

November 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: November 12-14, 2013

Trip Dates:	November 12-14, 2013
EDI Field Staff:	Dawn Hansen, Danny Skookum, Joel MacFabe
Tasks:	Hydrology and Water Quality

Field Summary

EDI completed the surface water quality sampling and hydrometric monitoring at the Mount Nansen Site from November 12 to November 14, 2013. Air temperatures during the trip ranged from -2°C to -28°C. Weather conditions were overcast or snowing with light, gusting winds. Ice had formed over the tailings pond (12 cm thick) and Brown McDade pit lake (37 cm thick), with ice cover also on most streams, however some only had ice along the margins of the streams. There was between 6 cm and 15 cm of snow on the ground during the site visit. Water levels across most of the sites/stations were low to moderate, however four creeks were frozen to substrate. EDI visited all regular water quality sites and hydrometric stations for the sampling period.

Each section below details additional site- and station-specific information for the Hydrology (Section 1) and Water Quality (Section 2) programs. Included in the Water Quality section are appendices of water quality parameters that exceeded guidelines and/or the Mount Nansen Effluent Quality Standards, ALS Lab Analysis Reports, and YG Environmental Health Services bacteriological analysis results for the previous trip (October 15-17, 2013). Section 3 contains relevant photos of field conditions. Section 4 details additional monitoring program comments, noteworthy observations, and any changes to budget or scope moving forward.



1. Hydrology

All hydrometric stations were visited and station conditions documented. Stream discharge measurements were collected at each hydrometric station that was not frozen or dry using the cross-sectional velocity-area method (*i.e.* mid-section method), the volumetric method, and/or the salt tracer method using a salt slug injection.

Water levels at all stations were typical of the early winter period, with discharges ranging from low to moderate. Due to air temperatures remaining below zero degrees ice had formed over most of the streams, which were also snow covered. Some streams are not entirely covered in ice and have ice along the shore as well as snow up to the water's edge, such as some sites on Victoria Creek. Overflow ice ('aufeis') was beginning to form at several stations on Dome Creek (H-DC-D1b, H-DC-U1, H-DC-U2), making conditions unsuitable for discharge measurements. In general, ice thickness ranged from 1 cm to 20 cm across the Mount Nansen Site. Of note some stations had frozen to substrate and were dry during this trip, such as H-BC, H-PC-D, H-DC-B. Table 1 summarizes the hydrometric monitoring program measurements completed at each station and any additional relevant station details.

Table 1. Hydrometric program details.

Hydrology program dates:	November 12-14, 2013
Weather at time of monitoring:	Weather conditions were typically overcast and calm, with temperatures between -2°C to -28°C.

Station	Hydrometric Measurement Type	Notes & Comments
ATM-DC2/DC4	None	Both atmospheric barologgers were downloaded.
H-DC-DX	None	No hydrometric measurement taken, culvert frozen through with no flow, upstream of culvert water level too low and braiding through vegetation.
H-DC-DX+105	Salt Slug	Water levels moderate. Salt tracer method used to measure stream discharge. Shore ice along channel and snow.
H-DC-D1b	Salt Slug	Flow levels were low. Salt tracer discharge measurement taken. Sections of channel are snow and ice covered. Crew noted excavator activity upstream with the removal of the building on the upstream pond.
H-DC-U1	None	No salt slug performed due to unsuitable conditions for Q measurement. No channel, water flowing through ice and overflow ice forming. Channel comprised of snow and ice.
H-DC-U2	None	Salt slug attempted but unsuccessful due to unsuitable conditions with overflow ice. Water levels were low and channel was entirely covered in snow and layers of ice 20 centimeters thick.
H-DC-B	None	Channel frozen through and dry beneath. Channel covered in ice and snow. Crew noted signs of recent re-trenching in diversion (Photo 1).
H-DC-M	Salt Slug	Water level low, channel snow and ice (1-4cm thick) covered. Salt tracer used to estimate stream discharge. Logger downloaded.



Station	Hydrometric Measurement Type	Notes & Comments
H-DC-R	Salt Slug	Water level low. Salt tracer used to estimate stream discharge. Snow and ice covered channel with overflow beginning to form downstream.
H-VC-REF	Salt Slug	Flow levels low and water clear. Salt tracer used to estimate stream discharge. Channel snow and ice covered (Photo 2).
H-VC-U	Salt Slug	Water level moderate and clear. Discharge measurement completed using salt tracer. Logger downloaded and survey conducted. Ice cover on majority of the channel, however there are still open sections (Photo 3).
H-BC	None	No hydrometric measurement taken, channel frozen through and dry (Photo 4).
H-VC-DBC	ADV & Salt Slug	Water level moderate and water was clear. Mid-section method was the primary method used to measure discharge. Salt tracer was also used to measure discharge as a secondary method. Logger downloaded. Channel is snow and ice covered with some sections of water flowing above and below the ice.
H-VC-UMN	Salt Slug	Salt tracer used to measure discharge. Water level was moderate and turbidity was clear. Channel snow and ice covered with an open water section.
H-MN	Salt Slug	Salt tracer used to measure discharge. Water level was moderate and turbidity was light. Channel snow and ice covered (1-10cm).
H-VC-R	ADV	Water level low and water relatively clear. Mid-section method used to estimate discharge. Logger downloaded. Channel snow and ice covered with small open leads in thalweg. Water flowing above and below ice (Photo 5).
H-SEEP	Volumetric	A volumetric measurement was made at the pipe discharge. Flow rate and total volume was recorded from the flow meter. No staff gauge reading taken due to ice.
H-TP	None	Note full ice coverage at time of sampling. No staff gauge reading taken due to ice.
H-PC-U	Salt Slug	Very low and slow flow at station (almost frozen to substrate). Salt tracer was used to measure discharge. Channel snow and ice covered.
H-PC-DSP	None	No hydrometric measurement taken, channel frozen through and dry.

2. Water Quality

Water quality samples were collected from all monitoring sites with the exception of WQ-ADIT-SEEP, WQ-BC and WQ-PC-U due to zero flow. Water levels were moderate to low at all sites, with most creek sites having ice cover across the channel, while some remained with ice cover only on the margins. The pit lake had sufficient ice thickness to safely access the sampling location, and the regular samples were taken. Table 2 summarizes the water quality sampling conditions at each site.



All water quality samples were delivered to ALS on Thursday, November 14, 2013. Bacteriological samples collected from the pump house well were submitted to YG Environmental Health Services (EHS) on Thursday, November 14, 2013.

This memo includes analytical results from samples collected during the October 15-17, 2013 trip (Appendix A, C) as well as copies of the ALS Certificate of Analysis (Appendix B).

Table 2. Water quality sampling program details.

WQ Sampling dates:	November 13-14, 2013
Weather at time of sampling:	Weather conditions were typically overcast or snowing and calm with gusts of wind. Temperatures ranged between -2°C to -28°C during sampling.

Site	Sampled? (Yes/No)	Notes / Explanations
WQ-PIT1	Yes	Samples taken from surface. Water level was lower than usual with total depth of 6.5 meters (Photo 6). Dissolved oxygen (DO) 9.84 mg/L.
WQ-PIT2	Yes	Samples taken from 3 m depth (Photo 6). DO 9.09 mg/L.
WQ-PIT3	Yes	Samples taken from 6 m depth (Photo 6). DO 5.49 mg/L.
WQ-SEEP	Yes	Conditions normal for this time of year. Ice build-up around pipe and barrel at the site.
WQ-TP	Yes	Ice thickness 12 cm.
WQ-DC-DX	Yes	Water levels were very low and turbidity was high (59.8 NTU).
WQ-DC-DX+105	Yes	Water levels were moderate.
WQ-DC-D1b	Yes	Water levels were low and overflow ice was 12 cm thick with water flowing through. Excavator activity upstream with the removal of the building on the upstream pond. Suspect disturbed bed when cutting hole in ice, water did not clear up over time.
WQ-DC-U1	Yes	Water quality sample collected slightly upstream of regular site, due to more suitable sampling conditions. Overflow ice developing.
WQ-DC-U2	Yes	Water levels were low under cover of ice and snow (30 cm). Overflow ice developing.
WQ-DC-U	Yes	Water levels were low. Sample collected at regular location. Ice cover over whole channel.
WQ-DC-R	Yes	Water levels were low with multiple layers of overflow ice on top (25 cm). Turbidity was moderate (17.02 NTU).
WQ-VC-REF	Yes	Water levels were low. Whole site ice covered. Ice in layers (20 cm).
WQ-VC-U	Yes	Water levels were moderate. Area of open water just below sample site.
WQ-BC	No	Channel frozen to bed and dry. No sample collected (Photo 4).
WQ-VC-DBC	Yes	Water levels were moderate. Open water section upstream of sample site.
WQ-VC-UMN	Yes	Water levels were moderate. Water quality samples were collected within an open water section.
WQ-MN	Yes	Water levels were moderate and turbidity was light (11.95 NTU).



