43	5.59	4.99	19.8
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Silicon (Si)-Total	mg/L	-	-	0.05	5.44	5.34	5.26	5.31	11.9	7.02	4.61
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000301	0.00005	0.000105
Sodium (Na)-Total	mg/L	-	-	0.05	6.06	2.51	2.56	2.48	2.68	10.1	32.3
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.4	0.311	0.335	0.313	0.232	0.775	0.914
Sulfur (S)-Total	mg/L	-	-	0.5	49	6.48	5.68	5.5	27.2	247	364
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.00008	0.000012	0.000343
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00020
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	0.146	0.011	<0.020
Uranium (U)-Total	mg/L	-	-	0.00001	0.000959	0.000728	0.000765	0.000692	0.000407	0.00279	0.00179
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.011	0.0013	<0.0020
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0079	0.0033	<0.0030	0.0034	***0.0466***	0.0144	***0.519***
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0053***	***0.0093***	***0.0109***	***0.0102***	***0.0546***	0.0035	<0.0020
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00038	<0.00010	<0.00010	<0.00010	0.00031	0.00179	0.0533
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00369	0.00043	0.00035	0.00038	0.00345	0.00393	***0.0671***
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0744	0.073	0.0712	0.0699	0.0384	0.0525	0.0256
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.129
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	***0.000105***	***0.000044***	***0.000028***	***0.000035***	***0.000297***	***0.000059***	***0.00406***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	62.4	26	26	25.6	33.7	229	373
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00020
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00043	<0.00010	<0.00010	<0.00010	0.00013	0.00072	0.00278
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.0011	0.00103	0.001	0.00097	0.0017	0.00049	***0.0232***
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.04	0.041	0.049	0.043	0.105	0.215	0.049
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	0.000197	<0.000050	<0.00010
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00105	0.00081	0.00094	0.00086	<0.00050	0.00475	0.0109
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	21.6	9.56	9.94	9.82	8.99	102	82.3
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.303	0.0766	0.05	0.0583	0.127	1.23	5.81
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000432	0.000391	0.000373	0.000365	0.00009	0.000273	0.00439
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00083	0.0046
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	2.34	1.45	1.32	1.38	5.02	5.11	20.9
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.34	5.13	5.15	5.2	2.95	6.48	4.3

Table A-1. Water Quality Parameter Guideline Exceedances; May 7, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-001 WQ-VC-UMN 05/07/2013	0167-130507-003 WQ-VC-DBC 05/07/2013	0167-130507-007 WQ-VC-REF 05/07/2013	0167-130507-002 WQ-VC-U 05/07/2013	0167-130507-008 WQ-PC-U 05/07/2013	0167-130507-010 WQ-DC-U 05/07/2013	0167-130507-012 WQ-TP 05/07/2013
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	<0.000010	<0.000020
Sodium (Na)-Dissolved	mg/L	-	-	0.05	5.95	2.53	2.39	2.43	2.54	9.6	32.3
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.386	0.302	0.321	0.306	0.232	0.69	0.916
Sulfur (S)-Dissolved	mg/L	-	-	0.5	47.6	6.44	5.56	5.36	27.8	240	363
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000344
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.000918	0.000669	0.000698	0.000657	0.00026	0.00248	0.00179
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0072	0.0024	0.0027	0.0032	0.0106	0.0053	***0.52***

Applied Guidelines: **- Federal CCME Canadian Environmental Quality Guidelines (JUL, 2012), CCME: Freshwater Aquatic Life**

- Mount Nansen Effluent Discharge Standards

Color Key:
- Exceeds CCME Guideline
- Exceeds MN Effluent Discharge Standards
- Exceeds both CCME and MN Standards