Site	Sampled? (Yes/No)	Notes / Explanations
WQ-VC-R	Yes	Water levels were low. No open water upstream of culvert at sampling location. Ice approximately 20 cm thick.
WQ-PW	Yes	Bacteriological sample and drinking water samples collected from discharge pipe.
WQ-PC-U	No	Channel frozen to bed and dry. No sample collected.
WQ-PC-D	Yes	Low flows present in creek, almost frozen to substrate. Sample was collected.
WQ-ADIT-SEEP	No	Seep was dry. No samples collected.
WQ-MS-S-03	Yes	Water levels were moderate. Channel snow covered with thin ice.
WQ-DRY	No	No sampling required at this time.
Quality Assurance/Quality Control Samples		
Field Replicate A	Yes	Collected from WQ-DC-R.
Field Replicate B	Yes	Collected from WQ-VC-DBC.
Field Blank	Yes	Samples prepared with lab-supplied de-ionized water at the site.
Trip Blank	Yes	Samples provided by lab and were transported to and from site.

3. Trip Photographs



Photo 1. H-DC-B Snow and ice covered as well as signs of recent re-trenching November 12, 2013.



Photo 2. H/WQ-VC-REF - snow and ice covered November 13, 2013, looking downstream.



Photo 3. H-VC-U - ice covered with open sections November 13, 2013, looking downstream.



Photo 4. H/WQ-BC Snow and ice covered channel with dry streambed below November 12, 2013.



Photo 5. H-VC-R (looking downstream) station showing ice across stream with open water at thalweg.



Photo 6. WQ-PIT ice and snow covered.

4. Additional Trip Information/Comments

Any changes to project scope (i.e. additional sites sampled):	None
Any alterations to sample scheduling:	No alterations to monitoring trip schedule
Any events resulting in changes to budget:	None
Additional Comments:	<p>Note: There has been a change in lab bottles and sampling processes based on the new mercury analysis requirements. This has resulted in three additional bottles added to all bottle sets for all sites, with one of the additional bottles requiring filtering. This has added a small amount of time and effort per site, which may add up in the long run. This will be noted for budget tracking purposes, but is not expected to have a large impact.</p>
Wildlife Sightings:	Red Fox (<i>Vulpes vulpes</i>) sighted on walk into Back Creek.
Site concerns including safety concerns:	None



Appendix A:
Water Quality Parameter Guideline Exceedances
October 15-17, 2013



Table A1. Water Quality Results for the October 16-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-131016-008	0167-131016-002	0167-131016-006	0167-131016-200	0167-131016-100	0167-131016-011	0167-131016-015	0167-131016-013	0167-131016-014	0167-131016-009	0167-131016-016	0167-131016-012
				WQ Site ID	WQ-VC-UMN	WQ-VC-R	WQ-MN	WQ-SEEP	WQ-DESS-01	WQ-PC-D	WQ-TP	WQ-VC-REF	WQ-DC-U2	WQ-DC-U	WQ-PC-U	WQ-DC-U1
				Date Sampled	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13
Temperature (in-situ)	°C	-	-	-	0.0	0.0	0.0	1.5	0.7	0.5	2.7	0.0	0.0	0.2	0.0	0.0
Specific Conductivity (in-situ)	µS/cm	-	-	-	241.3	216.6	75.5	17.1	626.9	357.0	1382.0	177.7	1213.0	1220.0	331.9	1295.0
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.12	6.72	6.29	6.99	7.66	7.51	7.88	7.41	7.38	7.56	7.18	7.48
Turbidity (In-situ)	NTU	-	-	-	1.49	2.20	13.91	52.50	11.30	0.87	6.75	2.51	12.64	28.20	0.20	0.87
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	232	206	79.8	1350	542	315	1150	179	913	904	320	948
Hardness (as CaCO3)	mg/L	-	-	0.5	128	113	38.3	1010	330	182	803	88.3	706	716	173	772
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.99	7.98	7.77	7.46	6.29	7.36	7.98	8	7.94	8.04	7.87	7.81
Total Suspended Solids	mg/L	-	50	3	<3.0	3.3	<3.0	20	126	<3.0	<3.0	8	62.7	28	3.3	<3.0
Total Dissolved Solids	mg/L	-	-	10	138	122	38.1	1400	432	219	1130	95.8	886	905	216	961
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	85.4	77.1	27.7	253	2.1	74.3	96.9	78.1	204	192	57.6	201
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	85.4	77.1	27.7	253	2.1	74.3	96.9	78.1	204	192	57.6	201
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0188	0.0206	0.0384	4.4	0.0138	<0.0050	0.107	0.0056	0.121	0.261	0.0088	0.0248
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.055	0.05	0.052	<0.20	0.039	0.055	0.3	0.05	<0.20	<0.20	0.046	<0.20
Nitrate (as N)	mg/L	13	-	0.005	0.131	0.12	0.0645	1.7	0.308	0.0862	0.13	0.119	0.182	0.236	0.0333	0.148
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	<0.0010	0.029	<0.0010	<0.0010	<0.010	<0.0010	<0.010	<0.010	0.001	<0.010
Sulfate (SO4)	mg/L	-	-	0.5	37.9	32.3	3.6	815	311	104	751	15	516	535	116	575
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	0.0058	<0.0050	<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	0.0462	0.0135	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<2.0	<0.20	<0.20	2.01	0.35	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	2.67	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0411	0.0536	0.144	0.0227	3.65	0.0273	0.0353	0.205	1.61	0.499	0.0192	0.0477
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00023	0.0002	0.00013	0.00058	0.00122	0.003	0.0435	0.00014	0.00353	0.00233	0.00043	0.00316
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00125	0.00131	0.00202	0.0504	0.0774	0.00543	0.179	0.00073	0.0159	0.0198	0.00123	0.00669
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0667	0.0643	0.0615	0.0717	0.115	0.0262	0.0108	0.0652	0.0699	0.0526	0.0477	0.026
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<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	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	0.077	<0.010	<0.010	0.106	<0.010	0.027	0.024	<0.010	0.033
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000028	0.000027	0.000033	0.00063	0.00402	0.0013	0.000769	0.000029	0.000162	0.000096	0.00002	0.000016
Calcium (Ca)-Total	mg/L	-	-	0.05	32.3	29.5	10.6	292	77.1	53.4	236	23.1	158	164	49.7	176
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00031	0.00069	0.00072	0.00056	0.00547	0.00028	0.00035	0.00059	0.00287	0.00126	0.00023	0.00031
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00017	0.00025	0.00092	0.00843	0.00282	<0.00010	0.00085	0.00023	0.00168	0.00083	<0.00010	0.00015
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00149	0.00162	0.00244	0.00535	0.00832	0.0109	0.0192	0.00164	0.00481	0.00251	0.00082	0.00107
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.186	0.392	1.87	11.8	15.1	0.049	0.433	0.423	3.94	3.29	0.084	0.545
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.000077	0.000064	0.000057	0.000084	0.00392	0.000764	0.00542	0.000314	0.00138	0.00162	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00076	0.00066	0.00074	0.00072	0.00269	0.00057	0.00806	<0.00050	0.00485	0.00281	<0.00050	0.00417
Magnesium (Mg)-Total	mg/L	-	-	0.1	10.3	9.38	2.78	67.7	31.8	11.9	51.2	7.84	71.8	67.1	11.6	84.3
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.108	0.114	0.227	5.83	0.283	0.0447	0.317	0.041	0.551	0.667	0.00881	0.0888
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.00006	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000398	0.000468	0.000244	0.00108	0.000698	0.000087	0.00186	0.000387	0.00032	0.000403	0.000065	0.000276
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	0.00068	0.00216	0.00305	0.0073	0.00065	0.00116	0.00061	0.0024	0.00156	<0.00050	0.00063
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	0.244	<0.050	<0.050	<0.050	0.13	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	0.71	0.68	0.62	6.62	0.76	0.61	14	0.59	3.2	2.87	0.4	3.47
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00012	0.00026	0.00041	0.00011	<0.00010	<0.00010	0.00011	0.00011	<0.00010	0.00013
Silicon (Si)-Total	mg/L	-	-	0.05	6.32	6.66	8.6	6.97	15.5	6.34	1.63	6.48	8.24	6.53	6.78	6.13
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	0.000034	0.000285	0.000027	0.00027	<0.000010	0.000025	0.000046	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	3.11	2.86	1.91	39.5	3.43	3.88	19.2	2.34	6.61	7.73	3.92	6.24
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.285	0.247	0.055	0.849	0.226	0.334	0.626	0.264	0.462	0.492	0.343	0.448
Sulfur (S)-Total	mg/L	-	-	0.5	13.4	11.6	1.55	281	100	35.2	237	5.27	159	163	38.9	190
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	0.000011	0.000119	<0.000010	0.000193	<0.000010	0.000032	0.000013	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.0003	<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	0.101	<0.010	<0.010	0.01	0.09	0.024	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000629	0.000547	0.000138	0.0037	0.000268	0.000288	0.00117	0.000578	0.00216	0.00204	0.000221	0.00218



Table A1. Water Quality Results for the October 16-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-131016-008	0167-131016-002	0167-131016-006	0167-131016-200	0167-131016-100	0167-131016-011	0167-131016-015	0167-131016-013	0167-131016-014	0167-131016-009	0167-131016-016	0167-131016-012
				WQ Site ID	WQ-VC-UMN	WQ-VC-R	WQ-MN	WQ-SEEP	WQ-DESS-01	WQ-PC-D	WQ-TP	WQ-VC-REF	WQ-DC-U2	WQ-DC-U	WQ-PC-U	WQ-DC-U1
				Date Sampled	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	0.0012	0.0018	0.0125	<0.0010	<0.0010	<0.0010	0.0058	0.0024	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030	<0.0030	0.004	0.0112	1.6	0.119	0.0804	0.0039	0.0538	0.0199	0.0038	0.0121
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.017	0.0284	0.1	0.0106	0.115	0.0138	0.0043	0.0211	0.0078	0.0118	0.0096	0.0216
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00019	0.00017	0.00012	0.00053	0.00018	0.00281	0.0424	<0.00010	0.00351	0.00216	0.00039	0.00313
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00091	0.00097	0.00164	0.0322	0.00063	0.00474	0.112	0.00033	0.00531	0.0118	0.0011	0.00562
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0643	0.0639	0.0588	0.0667	0.0228	0.0258	0.0101	0.06	0.0429	0.0464	0.0469	0.0246
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	0.068	<0.010	<0.010	0.094	<0.010	0.021	0.019	<0.010	0.024
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000024	0.000027	0.000024	0.000397	0.00304	0.00129	0.000588	0.000015	0.000045	0.00003	0.00019	0.00021
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	33.6	29.9	10.7	296	77.5	53.6	235	22.7	163	171	49.8	171
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00011	0.00015	0.00055	0.00031	0.00014	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	0.00012
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00015	0.00022	0.00084	0.00813	0.00041	<0.00010	0.00081	<0.00010	0.00036	0.00059	<0.00010	0.00013
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00118	0.00125	0.00201	0.00273	0.00169	0.0098	0.0146	0.00104	0.00048	0.00058	0.00052	0.0007
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.083	0.209	1.15	6.99	0.265	0.014	0.053	0.079	0.876	0.908	0.037	0.367
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000331	0.0005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00087	0.00075	0.00073	0.00052	0.001	0.00075	0.00801	<0.00050	0.00403	0.00281	<0.00050	0.00398
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	10.7	9.43	2.81	65.8	33.2	11.8	52.4	7.68	72.7	70.3	11.8	83.9
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.102	0.112	0.218	5.68	0.0569	0.0452	0.289	0.0275	0.422	0.676	0.00715	0.0833
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000348	0.000325	0.000221	0.000991	<0.000050	0.000077	0.00175	0.000321	0.000254	0.000345	<0.000050	0.000258
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	<0.00050	0.00068	0.00204	0.00283	0.00409	0.00062	0.001	<0.00050	0.00062	0.00079	<0.00050	0.00054
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.75	0.7	0.67	6.78	0.36	0.57	13.9	0.56	3.22	2.89	0.42	3.36
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00011	0.00027	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.43	6.61	8.59	6.89	9.93	6.25	1.49	5.94	5.88	5.79	6.79	5.82
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000028	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.98	2.83	1.88	38.7	6.04	3.68	18.3	2.21	6.49	8.09	3.81	5.95
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.255	0.237	0.0523	0.817	0.212	0.324	0.608	0.247	0.459	0.512	0.322	0.422
Sulfur (S)-Dissolved	mg/L	-	-	0.5	13.5	11.5	1.52	265	102	34.8	238	4.94	157	166	38.2	186
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	0.00001	<0.000010	<0.000010	0.000182	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000572	0.000518	0.000122	0.00351	0.000011	0.000274	0.00111	0.000509	0.002	0.00206	0.000199	0.00206
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0022	0.0013	0.0023	0.0089	1.51	0.116	0.0578	<0.0010	0.0331	0.0093	0.0022	0.0097



Table A1. Water Quality Results for the October 16-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-131016-018	0167-131016-021	0167-131016-004	0167-131016-019	0167-131016-005	0167-131016-007	0167-131016-003	0167-131016-010	0167-131017-024	0167-131017-023	0167-131017-TRAVEL-BLANK
				WQ Site ID	WQ-DC-D1b	WQ-DC-DX	WQ-BC	WQ-MS-03	WQ-VC-DBC	WQ-VC-UMN-r	WQ-DC-R	WQ-CD-DX+105	WQ-VC-U	WQ-VC-U-r	TRAVEL BLANK
				Date Sampled	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	17-OCT-13	17-OCT-13
Temperature (in-situ)	°C	-	-	-	0.0	0.8	0.0	0.7	0.1	0.0	0.0	0.6	0.0	0.0	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	1633.0	570.3	327.2	1213.0	193.5	241.3	1163.0	1193.0	185.6	185.6	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.73	7.56	7.64	7.24	6.88	7.12	6.41	7.00	6.61	6.61	-
Turbidity (In-situ)	NTU	-	-	-	5.97	1.21	3.24	0.84	1.54	1.49	24.90	1.47	0.66	0.66	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1250	468	290	896	189	224	855	890	177	175	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	965	278	161	716	96.1	118	668	719	93.7	93.8	<0.50
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.16	7.89	8.04	7.74	8.01	7.97	7.96	7.48	8.03	7.99	5.84
Total Suspended Solids	mg/L	-	50	3	6	<3.0	<3.0	6	<3.0	<3.0	13.3	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	1220	350	191	875	105	133	838	857	97.4	99.5	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	279	96.5	99.5	275	80.3	83.7	162	274	75.3	79.4	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	279	96.5	99.5	275	80.3	83.7	162	274	75.3	79.4	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.115	0.019	0.0117	0.0541	<0.0050	0.0235	0.92	0.0274	<0.0050	<0.0050	0.0093
Chloride (Cl)	mg/L	120	-	0.5	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.057	0.075	0.24	0.053	0.055	<0.20	0.27	0.053	0.051	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.167	0.07	0.066	<0.050	0.112	0.131	0.504	<0.050	0.124	0.121	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.0010	<0.0010	<0.010	<0.0010	<0.0010	0.016	<0.010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	720	186	68.6	452	19.9	37.8	489	435	16.5	16.1	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<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	0.0073	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<2.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.141	0.0216	0.0502	0.0159	0.0491	0.0382	0.111	0.0042	0.165	0.0379	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0139	0.00118	0.00024	0.0136	0.00012	0.0002	0.00155	0.0117	0.00011	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0261	0.00287	0.00248	0.089	0.00057	0.00122	0.0228	0.0331	0.00058	0.00036	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0222	0.056	0.0594	0.0191	0.0657	0.0656	0.0576	0.0121	0.0684	0.0647	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	0.047	<0.010	<0.010	<0.010	<0.010	<0.010	0.026	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.00129	0.000014	0.000105	0.00231	0.000032	0.000025	0.000091	0.00375	0.000025	0.000038	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	227	77.6	46.8	190	25.3	31.1	164	184	24.9	24.3	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.0004	0.00017	0.00023	<0.00010	0.00018	0.00018	0.00058	<0.00010	0.00029	0.00021	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00031	0.00021	0.00027	0.0011	0.00013	0.00015	0.0019	0.00052	0.00018	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00169	0.00097	0.00163	0.00103	0.00132	0.00131	0.00153	<0.00050	0.00163	0.00136	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.958	0.327	0.22	2.59	0.154	0.177	3.7	0.27	0.33	0.138	<0.010
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00551	<0.000050	0.000207	0.000587	0.000061	0.000059	0.000307	<0.000050	0.000231	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00804	<0.00050	0.00085	0.00886	<0.00050	<0.00050	0.00191	0.00863	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	102	20.8	11.3	62.7	8.25	10.2	59.2	61.4	8.33	8.22	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.628	0.167	0.478	1.37	0.0744	0.104	1.6	1.12	0.0465	0.0399	<0.000050
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	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000262	0.000052	0.000852	0.000346	0.000396	0.000379	0.000463	0.000373	0.000363	0.000335	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00096	<0.00050	0.0007	0.00184	<0.00050	<0.00050	0.00132	0.00166	0.00053	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	4.51	4.2	0.8	3.71	0.55	0.68	3.16	3.71	0.64	0.57	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	6.34	4.87	6.96	6.76	6.33	6.29	6.65	6.72	6.79	6.45	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000064	<0.000010	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	7.1	3.73	3.54	4.84	2.35	2.85	13	4.97	2.26	2.22	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.582	0.25	0.308	0.449	0.268	0.274	0.508	0.438	0.266	0.261	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	231	63.8	23.3	149	7.1	12.8	159	141	5.75	5.55	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000037	<0.000010	<0.000010	0.000086	<0.000010	<0.000010	<0.000010	0.000112	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00346	0.000215	0.00121	0.00397	0.000593	0.000602	0.00192	0.00454	0.000542	0.000517	<0.000010