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table A-1. Water Quality Parameter Guideline Exceedances; May 7, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-013 WQ-SEEP 05/07/2013	TRAVEL TRIP BLANK 05/07/2013	0167-130508-016 WQ-VC-R 05/08/2013	0167-130508-017 WQ-VC-R-r 05/08/2013	0167-130508-018 FIELD BLANK 05/08/2013	0167-130508-011 WQ-DC-DX+105-r 05/08/2013	0167-130508-005 WQ-DC-DX+105 05/08/2013
Temperature (in-situ)	°C	-	-	-	1.2	-	0	-	-	-	0.3
Specific Conductivity (in-situ)	µS/cm	-	-	-	1647	-	401.2	-	-	-	870.1
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.75	-	7.22	-	-	-	6.72
Turbidity (in-situ)	NTU	-	-	-	23.2	-	1.86	-	-	-	14.45
Colour, True	CU	15	-	5							
Conductivity	µS/cm	-	-	2	1590	<2.0	401	399	<2.0	856	847
Hardness (as CaCO3)	mg/L	-	-	0.5	884	-	205	210	<0.50	493	486
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.47	***5.97***	7.95	7.97	***5.73***	7.83	7.83
Total Suspended Solids	mg/L	-	50	3	33.1	<3.0	3.5	5.8	<3.0	8.2	6.8
Total Dissolved Solids	mg/L	-	-	10	1250	<10	276	267	<10	613	643
Turbidity	NTU	-	-	0.1							
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	246	1.2	107	105	1.5	196	195
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	246	1.2	107	105	1.5	196	195
Ammonia, Total (as N)	mg/L	-	-	0.005	4.63	0.0212	0.0458	0.0455	<0.0050	0.0179	0.0207
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	0.53	0.53	<0.50	<2.5	<2.5
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	<0.020	0.035	0.035	<0.020	<0.10	<0.10
Nitrate (as N)	mg/L	3	-	0.005	1.47	<0.0050	0.101	0.102	<0.0050	0.029	<0.025
Nitrite (as N)	mg/L	0.06	-	0.001	0.048	<0.0010	0.0014	<0.0010	<0.0010	<0.0050	<0.0050
Sulfate (SO4)	mg/L	-	-	0.5	716	<0.50	105	104	<0.50	300	294
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	0.0065	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	0.0414	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	0.51	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	3.36	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0343***	<0.0030	***0.0509***	***0.0602***	<0.0030	***0.26***	***0.344***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00087	<0.00010	0.00033	0.00034	<0.00010	0.0116	0.0111
Arsenic (As)-Total	mg/L	0.005	-	0.0001	***0.0507***	<0.00010	0.00354	0.00356	<0.00010	***0.0614***	***0.0634***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0553	<0.000050	0.0814	0.0796	<0.000050	0.0221	0.0226
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	0.09	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	***0.000655***	<0.000010	***0.000088***	***0.00009***	<0.000010	***0.00287***	***0.00299***
Calcium (Ca)-Total	mg/L	-	-	0.05	272	<0.050	53.3	54.2	<0.050	134	125
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.00053	<0.00010	0.00017	0.00019	<0.00010	0.00038	0.00043
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00871	<0.00010	0.00047	0.00043	<0.00010	0.00058	0.00061
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00517***	<0.00050	0.00145	0.00135	<0.00050	***0.00321***	***0.00322***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***12.7***	<0.010	0.242	0.255	<0.010	***0.959***	***0.996***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000337	<0.000050	0.000184	0.000193	<0.000050	***0.0156***	***0.015***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00122	<0.00050	0.00121	0.00114	<0.00050	0.00603	0.00558
Magnesium (Mg)-Total	mg/L	-	-	0.1	48.1	<0.10	17.2	17.6	<0.10	42.7	40.4
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***6.26***	<0.000050	0.293	0.287	<0.000050	***1.06***	***1.02***

Table A-1. Water Quality Parameter Guideline Exceedances; May 7, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-013 WQ-SEEP 05/07/2013	TRAVEL TRIP BLANK 05/07/2013	0167-130508-016 WQ-VC-R 05/08/2013	0167-130508-017 WQ-VC-R-r 05/08/2013	0167-130508-018 FIELD BLANK 05/08/2013	0167-130508-011 WQ-DC-DX+105-r 05/08/2013	0167-130508-005 WQ-DC-DX+105 05/08/2013
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.00107	<0.000050	0.000455	0.000444	<0.000050	0.000401	0.000375
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00249	<0.00050	0.00068	0.00061	<0.00050	0.00165	0.00161
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	7.3	<0.10	2.04	2.09	<0.10	4.81	4.5
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00022	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	7.12	<0.050	5.33	5.44	<0.050	5.98	5.81
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000044	<0.000010	0.000237	0.000024	<0.000010	0.000249	0.000241
Sodium (Na)-Total	mg/L	-	-	0.05	46.3	<0.050	4.9	4.71	<0.050	4.42	4.26
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.783	<0.00020	0.356	0.355	<0.00020	0.307	0.285
Sulfur (S)-Total	mg/L	-	-	0.5	244	<0.50	37.2	36.8	<0.50	104	99.1
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	0.000081	0.000076
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011
Uranium (U)-Total	mg/L	-	-	0.00001	0.0024	<0.000010	0.000884	0.000913	<0.000010	0.00296	0.00272
Vanadium (V)-Total	mg/L	-	-	0.001	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0013
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0086	<0.0030	0.0072	0.007	<0.0030	***0.558***	***0.548***
Dissolved Metals Filtration Location		-	-	n/a	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0078***	-	***0.0073***	***0.007***	<0.0010	***0.0057***	***0.006***
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00077	-	0.00032	0.0003	<0.00010	0.00878	0.00863
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.029***	-	0.00312	0.00319	<0.00010	***0.0361***	***0.0359***
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0518	-	0.0794	0.0787	<0.000050	0.0186	0.0192
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	0.081	-	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	***0.00043***	-	***0.000085***	***0.000088***	<0.000010	***0.000887***	***0.000888***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	273	-	53.6	54.8	<0.050	128	126
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00031	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00833	-	0.00042	0.00041	<0.00010	0.00047	0.00048
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00169	-	0.00134	0.00121	0.00046	0.00172	0.00164
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	***10.4***	-	0.108	0.108	<0.010	***0.369***	***0.368***
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	-	<0.000050	<0.000050	0.000082	0.000358	0.000345
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00083	-	0.00114	0.00111	<0.00050	0.00567	0.00554
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	48.9	-	17.3	17.7	<0.10	42.3	41.9
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	6.06	-	0.282	0.285	<0.000050	0.995	0.988
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.001	-	0.000409	0.000391	<0.000050	0.000344	0.00034
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	0.00233	-	0.00061	0.00059	<0.00050	0.0021	0.00137
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	7.36	-	2.06	2.1	<0.10	4.52	4.49
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00017	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.99	-	5.28	5.39	<0.050	5.35	5.29