Table A1. Water Quality Results for the October 16-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-131016-018	0167-131016-021	0167-131016-004	0167-131016-019	0167-131016-005	0167-131016-007	0167-131016-003	0167-131016-010	0167-131017-024	0167-131017-023	0167-131017-TRAVEL-BLANK
				WQ Site ID	WQ-DC-D1b	WQ-DC-DX	WQ-BC	WQ-MS-03	WQ-VC-DBC	WQ-VC-UMN-r	WQ-DC-R	WQ-CD-DX+105	WQ-VC-U	WQ-VC-U-r	TRAVEL BLANK
				Date Sampled	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	17-OCT-13	17-OCT-13
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.352	<0.0030	<0.0030	0.783	<0.0030	<0.0030	0.0103	0.678	0.0034	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0029	0.0067	0.0081	0.003	0.0188	0.0175	0.015	0.001	0.0196	0.0185	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.0123	0.00113	0.00022	0.0132	0.00011	0.00018	0.00148	0.0113	<0.00010	<0.00010	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0113	0.0025	0.00209	0.0814	0.00044	0.00098	0.0126	0.0159	0.00029	0.00032	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0192	0.0548	0.0582	0.0185	0.0639	0.0642	0.0527	0.0117	0.0645	0.0641	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.00050	<0.00050	<0.00050	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	0.039	<0.010	<0.010	<0.010	<0.010	<0.010	0.023	<0.010	<0.010	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000594	0.000013	0.000099	0.000537	0.000025	0.000024	0.000051	0.00202	0.000016	0.000018	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	219	76.9	46.3	183	25	30.5	169	183	24.1	24.2	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	0.00012	0.00012	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00022	0.00019	0.00025	0.00103	0.00011	0.00014	0.00174	0.0005	<0.00010	<0.00010	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00068	0.00082	0.00132	<0.00020	0.00114	0.00113	0.0008	<0.00020	0.00111	0.0011	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.296	0.263	0.106	2.33	0.078	0.076	1.57	0.125	0.076	0.079	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000056	<0.000050	<0.000050	0.000091	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00776	<0.00050	0.00101	0.00901	0.00059	0.00063	0.0019	0.00858	0.00052	0.00052	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	102	20.8	11.2	62.6	8.15	10	59.7	63.9	8.15	8.08	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.581	0.168	0.465	1.31	0.0686	0.101	1.54	1.08	0.0375	0.0373	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000237	<0.000050	0.000802	0.000327	0.00036	0.000355	0.000437	0.000344	0.000343	0.00033	-
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.00076	<0.00050	0.0006	0.00176	<0.00050	<0.00050	0.00115	0.00154	<0.00050	<0.00050	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	4.41	4.31	0.76	3.6	0.57	0.64	3.37	3.75	0.59	0.57	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.75	4.82	6.78	6.41	6.2	6.04	6.51	6.65	6.32	6.31	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	6.8	3.65	3.47	4.64	2.28	2.83	12.7	4.8	2.19	2.19	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.558	0.242	0.296	0.434	0.258	0.268	0.492	0.419	0.255	0.256	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	223	61	22.8	144	6.48	12.2	155	141	5.42	5.5	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000029	<0.000010	<0.000010	0.000074	<0.000010	<0.000010	<0.000010	0.000101	<0.000010	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.010	<0.010	<0.010	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00329	0.000202	0.00115	0.00378	0.000549	0.000577	0.00186	0.00432	0.000495	0.000485	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.321	<0.0010	0.0014	0.775	0.0024	0.0021	0.0049	0.662	0.0014	0.0013	-



Table A1. Water Quality Results for the October 16-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-131017-FIELD-BLANK	0167-131017-030
				WQ Site ID	FIELD BLANK	WQ-PW
				Date Sampled	17-OCT-13	17-OCT-13
				Detection Limit	07:51	08:40
Temperature (in-situ)	°C	-	-	-	-	0.6
Specific Conductivity (in-situ)	µS/cm	-	-	-	-	367.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	-	6.29
Turbidity (In-situ)	NTU	-	-	-	-	0.56
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-
Colour, True	CU	15	-	5	-	<5.0
Conductivity	µS/cm	-	-	2	<2.0	323
Hardness (as CaCO3)	mg/L	-	-	0.5	<0.50	193
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	6.39	7.96
Total Suspended Solids	mg/L	-	50	3	<3.0	-
Total Dissolved Solids	mg/L	-	-	10	<1.0	203
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	<1.0	-
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	-
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	<1.0	167
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	-
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.020	0.108
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	0.146
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	<0.50	32.4
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	-
Cyanate	mg/L	-	-	0.2	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	-
Aluminum (Al)-Total	mg/L	0.1	-	0.003	<0.0030	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	<0.00010	<0.00050
Arsenic (As)-Total	mg/L	0.005	-	0.0001	<0.00010	0.00038
Barium (Ba)-Total	mg/L	-	1	0.00005	<0.000050	0.085
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	-
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	-
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.10
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	<0.000010	<0.00020
Calcium (Ca)-Total	mg/L	-	-	0.05	<0.050	44.5
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00010	<0.0020
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	-
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	<0.00050	<0.0010
Iron (Fe)-Total	mg/L	0.3	1	0.01	<0.010	<0.030
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	<0.000050	0.0007
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	<0.10	20
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	<0.000050	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	<0.000050	-
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	-
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	<0.10	0.88
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	<0.050	-
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	-
Sodium (Na)-Total	mg/L	-	-	0.05	<0.050	4.7
Strontium (Sr)-Total	mg/L	-	-	0.0002	<0.00020	-
Sulfur (S)-Total	mg/L	-	-	0.5	<0.50	-
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	-
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	<0.000010	0.00191

Applied Guidelines: - Federal CCME Canadian Environmental Quality Guidelines (JUL, 2012), CCME: Freshwater Aquatic Life
 - Mount Nansen Effluent Quality Standards

Color Key: Exceeds CCME Guideline
 Exceeds MN Effluent Quality Standards (EQS)
 Exceeds both CCME and EQS

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



Table A1. Water Quality Results for the October 16-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-131017-FIELD-BLANK	0167-131017-030
				WQ Site ID	FIELD BLANK	WQ-PW
				Date Sampled	17-OCT-13	17-OCT-13
				Detection Limit	07:51	08:40
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030	<0.050
Dissolved Metals Filtration Location		-	-	n/a	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	<0.0010	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	<0.00010	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	<0.000050	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	<0.000010	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	<0.050	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	<0.00020	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	<0.010	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	<0.10	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	<0.000050	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	<0.000050	-
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	<0.00050	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	<0.10	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	<0.050	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	<0.050	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	<0.00020	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	<0.50	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	<0.000010	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	<0.0010	-



Appendix B:
ALS Analytical Reports
October 15-17, 2013



ENVIRONMENTAL DYNAMICS INC.
ATTN: MEGHAN MARJANOVIC
2195 - 2nd Avenue
Whitehorse YT Y1A 3T8

Date Received: 17-OCT-13
Report Date: 31-OCT-13 11:45 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1379353
Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 13-Y-0167
C of C Numbers: 1, 2, 3, 4
Legal Site Desc:

Can Dang
Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1379353-1 Water 16-OCT-13 09:50 0167-131016-008	L1379353-2 Water 16-OCT-13 08:34 0167-131016-002	L1379353-3 Water 16-OCT-13 09:06 0167-131016-006	L1379353-4 Water 16-OCT-13 19:05 0167-131016-200	L1379353-5 Water 16-OCT-13 15:55 0167-131016-100
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	232	206	79.8	1350	542
	Hardness (as CaCO3) (mg/L)	128	113	38.3	1010	330
	pH (pH)	7.99	7.98	7.77	7.46	6.29
	Total Suspended Solids (mg/L)	<3.0	3.3	<3.0	20.0	126
	Total Dissolved Solids (mg/L)	138	122	38.1	1400	432
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	85.4	77.1	27.7	253	2.1
	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)	85.4	77.1	27.7	253	2.1
	Ammonia, Total (as N) (mg/L)	0.0188	0.0206	0.0384	4.4	0.0138
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<5.0 ^{DLA}	<0.50
	Fluoride (F) (mg/L)	0.055	0.050	0.052	<0.20 ^{DLA}	0.039
	Nitrate (as N) (mg/L)	0.131	0.120	0.0645	1.70	0.308
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	0.029	<0.0010
	Sulfate (SO4) (mg/L)	37.9	32.3	3.60	815	311
	Anion Sum (meq/L)	2.51	2.22	0.63	22.2	6.53
	Cation Sum (meq/L)	2.72	2.43	0.95	23.0	6.95
	Cation - Anion Balance (%)	4.0	4.4	19.8	1.8	3.1
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	0.0058	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	0.0462	0.0135
	Cyanate (mg/L)	<2.0 ^{DLIS}	<0.20	<0.20	2.01	0.35
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	2.67	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0411	0.0536	0.144	0.0227	3.65
	Antimony (Sb)-Total (mg/L)	0.00023	0.00020	0.00013	0.00058	0.00122
	Arsenic (As)-Total (mg/L)	0.00125	0.00131	0.00202	0.0504	0.0774
	Barium (Ba)-Total (mg/L)	0.0667	0.0643	0.0615	0.0717	0.115
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00012
	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	0.077	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000028	0.000027	0.000033	0.000630	0.00402
	Calcium (Ca)-Total (mg/L)	32.3	29.5	10.6	292	77.1
	Chromium (Cr)-Total (mg/L)	0.00031	0.00069	0.00072	0.00056	0.00547
	Cobalt (Co)-Total (mg/L)	0.00017	0.00025	0.00092	0.00843	0.00282
	Copper (Cu)-Total (mg/L)	0.00149	0.00162	0.00244	0.00535	0.00832
	Iron (Fe)-Total (mg/L)	0.186	0.392	1.87	11.8	15.1

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1379353-6 Water 16-OCT-13 16:45 0167-131016-011	L1379353-7 Water 16-OCT-13 15:27 0167-131016-015	L1379353-8 Water 16-OCT-13 14:30 0167-131016-013	L1379353-9 Water 16-OCT-13 16:24 0167-131016-014	L1379353-10 Water 16-OCT-13 15:10 0167-131016-009
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	315	1150	179	913	904
	Hardness (as CaCO3) (mg/L)	182	803	88.3	706	716
	pH (pH)	7.36	7.98	8.00	7.94	8.04
	Total Suspended Solids (mg/L)	<3.0	<3.0	8.0	62.7	28.0
	Total Dissolved Solids (mg/L)	219	1130	95.8	886	905
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	74.3	96.9	78.1	204	192
	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)	74.3	96.9	78.1	204	192
	Ammonia, Total (as N) (mg/L)	<0.0050	0.107 ^{DLA}	0.0056	0.121 ^{DLA}	0.261 ^{DLA}
	Chloride (Cl) (mg/L)	<0.50	<5.0	<0.50	<5.0 ^{DLA}	<5.0 ^{DLA}
	Fluoride (F) (mg/L)	0.055	0.30	0.050	<0.20 ^{DLA}	<0.20 ^{DLA}
	Nitrate (as N) (mg/L)	0.0862	0.130 ^{DLA}	0.119	0.182 ^{DLA}	0.236 ^{DLA}
	Nitrite (as N) (mg/L)	<0.0010	<0.010 ^{DLA}	<0.0010	<0.010 ^{DLA}	<0.010 ^{DLA}
	Sulfate (SO4) (mg/L)	104	751	15.0	516	535
	Anion Sum (meq/L)	3.66	17.6	1.89	14.8	15.0
	Cation Sum (meq/L)	3.83	17.2	1.88	14.5	14.8
	Cation - Anion Balance (%)	2.2	-1.1	-0.1	-1.0	-0.5
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)	0.0273	0.0353	0.205	1.61	0.499
	Antimony (Sb)-Total (mg/L)	0.00300	0.0435	0.00014	0.00353	0.00233
	Arsenic (As)-Total (mg/L)	0.00543	0.179	0.00073	0.0159	0.0198
	Barium (Ba)-Total (mg/L)	0.0262	0.0108	0.0652	0.0699	0.0526
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	0.106	<0.010	0.027	0.024
	Cadmium (Cd)-Total (mg/L)	0.00130	0.000769	0.000029	0.000162	0.000096
	Calcium (Ca)-Total (mg/L)	53.4	236	23.1	158	164
	Chromium (Cr)-Total (mg/L)	0.00028	0.00035	0.00059	0.00287	0.00126
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00085	0.00023	0.00168	0.00083
	Copper (Cu)-Total (mg/L)	0.0109	0.0192	0.00164	0.00481	0.00251
	Iron (Fe)-Total (mg/L)	0.049	0.433	0.423	3.94	3.29

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1379353-11 Water 16-OCT-13 16:45 0167-131016-016	L1379353-12 Water 16-OCT-13 16:19 0167-131016-012	L1379353-13 Water 16-OCT-13 18:04 0167-131016-018	L1379353-14 Water 16-OCT-13 19:49 0167-131016-021	L1379353-15 Water 16-OCT-13 13:30 0167-131016-004
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	320	948	1250	468	290
	Hardness (as CaCO3) (mg/L)	173	772	965	278	161
	pH (pH)	7.87	7.81	8.16	7.89	8.04
	Total Suspended Solids (mg/L)	3.3	<3.0	6.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	216	961	1220	350	191
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	57.6	201	279	96.5	99.5
	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)	57.6	201	279	96.5	99.5
	Ammonia, Total (as N) (mg/L)	0.0088	0.0248	0.115	0.0190	0.0117
	Chloride (Cl) (mg/L)	<0.50	<5.0 ^{DLA}	<5.0 ^{DLA}	<0.50	<0.50
	Fluoride (F) (mg/L)	0.046	<0.20 ^{DLA}	<0.20 ^{DLA}	0.057	0.075
	Nitrate (as N) (mg/L)	0.0333	0.148	0.167	0.0700	0.0660
	Nitrite (as N) (mg/L)	0.0010	<0.010 ^{DLA}	<0.010 ^{DLA}	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	116	575	720	186	68.6
	Anion Sum (meq/L)	3.57	16.0	20.6	5.80	3.43
	Cation Sum (meq/L)	3.63	15.8	19.7	5.84	3.42
	Cation - Anion Balance (%)	0.9	-0.6	-2.1	0.3	-0.1
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	<2.0 ^{DLIS}	<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)	0.0192	0.0477	0.141	0.0216	0.0502
	Antimony (Sb)-Total (mg/L)	0.00043	0.00316	0.0139	0.00118	0.00024
	Arsenic (As)-Total (mg/L)	0.00123	0.00669	0.0261	0.00287	0.00248
	Barium (Ba)-Total (mg/L)	0.0477	0.0260	0.0222	0.0560	0.0594
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	0.033	0.047	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000020	0.000016	0.00129	0.000014	0.000105
	Calcium (Ca)-Total (mg/L)	49.7	176	227	77.6	46.8
	Chromium (Cr)-Total (mg/L)	0.00023	0.00031	0.00040	0.00017	0.00023
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00015	0.00031	0.00021	0.00027
	Copper (Cu)-Total (mg/L)	0.00082	0.00107	0.00169	0.00097	0.00163
	Iron (Fe)-Total (mg/L)	0.084	0.545	0.958	0.327	0.220