Table A-1. Water Quality Parameter Guideline Exceedances; May 7, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-013 WQ-SEEP 05/07/2013	TRAVEL TRIP BLANK 05/07/2013	0167-130508-016 WQ-VC-R 05/08/2013	0167-130508-017 WQ-VC-R-r 05/08/2013	0167-130508-018 FIELD BLANK 05/08/2013	0167-130508-011 WQ-DC-DX+105-r 05/08/2013	0167-130508-005 WQ-DC-DX+105 05/08/2013
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	-	<0.000010	<0.000010	<0.000010	0.000015	0.00002
Sodium (Na)-Dissolved	mg/L	-	-	0.05	44.4	-	4.79	4.83	<0.050	4.34	4.1
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.732	-	0.35	0.346	<0.00020	0.291	0.283
Sulfur (S)-Dissolved	mg/L	-	-	0.5	228	-	36.8	37.2	<0.50	96.6	96.6
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	-	<0.000010	<0.000010	<0.000010	0.000053	0.000059
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.00232	-	0.000849	0.000854	<0.000010	0.00279	0.00274
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0079	-	0.0071	0.0076	<0.0010	***0.541***	***0.534***

Applied Guidelines: **- Federal CCME Canadian Environmental Quality Guidelines (JUL, 2012), CCME: Freshwater Aquatic Life**

- Mount Nansen Effluent Discharge Standards

Color Key:
- Exceeds CCME Guideline
- Exceeds MN Effluent Discharge Standards
- Exceeds both CCME and MN Standards

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Appendix B:

ALS Analytical Report

ENVIRONMENTAL DYNAMICS INC.
ATTN: Lyndsay Doetzel
2195 - 2nd Ave
Whitehorse YT Y1A 3T8

Date Received: 08-MAY-13
Report Date: 21-MAY-13 15:37 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1299017

Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 13-Y-0167
C of C Numbers: 1, 2, 3
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-1	L1299017-2	L1299017-3	L1299017-4	L1299017-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13
	Sampled Time	10:04	13:20	16:05	13:40	17:25
	Client ID	0167-130507-001	0167-130507-003	0167-130507-007	0167-130507-002	0167-130507-008
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	478	211	211	205	259
	Hardness (as CaCO3) (mg/L)	245	104	106	104	121
	pH (pH)	8.00	8.00	8.03	7.97	7.61
	Total Suspended Solids (mg/L)	<3.0	5.4	<3.0	4.6	38.2
	Total Dissolved Solids (mg/L)	325	127	128	125	204
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	115	98.7	102	98.4	40.8
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	115	98.7	102	98.4	40.8
	Ammonia, Total (as N) (mg/L)	0.0962	<0.0050	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	0.51	<0.50	<0.50	<0.50	1.01
	Fluoride (F) (mg/L)	0.039	0.035	0.034	0.032	0.030
	Nitrate (as N) (mg/L)	0.133	0.0827	0.0790	0.0786	0.0573
	Nitrite (as N) (mg/L)	0.0021	<0.0010	<0.0010	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	141	17.9	15.4	15.5	83.5
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0527	0.105	0.0540	0.0992	5.44
	Antimony (Sb)-Total (mg/L)	0.00042	<0.00010	<0.00010	<0.00010	0.00202
	Arsenic (As)-Total (mg/L)	0.00423	0.00062	0.00045	0.00051	0.0273
	Barium (Ba)-Total (mg/L)	0.0740	0.0721	0.0698	0.0721	0.0921
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000119	0.000057	0.000031	0.000075	0.000575
	Calcium (Ca)-Total (mg/L)	63.5	26.5	26.4	25.7	32.8
	Chromium (Cr)-Total (mg/L)	0.00015	0.00022	0.00016	0.00022	0.00485
	Cobalt (Co)-Total (mg/L)	0.00046	0.00012	<0.00010	0.00011	0.00162
	Copper (Cu)-Total (mg/L)	0.00127	0.00127	0.00110	0.00126	0.00824
	Iron (Fe)-Total (mg/L)	0.171	0.174	0.116	0.175	5.66
	Lead (Pb)-Total (mg/L)	0.000163	0.000174	0.000072	0.000218	0.0126
	Lithium (Li)-Total (mg/L)	0.00115	0.00090	0.00103	0.00087	0.00376
	Magnesium (Mg)-Total (mg/L)	21.7	9.75	10.1	9.86	9.62
	Manganese (Mn)-Total (mg/L)	0.316	0.0842	0.0537	0.0676	0.225
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-6	L1299017-7	L1299017-8	L1299017-9	L1299017-10
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13	08-MAY-13
	Sampled Time	14:10	17:20	14:45	12:00	08:50
	Client ID	0167-130507-010	0167-130507-012	0167-130507-013	ALS TRAVEL BLANK	0167-130508-016
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1550	1990	1590	<2.0	401
	Hardness (as CaCO3) (mg/L)	993	1290	884		205
	pH (pH)	8.16	7.88	7.47	5.97	7.95
	Total Suspended Solids (mg/L)	15.7	17.7	33.1	<3.0	3.5
	Total Dissolved Solids (mg/L)	1280	1690	1250	<10	276
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	232	199	246	1.2	107
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	232	199	246	1.2	107
	Ammonia, Total (as N) (mg/L)	0.122	1.20	4.63	0.0212	0.0458
	Chloride (Cl) (mg/L)	<5.0 DLA	<10 DLA	<5.0 DLA	<0.50	0.53
	Fluoride (F) (mg/L)	<0.20 DLA	<0.40 DLA	<0.20 DLA	<0.020	0.035
	Nitrate (as N) (mg/L)	<0.050 DLA	0.15	1.47	<0.0050	0.101
	Nitrite (as N) (mg/L)	<0.010 DLA	<0.020 DLA	0.048	<0.0010	0.0014
	Sulfate (SO4) (mg/L)	737	1090	716	<0.50	105
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	0.0065	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	0.0414	<0.0050	<0.0050
	Cyanate (mg/L)	0.20	0.66	0.51	<0.20	<0.20
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	3.36	<0.50 PEHT	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.263	0.255	0.0343	<0.0030	0.0509
	Antimony (Sb)-Total (mg/L)	0.00227	0.0545	0.00087	<0.00010	0.00033
	Arsenic (As)-Total (mg/L)	0.0103	0.318	0.0507	<0.00010	0.00354
	Barium (Ba)-Total (mg/L)	0.0586	0.0281	0.0553	<0.000050	0.0814
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00020 DLA	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.0010 DLA	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	0.014	0.126	0.090	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000159	0.00417	0.000655	<0.000010	0.000088
	Calcium (Ca)-Total (mg/L)	224	352	272	<0.050	53.3
	Chromium (Cr)-Total (mg/L)	0.00058	0.00063	0.00053	<0.00010	0.00017
	Cobalt (Co)-Total (mg/L)	0.00090	0.00295	0.00871	<0.00010	0.00047
	Copper (Cu)-Total (mg/L)	0.00144	0.0277	0.00517	<0.00050	0.00145
	Iron (Fe)-Total (mg/L)	2.28	1.76	12.7	<0.010	0.242
	Lead (Pb)-Total (mg/L)	0.00191	0.00408	0.000337	<0.000050	0.000184
	Lithium (Li)-Total (mg/L)	0.00542	0.0107	0.00122	<0.00050	0.00121
	Magnesium (Mg)-Total (mg/L)	98.4	76.7	48.1	<0.10	17.2
	Manganese (Mn)-Total (mg/L)	1.28	5.61	6.26	<0.000050	0.293
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-11	L1299017-12	L1299017-13	L1299017-14	
	Description	Water	Water	Water	Water	
	Sampled Date	08-MAY-13	08-MAY-13	08-MAY-13	08-MAY-13	
	Sampled Time	08:50	09:15	08:40	08:40	
	Client ID	0167-130508-017	0167-130508-018	0167-130508-011	0167-130508-005	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	399	<2.0	856	847	
	Hardness (as CaCO3) (mg/L)	210	<0.50	493	486	
	pH (pH)	7.97	5.73	7.83	7.83	
	Total Suspended Solids (mg/L)	5.8	<3.0	8.2	6.8	
	Total Dissolved Solids (mg/L)	267	<10	613	643	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	105	1.5	196	195	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	105	1.5	196	195	
	Ammonia, Total (as N) (mg/L)	0.0455	<0.0050	0.0179	0.0207	
	Chloride (Cl) (mg/L)	0.53	<0.50	<2.5 DLA	<2.5 DLA	
	Fluoride (F) (mg/L)	0.035	<0.020	<0.10 DLA	<0.10 DLA	
	Nitrate (as N) (mg/L)	0.102	<0.0050	0.029	<0.025 DLA	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0050 DLA	<0.0050 DLA	
	Sulfate (SO4) (mg/L)	104	<0.50	300	294	
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0602	<0.0030	0.260	0.344	
	Antimony (Sb)-Total (mg/L)	0.00034	<0.00010	0.0116	0.0111	
	Arsenic (As)-Total (mg/L)	0.00356	<0.00010	0.0614	0.0634	
	Barium (Ba)-Total (mg/L)	0.0796	<0.000050	0.0221	0.0226	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000090	<0.000010	0.00287	0.00299	
	Calcium (Ca)-Total (mg/L)	54.2	<0.050	134	125	
	Chromium (Cr)-Total (mg/L)	0.00019	<0.00010	0.00038	0.00043	
	Cobalt (Co)-Total (mg/L)	0.00043	<0.00010	0.00058	0.00061	
	Copper (Cu)-Total (mg/L)	0.00135	<0.00050	0.00321	0.00322	
	Iron (Fe)-Total (mg/L)	0.255	<0.010	0.959	0.996	
	Lead (Pb)-Total (mg/L)	0.000193	<0.000050	0.0156	0.0150	
	Lithium (Li)-Total (mg/L)	0.00114	<0.00050	0.00603	0.00558	
	Magnesium (Mg)-Total (mg/L)	17.6	<0.10	42.7	40.4	
	Manganese (Mn)-Total (mg/L)	0.287	<0.000050	1.06	1.02	
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-1	L1299017-2	L1299017-3	L1299017-4	L1299017-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13
	Sampled Time	10:04	13:20	16:05	13:40	17:25
	Client ID	0167-130507-001	0167-130507-003	0167-130507-007	0167-130507-002	0167-130507-008
Grouping	**Analyte**					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	0.000453	0.000427	0.000413	0.000396	0.000400
	Nickel (Ni)-Total (mg/L)	0.00060	<0.00050	<0.00050	<0.00050	0.00316
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	0.139
	Potassium (K)-Total (mg/L)	2.36	1.50	1.34	1.43	5.59
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	5.44	5.34	5.26	5.31	11.9
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000301
	Sodium (Na)-Total (mg/L)	6.06	2.51	2.56	2.48	2.68
	Strontium (Sr)-Total (mg/L)	0.400	0.311	0.335	0.313	0.232
	Sulfur (S)-Total (mg/L)	49.0	6.48	5.68	5.50	27.2
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000080
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00011
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	0.146
	Uranium (U)-Total (mg/L)	0.000959	0.000728	0.000765	0.000692	0.000407
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0110
	Zinc (Zn)-Total (mg/L)	0.0079	0.0033	<0.0030	0.0034	0.0466
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0053	0.0093	0.0109	0.0102	0.0546
	Antimony (Sb)-Dissolved (mg/L)	0.00038	<0.00010	<0.00010	<0.00010	0.00031
	Arsenic (As)-Dissolved (mg/L)	0.00369	0.00043	0.00035	0.00038	0.00345
	Barium (Ba)-Dissolved (mg/L)	0.0744	0.0730	0.0712	0.0699	0.0384
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000105	0.000044	0.000028	0.000035	0.000297
	Calcium (Ca)-Dissolved (mg/L)	62.4	26.0	26.0	25.6	33.7
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
	Cobalt (Co)-Dissolved (mg/L)	0.00043	<0.00010	<0.00010	<0.00010	0.00013
	Copper (Cu)-Dissolved (mg/L)	0.00110	0.00103	0.00100	0.00097	0.00170
	Iron (Fe)-Dissolved (mg/L)	0.040	0.041	0.049	0.043	0.105
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000197
	Lithium (Li)-Dissolved (mg/L)	0.00105	0.00081	0.00094	0.00086	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	21.6	9.56	9.94	9.82	8.99
	Manganese (Mn)-Dissolved (mg/L)	0.303	0.0766	0.0500	0.0583	0.127
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000432	0.000391	0.000373	0.000365	0.000090
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1299017-6 Water 07-MAY-13 14:10 0167-130507-010	L1299017-7 Water 07-MAY-13 17:20 0167-130507-012	L1299017-8 Water 07-MAY-13 14:45 0167-130507-013	L1299017-9 Water 07-MAY-13 12:00 ALS TRAVEL BLANK	L1299017-10 Water 08-MAY-13 08:50 0167-130508-016
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	0.000347	0.00430	0.00107	<0.000050	0.000455
	Nickel (Ni)-Total (mg/L)	0.00125	0.0045	0.00249	<0.00050	0.00068
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	4.99	19.8	7.30	<0.10	2.04
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00020 DLA	0.00022	<0.00010	0.00011
	Silicon (Si)-Total (mg/L)	7.02	4.61	7.12	<0.050	5.33
	Silver (Ag)-Total (mg/L)	0.000050	0.000105	0.000044	<0.000010	0.000237
	Sodium (Na)-Total (mg/L)	10.1	32.3	46.3	<0.050	4.90
	Strontium (Sr)-Total (mg/L)	0.775	0.914	0.783	<0.00020	0.356
	Sulfur (S)-Total (mg/L)	247	364	244	<0.50	37.2
	Thallium (Tl)-Total (mg/L)	0.000012	0.000343	0.000013	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00020 DLA	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.011	<0.020 DLA	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00279	0.00179	0.00240	<0.000010	0.000884
	Vanadium (V)-Total (mg/L)	0.0013	<0.0020 DLA	0.0018	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0144	0.519	0.0086	<0.0030	0.0072
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0035	<0.0020 DLA	0.0078		0.0073
	Antimony (Sb)-Dissolved (mg/L)	0.00179	0.0533	0.00077		0.00032
	Arsenic (As)-Dissolved (mg/L)	0.00393	0.0671	0.0290		0.00312
	Barium (Ba)-Dissolved (mg/L)	0.0525	0.0256	0.0518		0.0794
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00010		<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.0010 DLA	<0.00050		<0.00050
	Boron (B)-Dissolved (mg/L)	0.012	0.129	0.081		<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000059	0.00406	0.000430		0.000085
	Calcium (Ca)-Dissolved (mg/L)	229	373	273		53.6
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	0.00031		<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00072	0.00278	0.00833		0.00042
	Copper (Cu)-Dissolved (mg/L)	0.00049	0.0232	0.00169		0.00134
	Iron (Fe)-Dissolved (mg/L)	0.215	0.049	10.4		0.108
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.000050		<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.00475	0.0109	0.00083		0.00114
	Magnesium (Mg)-Dissolved (mg/L)	102	82.3	48.9		17.3
	Manganese (Mn)-Dissolved (mg/L)	1.23	5.81	6.06		0.282
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000273	0.00439	0.00100		0.000409
	Nickel (Ni)-Dissolved (mg/L)	0.00083	0.0046	0.00233		0.00061