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L1379353-16 Water 16-OCT-13 19:05 0167-131016-019	L1379353-17 Water 16-OCT-13 12:31 0167-131016-005	L1379353-18 Water 16-OCT-13 09:35 0167-131016-007	L1379353-19 Water 16-OCT-13 11:03 0167-131016-003	L1379353-20 Water 16-OCT-13 19:05 0167-131016-010	
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	896	189	224	855	890
	Hardness (as CaCO3) (mg/L)	716	96.1	118	668	719
	pH (pH)	7.74	8.01	7.97	7.96	7.48
	Total Suspended Solids (mg/L)	6.0	<3.0	<3.0	13.3	<3.0
	Total Dissolved Solids (mg/L)	875	105	133	838	857
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	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)	275	80.3	83.7	162	274
	Ammonia, Total (as N) (mg/L)	0.0541 ^{DLA}	<0.0050	0.0235	0.92 ^{DLA}	0.0274 ^{DLA}
	Chloride (Cl) (mg/L)	<5.0	<0.50	<0.50	<5.0 ^{DLA}	<5.0 ^{DLA}
	Fluoride (F) (mg/L)	0.24 ^{DLA}	0.053	0.055	<0.20 ^{DLA}	0.27 ^{DLA}
	Nitrate (as N) (mg/L)	<0.050 ^{DLA}	0.112	0.131	0.504	<0.050 ^{DLA}
	Nitrite (as N) (mg/L)	<0.010 ^{DLA}	<0.0010	<0.0010	0.016	<0.010 ^{DLA}
	Sulfate (SO4) (mg/L)	452	19.9	37.8	489	435
	Anion Sum (meq/L)	14.9	2.03	2.47	13.5	14.6
	Cation Sum (meq/L)	14.8	2.04	2.50	14.2	14.7
	Cation - Anion Balance (%)	-0.4	0.3	0.6	2.6	0.6
Cyanides	Cyanide, Weak Acid Diss (mg/L)					
	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)					
	Antimony (Sb)-Total (mg/L)	0.0159	0.0491	0.0382	0.111	0.0042
	Arsenic (As)-Total (mg/L)	0.0136	0.00012	0.00020	0.00155	0.0117
	Barium (Ba)-Total (mg/L)	0.0890	0.00057	0.00122	0.0228	0.0331
	Beryllium (Be)-Total (mg/L)	0.0191	0.0657	0.0656	0.0576	0.0121
	Bismuth (Bi)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	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	0.026	<0.010
	Cadmium (Cd)-Total (mg/L)	0.00231	0.000032	0.000025	0.000091	0.00375
	Calcium (Ca)-Total (mg/L)	190	25.3	31.1	164	184
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00018	0.00018	0.00058	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00110	0.00013	0.00015	0.00190	0.00052
	Copper (Cu)-Total (mg/L)	0.00103	0.00132	0.00131	0.00153	<0.00050
	Iron (Fe)-Total (mg/L)	2.59	0.154	0.177	3.70	0.270