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-11	L1299017-12	L1299017-13	L1299017-14	
	Description	Water	Water	Water	Water	
	Sampled Date	08-MAY-13	08-MAY-13	08-MAY-13	08-MAY-13	
	Sampled Time	08:50	09:15	08:40	08:40	
	Client ID	0167-130508-017	0167-130508-018	0167-130508-011	0167-130508-005	
Grouping	**Analyte**					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	0.000444	<0.000050	0.000401	0.000375	
	Nickel (Ni)-Total (mg/L)	0.00061	<0.00050	0.00165	0.00161	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	2.09	<0.10	4.81	4.50	
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Silicon (Si)-Total (mg/L)	5.44	<0.050	5.98	5.81	
	Silver (Ag)-Total (mg/L)	0.000024	<0.000010	0.000249	0.000241	
	Sodium (Na)-Total (mg/L)	4.71	<0.050	4.42	4.26	
	Strontium (Sr)-Total (mg/L)	0.355	<0.00020	0.307	0.285	
	Sulfur (S)-Total (mg/L)	36.8	<0.50	104	99.1	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	0.000081	0.000076	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	0.011	
	Uranium (U)-Total (mg/L)	0.000913	<0.000010	0.00296	0.00272	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	0.0011	0.0013	
	Zinc (Zn)-Total (mg/L)	0.0070	<0.0030	0.558	0.548	
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0070	<0.0010	0.0057	0.0060	
	Antimony (Sb)-Dissolved (mg/L)	0.00030	<0.00010	0.00878	0.00863	
	Arsenic (As)-Dissolved (mg/L)	0.00319	<0.00010	0.0361	0.0359	
	Barium (Ba)-Dissolved (mg/L)	0.0787	<0.000050	0.0186	0.0192	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.000088	<0.000010	0.000887	0.000888	
	Calcium (Ca)-Dissolved (mg/L)	54.8	<0.050	128	126	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	0.00041	<0.00010	0.00047	0.00048	
	Copper (Cu)-Dissolved (mg/L)	0.00121	0.00046 RRV	0.00172	0.00164	
	Iron (Fe)-Dissolved (mg/L)	0.108	<0.010	0.369	0.368	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000082 RRV	0.000358	0.000345	
	Lithium (Li)-Dissolved (mg/L)	0.00111	<0.00050	0.00567	0.00554	
	Magnesium (Mg)-Dissolved (mg/L)	17.7	<0.10	42.3	41.9	
	Manganese (Mn)-Dissolved (mg/L)	0.285	<0.000050	0.995	0.988	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000391	<0.000050	0.000344	0.000340	
	Nickel (Ni)-Dissolved (mg/L)	0.00059	<0.00050	0.00210	0.00137	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-1	L1299017-2	L1299017-3	L1299017-4	L1299017-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13
	Sampled Time	10:04	13:20	16:05	13:40	17:25
	Client ID	0167-130507-001	0167-130507-003	0167-130507-007	0167-130507-002	0167-130507-008
Grouping	**Analyte**					
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	2.34	1.45	1.32	1.38	5.02
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	5.34	5.13	5.15	5.20	2.95
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000025
	Sodium (Na)-Dissolved (mg/L)	5.95	2.53	2.39	2.43	2.54
	Strontium (Sr)-Dissolved (mg/L)	0.386	0.302	0.321	0.306	0.232
	Sulfur (S)-Dissolved (mg/L)	47.6	6.44	5.56	5.36	27.8
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000918	0.000669	0.000698	0.000657	0.000260
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0072	0.0024	0.0027	0.0032	0.0106

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-6	L1299017-7	L1299017-8	L1299017-9	L1299017-10
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-MAY-13	07-MAY-13	07-MAY-13	07-MAY-13	08-MAY-13
	Sampled Time	14:10	17:20	14:45	12:00	08:50
	Client ID	0167-130507-010	0167-130507-012	0167-130507-013	ALS TRAVEL BLANK	0167-130508-016
Grouping	**Analyte**					
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050		<0.050
	Potassium (K)-Dissolved (mg/L)	5.11	20.9	7.36		2.06
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	0.00017		<0.00010
	Silicon (Si)-Dissolved (mg/L)	6.48	4.30	6.99		5.28
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000010		<0.000010
	Sodium (Na)-Dissolved (mg/L)	9.60	32.3	44.4		4.79
	Strontium (Sr)-Dissolved (mg/L)	0.690	0.916	0.732		0.350
	Sulfur (S)-Dissolved (mg/L)	240	363	228		36.8
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000344	<0.000010		<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.020 DLA	<0.010		<0.010
	Uranium (U)-Dissolved (mg/L)	0.00248	0.00179	0.00232		0.000849
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0020 DLA	<0.0010		<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0053	0.520	0.0079		0.0071

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1299017-11	L1299017-12	L1299017-13	L1299017-14	
	Description	Water	Water	Water	Water	
	Sampled Date	08-MAY-13	08-MAY-13	08-MAY-13	08-MAY-13	
	Sampled Time	08:50	09:15	08:40	08:40	
	Client ID	0167-130508-017	0167-130508-018	0167-130508-011	0167-130508-005	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	2.10	<0.10	4.52	4.49	
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Silicon (Si)-Dissolved (mg/L)	5.39	<0.050	5.35	5.29	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	0.000015	0.000020	
	Sodium (Na)-Dissolved (mg/L)	4.83	<0.050	4.34	4.10	
	Strontium (Sr)-Dissolved (mg/L)	0.346	<0.00020	0.291	0.283	
	Sulfur (S)-Dissolved (mg/L)	37.2	<0.50	96.6	96.6	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000053	0.000059	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.000854	<0.000010	0.00279	0.00274	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0076	<0.0010	0.541	0.534	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Cadmium (Cd)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Lead (Pb)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Total	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Total	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Total	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Total	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Boron (B)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1299017-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19,

Reference Information

Dionex 2003.

ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

ANIONS-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

CN-CNO-WT	Water	Cyanate	APHA 4500-CN-L
CN-SCN-VA	Water	Thiocyanate by Colour	APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method.

CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method

Reference Information

6020A).

MET-TOT-LOW-ICP-VA	Water	Total Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

It is recommended that this analysis be conducted in the field.

PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

It is recommended that this analysis be conducted in the field.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA	Water	Dissolved Sulfur in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA	Water	Total Sulfur in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Reference Information

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2 3

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____ Page ____ of ____

ALS Environmental

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	EDI	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Lyndsay Doetzel	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	2195 - 2nd Ave	Email 1: ldoetzel@edynamics.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Y1A 3T8	Email 2:	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-393-4882 Fax:	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #: Mount Nansen 13-Y-0167	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38399	
Lab Work Order # (lab use only)		ALS Contact:	Sampler: MM,LG,MK,DS

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA	ANIONS-ALL-IC-WR	CN-CNO-WT (P)	CN-SCN-VA (P)	CN-T-CFA-VA (P)	CN-WAD-CFA-VA (P)	EC-MAN-WR,PH-MAN-WR	MET-D-BCMDG-A (F/P)	MET-T-BCMDG-VA (P)	NH3-F-VA (P)	TDS-VA,TSS-VA		Number of Containers
	0167-130508 - 0167-130507-001	07~~08~~-May-13	10:04	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 0167-130507-003	07~~08~~-May-13	13:20	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 0167-130507-007	07~~08~~-May-13	16:05	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 0167-130507-002	07~~08~~-May-13	13:40	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 0167_130507-008	07~~08~~-May-13	17:25	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 -	~~08-May-13~~		~~Water~~	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 -	08-May-13		Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 -																

Special Instructions / Regulations with water or land use (eg. CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

L1299017-COFC

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: Meghan Marjanovic	Date (dd-mmm-yy) 08-MAY-13 ~~8-May-13 09:00~~	Time (hh-mm)	Received by:	Date: 8-MAY-13	Time: 14:40	Temperature: 9.8, 9.2, 5.2 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

GENF 18.01 Front

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC #

ALS Environmental

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	EDI	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Lyndsay Doetzel	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	2195 - 2nd Ave	Email 1: ldoetzel@edynamics.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Y1A 3T8	Email 2:	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-393-4882 Fax:	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #: Mount Nansen 13-Y-0167	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38399	
Lab Work Order # (lab use only)		ALS Contact:	Sampler: MM,~~LG~~,MK,DS BS

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA	ANIONS-ALL-IC-WR	CN-CNO-WT (P)	CN-SCN-VA (P)	CN-T-CFA-VA (P)	CN-WAD-CFA-VA (P)	EC-MAN-WR,PH-MAN-WR	MET-D-BCMDG-A (F/P)	MET-T-BCMDG-VA (P)	NH3-F-VA (P)	TDS-VA,TSS-VA		Number of Containers
	0167-130507 - 010	07-May-13	14:10	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130507 - 012	07-May-13	17:20	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130507 - 013	07-May-13	14:45	Water	X	X	X	X	X	X	X	X	X	X	X		6
	~~0167-130507~~ - ALS TRAVEL BLANK	~~07-May-13~~		Water	X	X	X	X	X	X	X	X	X	X	X		6
	~~0167-130507~~	~~07-May-13~~		Water	X	X	X	X	X	X	X	X	X	X	X		6
	~~0167-130507~~	~~07-May-13~~		Water	X	X	X	X	X	X	X	X	X	X	X		6
	~~0167-130507~~	~~07-May-13~~		Water	X	X	X	X	X	X	X	X	X	X	X		6
	~~010~~																

L1299017-COFC

nd use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Meghan Marjanovic	9-May-13	09-00				°C				

GENF 18.01 Front

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # ______

ALS Environmental

Report To
Company: EDI
Contact: Lyndsay Doetzel
Address: 2195 - 2nd Ave
Y1A 3T8
Phone: 867-393-4882 Fax:
Invoice To: Same as Report ? ☑ Yes ☐ No
Hardcopy of Invoice with Report? ☐ Yes ☐ No
Company:
Contact:
Address:
Phone: Fax:

Report Format / Distribution
☑ Standard ☐ Other
☑ PDF ☑ Excel ☐ Digital ☐ Fax
Email 1: ldoetzel@edynamics.com
Email 2:
Email 3:

Client / Project Information
Job #: Mount Nansen 13-Y-0167
PO / AFE:
LSD:
Quote #: Q38399
ALS Contact:
Sampler: MM,~~LC~~,MK,DS BS

Service Requested (Rush for routine analysis subject to availability)
◉ Regular (Standard Turnaround Times - Business Days)
○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request
Please indicate below Filtered, Preserved or both (F, P, F/P)

Lab Work Order # (lab use only)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA	ANIONS-ALL-IC-WR	CN-CNO-WT	CN-SCN-VA	CN-T-CFA-VA	CN-WAD-CFA-VA	EC-MAN-WR,PH-MAN-WR	MET-D-BCMDG-A	MET-T-BCMDG-VA	NH3-F-VA	TDS-VA,TSS-VA		Number of Containers
							P	P	P	P		F/P	P	P			
	0167-130508 - 016	08-May-13	08:50	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 017	08-May-13	08:50	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 018	08-May-13	09:15	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 0[illegible]	08-May-13	08:40	Water	X	X	X	X	X	X	X	X	X	X	X		6
	0167-130508 - 005	08-May-13	08:40	Water	X	X	X	X	X	X	X	X	X	X	X		6
	~~0167-130508 -~~	~~08-May-13~~		~~Water~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~6~~
	~~0167-130508 -~~	08-May-13		~~Water~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~6~~

L1299017-COFC

Special In[...]