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1379353-21 Water 17-OCT-13 08:52 0167-131017-024	L1379353-22 Water 17-OCT-13 08:52 0167-131017-023	L1379353-23 Water 17-OCT-13 12:35 TRAVEL BLANK	L1379353-24 Water 17-OCT-13 07:51 FIELD BLANK	L1379353-25 Water 17-OCT-13 08:40 0167-131017-30
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					<5.0
	Conductivity (uS/cm)	177	175	<2.0	<2.0	323
	Hardness (as CaCO3) (mg/L)	93.7	93.8	<0.50	<0.50	193
	pH (pH)	8.03	7.99	5.84	6.39	7.96
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	
	Total Dissolved Solids (mg/L)	97.4	99.5	<1.0	<1.0	203
	Turbidity (NTU)					<0.10
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	75.3	79.4	<1.0	<1.0	
	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)	75.3	79.4	<1.0	<1.0	167
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0093 ^{RRV}	<0.0050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.053	0.051	<0.020	<0.020	0.108
	Nitrate (as N) (mg/L)	0.124	0.121	<0.0050	<0.0050	0.146
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	16.5	16.1	<0.50	<0.50	32.4
	Anion Sum (meq/L)	1.86	1.93	<0.10	<0.10	4.02
	Cation Sum (meq/L)	1.99	1.99	<0.10	<0.10	4.09
	Cation - Anion Balance (%)	3.4	1.5	0.0	0.0	0.9
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)	0.165	0.0379	<0.0030	<0.0030	<0.010
	Antimony (Sb)-Total (mg/L)	0.00011	<0.00010	<0.00010	<0.00010	<0.00050
	Arsenic (As)-Total (mg/L)	0.00058	0.00036	<0.00010	<0.00010	0.00038
	Barium (Ba)-Total (mg/L)	0.0684	0.0647	<0.000050	<0.000050	0.085
	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	<0.10
	Cadmium (Cd)-Total (mg/L)	0.000025	0.000038	<0.000010	<0.000010	<0.00020
	Calcium (Ca)-Total (mg/L)	24.9	24.3	<0.050	<0.050	44.5
	Chromium (Cr)-Total (mg/L)	0.00029	0.00021	<0.00010	<0.00010	<0.0020
	Cobalt (Co)-Total (mg/L)	0.00018	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	0.00163	0.00136	<0.00050	<0.00050	<0.0010
	Iron (Fe)-Total (mg/L)	0.330	0.138	<0.010	<0.010	<0.030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1379353-1	L1379353-2	L1379353-3	L1379353-4	L1379353-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13
		Sampled Time	09:50	08:34	09:06	19:05	15:55
		Client ID	0167-131016-008	0167-131016-002	0167-131016-006	0167-131016-200	0167-131016-100
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.000077	0.000064	0.000057	0.000084	0.00392
	Lithium (Li)-Total (mg/L)		0.00076	0.00066	0.00074	0.00072	0.00269
	Magnesium (Mg)-Total (mg/L)		10.3	9.38	2.78	67.7	31.8
	Manganese (Mn)-Total (mg/L)		0.108	0.114	0.227	5.83	0.283
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	0.000060
	Molybdenum (Mo)-Total (mg/L)		0.000398	0.000468	0.000244	0.00108	0.000698
	Nickel (Ni)-Total (mg/L)		<0.00050	0.00068	0.00216	0.00305	0.00730
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	0.244
	Potassium (K)-Total (mg/L)		0.71	0.68	0.62	6.62	0.76
	Selenium (Se)-Total (mg/L)		<0.00010	<0.00010	0.00012	0.00026	0.00041
	Silicon (Si)-Total (mg/L)		6.32	6.66	8.60	6.97	15.5
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	0.000034	0.000285
	Sodium (Na)-Total (mg/L)		3.11	2.86	1.91	39.5	3.43
	Strontium (Sr)-Total (mg/L)		0.285	0.247	0.0550	0.849	0.226
	Sulfur (S)-Total (mg/L)		13.4	11.6	1.55	281	100
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	0.000011	0.000119
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	0.00030
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	0.101
	Uranium (U)-Total (mg/L)		0.000629	0.000547	0.000138	0.00370	0.000268
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	0.0012	0.0018	0.0125
	Zinc (Zn)-Total (mg/L)		<0.0030	<0.0030	0.0040	0.0112	1.60
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0170	0.0284	0.100	0.0106	0.115
	Antimony (Sb)-Dissolved (mg/L)		0.00019	0.00017	0.00012	0.00053	0.00018
	Arsenic (As)-Dissolved (mg/L)		0.00091	0.00097	0.00164	0.0322	0.00063
	Barium (Ba)-Dissolved (mg/L)		0.0643	0.0639	0.0588	0.0667	0.0228
	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	0.068	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000024	0.000027	0.000024	0.000397	0.00304
	Calcium (Ca)-Dissolved (mg/L)		33.6	29.9	10.7	296	77.5
	Chromium (Cr)-Dissolved (mg/L)		0.00011	0.00015	0.00055	0.00031	0.00014
	Cobalt (Co)-Dissolved (mg/L)		0.00015	0.00022	0.00084	0.00813	0.00041
	Copper (Cu)-Dissolved (mg/L)		0.00118	0.00125	0.00201	0.00273	0.00169
	Iron (Fe)-Dissolved (mg/L)		0.083	0.209	1.15	6.99	0.265
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1379353-6	L1379353-7	L1379353-8	L1379353-9	L1379353-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13
		Sampled Time	16:45	15:27	14:30	16:24	15:10
		Client ID	0167-131016-011	0167-131016-015	0167-131016-013	0167-131016-014	0167-131016-009
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.000764	0.00542	0.000314	0.00138	0.00162
	Lithium (Li)-Total (mg/L)		0.00057	0.00806	<0.00050	0.00485	0.00281
	Magnesium (Mg)-Total (mg/L)		11.9	51.2	7.84	71.8	67.1
	Manganese (Mn)-Total (mg/L)		0.0447	0.317	0.0410	0.551	0.667
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)		0.000087	0.00186	0.000387	0.000320	0.000403
	Nickel (Ni)-Total (mg/L)		0.00065	0.00116	0.00061	0.00240	0.00156
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	0.130	<0.050
	Potassium (K)-Total (mg/L)		0.61	14.0	0.59	3.20	2.87
	Selenium (Se)-Total (mg/L)		0.00011	<0.00010	<0.00010	0.00011	0.00011
	Silicon (Si)-Total (mg/L)		6.34	1.63	6.48	8.24	6.53
	Silver (Ag)-Total (mg/L)		0.000027	0.000270	<0.000010	0.000025	0.000046
	Sodium (Na)-Total (mg/L)		3.88	19.2	2.34	6.61	7.73
	Strontium (Sr)-Total (mg/L)		0.334	0.626	0.264	0.462	0.492
	Sulfur (S)-Total (mg/L)		35.2	237	5.27	159	163
	Thallium (Tl)-Total (mg/L)		<0.000010	0.000193	<0.000010	0.000032	0.000013
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	0.010	0.090	0.024
	Uranium (U)-Total (mg/L)		0.000288	0.00117	0.000578	0.00216	0.00204
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	0.0058	0.0024
	Zinc (Zn)-Total (mg/L)		0.119	0.0804	0.0039	0.0538	0.0199
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0138	0.0043	0.0211	0.0078	0.0118
	Antimony (Sb)-Dissolved (mg/L)		0.00281	0.0424	<0.00010	0.00351	0.00216
	Arsenic (As)-Dissolved (mg/L)		0.00474	0.112	0.00033	0.00531	0.0118
	Barium (Ba)-Dissolved (mg/L)		0.0258	0.0101	0.0600	0.0429	0.0464
	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	0.094	<0.010	0.021	0.019
	Cadmium (Cd)-Dissolved (mg/L)		0.00129	0.000588	0.000015	0.000045	0.000030
	Calcium (Ca)-Dissolved (mg/L)		53.6	235	22.7	163	171
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	0.00011	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	0.00081	<0.00010	0.00036	0.00059
	Copper (Cu)-Dissolved (mg/L)		0.00980	0.0146	0.00104	0.00048	0.00058
	Iron (Fe)-Dissolved (mg/L)		0.014	0.053	0.079	0.876	0.908
	Lead (Pb)-Dissolved (mg/L)		0.000331	0.000500	<0.000050	<0.000050	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1379353-11	L1379353-12	L1379353-13	L1379353-14	L1379353-15
		Description	Water	Water	Water	Water	Water
		Sampled Date	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13
		Sampled Time	16:45	16:19	18:04	19:49	13:30
		Client ID	0167-131016-016	0167-131016-012	0167-131016-018	0167-131016-021	0167-131016-004
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.00551	<0.000050	0.000207	
	Lithium (Li)-Total (mg/L)	<0.00050	0.00417	0.00804	<0.00050	0.00085	
	Magnesium (Mg)-Total (mg/L)	11.6	84.3	102	20.8	11.3	
	Manganese (Mn)-Total (mg/L)	0.00881	0.0888	0.628	0.167	0.478	
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Total (mg/L)	0.000065	0.000276	0.000262	0.000052	0.000852	
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00063	0.00096	<0.00050	0.00070	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	0.40	3.47	4.51	4.20	0.80	
	Selenium (Se)-Total (mg/L)	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	
	Silicon (Si)-Total (mg/L)	6.78	6.13	6.34	4.87	6.96	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	0.000064	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	3.92	6.24	7.10	3.73	3.54	
	Strontium (Sr)-Total (mg/L)	0.343	0.448	0.582	0.250	0.308	
	Sulfur (S)-Total (mg/L)	38.9	190	231	63.8	23.3	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	0.000037	<0.000010	<0.000010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	0.000221	0.00218	0.00346	0.000215	0.00121	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	0.0038	0.0121	0.352	<0.0030	<0.0030	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0096	0.0216	0.0029	0.0067	0.0081	
	Antimony (Sb)-Dissolved (mg/L)	0.00039	0.00313	0.0123	0.00113	0.00022	
	Arsenic (As)-Dissolved (mg/L)	0.00110	0.00562	0.0113	0.00250	0.00209	
	Barium (Ba)-Dissolved (mg/L)	0.0469	0.0246	0.0192	0.0548	0.0582	
	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	0.024	0.039	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.000019	0.000021	0.000594	0.000013	0.000099	
	Calcium (Ca)-Dissolved (mg/L)	49.8	171	219	76.9	46.3	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00013	0.00022	0.00019	0.00025	
	Copper (Cu)-Dissolved (mg/L)	0.00052	0.00070	0.00068	0.00082	0.00132	
	Iron (Fe)-Dissolved (mg/L)	0.037	0.367	0.296	0.263	0.106	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	0.000056	<0.000050	<0.000050	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1379353-16	L1379353-17	L1379353-18	L1379353-19	L1379353-20
		Description	Water	Water	Water	Water	Water
		Sampled Date	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13
		Sampled Time	19:05	12:31	09:35	11:03	19:05
		Client ID	0167-131016-019	0167-131016-005	0167-131016-007	0167-131016-003	0167-131016-010
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.000587	0.000061	0.000059	0.000307	<0.000050
	Lithium (Li)-Total (mg/L)		0.00886	<0.00050	<0.00050	0.00191	0.00863
	Magnesium (Mg)-Total (mg/L)		62.7	8.25	10.2	59.2	61.4
	Manganese (Mn)-Total (mg/L)		1.37	0.0744	0.104	1.60	1.12
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)		0.000346	0.000396	0.000379	0.000463	0.000373
	Nickel (Ni)-Total (mg/L)		0.00184	<0.00050	<0.00050	0.00132	0.00166
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)		3.71	0.55	0.68	3.16	3.71
	Selenium (Se)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00012	<0.00010
	Silicon (Si)-Total (mg/L)		6.76	6.33	6.29	6.65	6.72
	Silver (Ag)-Total (mg/L)		0.000014	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		4.84	2.35	2.85	13.0	4.97
	Strontium (Sr)-Total (mg/L)		0.449	0.268	0.274	0.508	0.438
	Sulfur (S)-Total (mg/L)		149	7.10	12.8	159	141
	Thallium (Tl)-Total (mg/L)		0.000086	<0.000010	<0.000010	<0.000010	0.000112
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.00397	0.000593	0.000602	0.00192	0.00454
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	0.0012	<0.0010
	Zinc (Zn)-Total (mg/L)		0.783	<0.0030	<0.0030	0.0103	0.678
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0030	0.0188	0.0175	0.0150	0.0010
	Antimony (Sb)-Dissolved (mg/L)		0.0132	0.00011	0.00018	0.00148	0.0113
	Arsenic (As)-Dissolved (mg/L)		0.0814	0.00044	0.00098	0.0126	0.0159
	Barium (Ba)-Dissolved (mg/L)		0.0185	0.0639	0.0642	0.0527	0.0117
	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	0.023	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000537	0.000025	0.000024	0.000051	0.00202
	Calcium (Ca)-Dissolved (mg/L)		183	25.0	30.5	169	183
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00015	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		0.00103	0.00011	0.00014	0.00174	0.00050
	Copper (Cu)-Dissolved (mg/L)		<0.00020	0.00114	0.00113	0.00080	<0.00020
	Iron (Fe)-Dissolved (mg/L)		2.33	0.078	0.076	1.57	0.125
	Lead (Pb)-Dissolved (mg/L)		0.000091	<0.000050	<0.000050	<0.000050	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1379353-21	L1379353-22	L1379353-23	L1379353-24	L1379353-25
		Description	Water	Water	Water	Water	Water
		Sampled Date	17-OCT-13	17-OCT-13	17-OCT-13	17-OCT-13	17-OCT-13
		Sampled Time	08:52	08:52	12:35	07:51	08:40
		Client ID	0167-131017-024	0167-131017-023	TRAVEL BLANK	FIELD BLANK	0167-131017-30
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.000231	<0.000050	<0.000050	<0.000050	0.00070
	Lithium (Li)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Magnesium (Mg)-Total (mg/L)		8.33	8.22	<0.10	<0.10	20.0
	Manganese (Mn)-Total (mg/L)		0.0465	0.0399	<0.000050	<0.000050	<0.0020
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.00020
	Molybdenum (Mo)-Total (mg/L)		0.000363	0.000335	<0.000050	<0.000050	
	Nickel (Ni)-Total (mg/L)		0.00053	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)		0.64	0.57	<0.10	<0.10	0.88
	Selenium (Se)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
	Silicon (Si)-Total (mg/L)		6.79	6.45	<0.050	<0.050	
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)		2.26	2.22	<0.050	<0.050	4.7
	Strontium (Sr)-Total (mg/L)		0.266	0.261	<0.00020	<0.00020	
	Sulfur (S)-Total (mg/L)		5.75	5.55	<0.50	<0.50	
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)		0.000542	0.000517	<0.000010	<0.000010	0.00191
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)		0.0034	<0.0030	<0.0030	<0.0030	<0.050
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD		FIELD	
	Dissolved Metals Filtration Location		FIELD	FIELD		FIELD	
	Aluminum (Al)-Dissolved (mg/L)		0.0196	0.0185		<0.0010	
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010		<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00029	0.00032		<0.00010	
	Barium (Ba)-Dissolved (mg/L)		0.0645	0.0641		<0.000050	
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010		<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.00050		<0.00050	
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010		<0.010	
	Cadmium (Cd)-Dissolved (mg/L)		0.000016	0.000018		<0.000010	
	Calcium (Ca)-Dissolved (mg/L)		24.1	24.2		<0.050	
	Chromium (Cr)-Dissolved (mg/L)		0.00012	0.00012		<0.00010	
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010		<0.00010	
	Copper (Cu)-Dissolved (mg/L)		0.00111	0.00110		<0.00020	
	Iron (Fe)-Dissolved (mg/L)		0.076	0.079		<0.010	
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050		<0.000050	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1379353-1 Water 16-OCT-13 09:50 0167-131016-008	L1379353-2 Water 16-OCT-13 08:34 0167-131016-002	L1379353-3 Water 16-OCT-13 09:06 0167-131016-006	L1379353-4 Water 16-OCT-13 19:05 0167-131016-200	L1379353-5 Water 16-OCT-13 15:55 0167-131016-100
Grouping	Analyte					
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)	0.00087	0.00075	0.00073	0.00052	0.00100
	Magnesium (Mg)-Dissolved (mg/L)	10.7	9.43	2.81	65.8	33.2
	Manganese (Mn)-Dissolved (mg/L)	0.102	0.112	0.218	5.68	0.0569
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000348	0.000325	0.000221	0.000991	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00068	0.00204	0.00283	0.00409
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.75	0.70	0.67	6.78	0.36
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011	0.00027	<0.00010
	Silicon (Si)-Dissolved (mg/L)	6.43	6.61	8.59	6.89	9.93
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010 ^{DTC}
	Sodium (Na)-Dissolved (mg/L)	2.98	2.83	1.88	38.7	6.04
	Strontium (Sr)-Dissolved (mg/L)	0.255	0.237	0.0523	0.817	0.212
	Sulfur (S)-Dissolved (mg/L)	13.5	11.5	1.52	265	102
	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)	0.000572	0.000518	0.000122	0.00351	0.000011
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0011	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0022	0.0013	0.0023	0.0089	1.51