ME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: Meghan Marjanovic	Date (dd-mmm-yy) 08-MAY-13 ~~8-May-13~~	Time (hh-mm) ~~09:00~~	Received by:	Date:	Time:	Temperature: °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

Appendix C:

YG Bacteriological Results

Yukon

Health and Social Services
Santé et Affaires sociales
Environmental Health Services
Service d'hygiène du millieu

BACTERIOLOGICAL ANALYSIS OF DRINKING WATER
ANALYSE BACTÉRIOLOGIQUE DE L'EAU POTABLE

#2 Hospital Road, Whitehorse, Yukon Y1A 3H8
phone : (867) 667-8391 fax : (867) 667-8322
Toll free: 1-800-661-0408 ext.8391

2 Hospital Road, Whitehorse (Yukon) Y1A 3H8
Tél. : 867-667-8391 Téléc. : 867-667-8322
Sans frais au Yukon : 1-800-661-0408, poste 8391

Contact Information · *Coordonnées de la personne ressource*

Contact Person / *Personne ressource*: Lyndsay Doetzel
Phone / *Téléphone*: 867-393-4882
Mailing address / *Adresse postale*: 2195 - 2nd Ave
Fax / *Télécopieur*: 867-393-4883
Whitehorse, YT
Postal code / *Code postal*: Y1A 3T8
First Nation, Municipal or Business Name / *Nom de la Première nation, de la municipalité ou de l'entreprise*:
Agent / *Agent*: EDI Environmental Dynamics Inc.
Fax / *Télécopieur*:

Sampling Location · *Lieu de la prise d'échantillon*

Municipal Address / *Adresse municipale*: Mount Nansen
Subdivision / *Lotissement*:
Legal Description Lot / *Désignation officielle Lot*:
Quad / *Quadrilatère*:
Plan no. / *Plan n°*:
Other Information (e.g., Location, Business / Building Name) / *Autres renseignements (ex. : emplacement, nom de l'entreprise, nom de l'édifice)*:

Sample Collection / *Prélèvement de l'échantillon*

Sample Collected By / *Échantillon prélevé par*: Meighan Kearns
Date / *Date*: 13/05/08 (YY/MM/DD · *AA/MM/JJ*)
Time / *Heure*: 09:30 (am / pm)
Sampling Site (e.g., kitchen tap) / *Point d'échantillonnage (ex. : robinet de cuisine)*: Pumphouse Well (WQ-PW)
Is this a Resample from a Previous Test? / *Est-ce un deuxième échantillon d'un test antérieur?* ☐ Yes / *Oui* ☐ No / *Non*
Previous Sample Number / *Numéro de l'échantillon précédent*:

Sample Supply / *Source d'approvisionnement en eau*

☒ Public Supply / *Municipal – par canalisation*
☐ Bulk Water Distributor / *Municipal – par camion*
☐ Business / *Privé – entreprise*
☐ Private Residence / *Privé – résidence*

Sample Source / *Provenance de l'échantillon*

☐ Dug Well / *Puits creusé*
☐ Driven Well / *Puits tubulaire*
☒ Drilled Well / *Puits foré à la sondeuse*
Depth of Well / *Profondeur du puits*:
☐ Water Holding Tank / *Réservoir d'eau*
☐ Other (explain) / *Autre (précisez)*:

Water Treatment / *Traitement de l'eau*

Is the Water Chlorinated? / *L'eau contient-elle du chlore?* ☐ Yes / *Oui* ☒ No / *Non*
Free Available Chlorine / *Chlore libre disponible*: ppm / *mg/L*
Other Treatment Systems (e.g., UV, softener, filter) / *Autre dispositif de traitement (ex. : désinfection aux rayons UV, adoucisseur d'eau, filtre)*: N/A

For Laboratory Use Only / *À l'usage du laboratoire seulement*

Receipt of Sample / ***Réception de l'échantillon***: Date / *Date*: 13-05-08 (YY/MM/DD · *AA/MM/JJ*) Time / *Heure*: 250 (am / pm) By / *Par*: SS
Condition of Sample / ***État de l'échantillon***: ☑ Satisfactory / *Satisfaisant* ☐ Unsatisfactory / *Non satisfaisant* Details / *Précisez*: 8.4°C
Incubation / ***Incubation***: Date / *Date*: 13-05-08 (YY/MM/DD · *AA/MM/JJ*) Time / *Heure*: 410 (am / pm) By / *Par*: SS Incubator / *Incubateur*: 4
Analysis Completed / ***Analyse terminée***: Date / *Date*: 13-05-09 (YY/MM/DD · *AA/MM/JJ*) Time / *Heure*: 430 (am / pm) By / *Par*: SS

Results (See Reverse Side for Interpretation) per 100 ml / *Résultats (Voir au verso l'interprétation des résultats)*

Total Coliforms/*Coliformes totaux*	E. coli/*E. coli*
☐ Present / *Présence* ☒ Absent / *Absence*	☐ Present / *Présence* ☒ Absent / *Absence*

Comments / *Commentaires*

Report Authorized By / *Rapport autorisé par*: SS
Position / *Poste*: WLT
Date / *Date*: 13-05-0[illegible] (YY/MM/DD · *AA/MM*)

Distribution: / *Distribution :*
White - Chain of Custody / *Blanc - Chaîne de possession*
Yellow - Lab Copy / *Jaune - Laboratoire*
Pink - Client Copy / *Rose - Client*

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Sample Number / ***Numéro de l'échantillon***: 606