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L1379353-6 Water 16-OCT-13 16:45 0167-131016-011	L1379353-7 Water 16-OCT-13 15:27 0167-131016-015	L1379353-8 Water 16-OCT-13 14:30 0167-131016-013	L1379353-9 Water 16-OCT-13 16:24 0167-131016-014	L1379353-10 Water 16-OCT-13 15:10 0167-131016-009	
Grouping	Analyte					
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)	0.00075	0.00801	<0.00050	0.00403	0.00281
	Magnesium (Mg)-Dissolved (mg/L)	11.8	52.4	7.68	72.7	70.3
	Manganese (Mn)-Dissolved (mg/L)	0.0452	0.289	0.0275	0.422	0.676
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000077	0.00175	0.000321	0.000254	0.000345
	Nickel (Ni)-Dissolved (mg/L)	0.00062	0.00100	<0.00050	0.00062	0.00079
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.57	13.9	0.56	3.22	2.89
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	6.25	1.49	5.94	5.88	5.79
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000028	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	3.68	18.3	2.21	6.49	8.09
	Strontium (Sr)-Dissolved (mg/L)	0.324	0.608	0.247	0.459	0.512
	Sulfur (S)-Dissolved (mg/L)	34.8	238	4.94	157	166
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000182	<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)	0.000274	0.00111	0.000509	0.00200	0.00206
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.116	0.0578	<0.0010	0.0331	0.0093

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1379353-11	L1379353-12	L1379353-13	L1379353-14	L1379353-15
		Description	Water	Water	Water	Water	Water
		Sampled Date	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13	16-OCT-13
		Sampled Time	16:45	16:19	18:04	19:49	13:30
		Client ID	0167-131016-016	0167-131016-012	0167-131016-018	0167-131016-021	0167-131016-004
Grouping	Analyte						
WATER							
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)		<0.00050	0.00398	0.00776	<0.00050	0.00101
	Magnesium (Mg)-Dissolved (mg/L)		11.8	83.9	102	20.8	11.2
	Manganese (Mn)-Dissolved (mg/L)		0.00715	0.0833	0.581	0.168	0.465
	Mercury (Hg)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)		<0.000050	0.000258	0.000237	<0.000050	0.000802
	Nickel (Ni)-Dissolved (mg/L)		<0.00050	0.00054	0.00076	<0.00050	0.00060
	Phosphorus (P)-Dissolved (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)		0.42	3.36	4.41	4.31	0.76
	Selenium (Se)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)		6.79	5.82	5.75	4.82	6.78
	Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)		3.81	5.95	6.80	3.65	3.47
	Strontium (Sr)-Dissolved (mg/L)		0.322	0.422	0.558	0.242	0.296
	Sulfur (S)-Dissolved (mg/L)		38.2	186	223	61.0	22.8
	Thallium (Tl)-Dissolved (mg/L)		<0.000010	<0.000010	0.000029	<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)		0.000199	0.00206	0.00329	0.000202	0.00115
	Vanadium (V)-Dissolved (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)		0.0022	0.0097	0.321	<0.0010	0.0014

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L1379353-16 Water 16-OCT-13 19:05 0167-131016-019	L1379353-17 Water 16-OCT-13 12:31 0167-131016-005	L1379353-18 Water 16-OCT-13 09:35 0167-131016-007	L1379353-19 Water 16-OCT-13 11:03 0167-131016-003	L1379353-20 Water 16-OCT-13 19:05 0167-131016-010	
Grouping	Analyte					
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)	0.00901	0.00059	0.00063	0.00190	0.00858
	Magnesium (Mg)-Dissolved (mg/L)	62.6	8.15	10.0	59.7	63.9
	Manganese (Mn)-Dissolved (mg/L)	1.31	0.0686	0.101	1.54	1.08
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000327	0.000360	0.000355	0.000437	0.000344
	Nickel (Ni)-Dissolved (mg/L)	0.00176	<0.00050	<0.00050	0.00115	0.00154
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	3.60	0.57	0.64	3.37	3.75
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
	Silicon (Si)-Dissolved (mg/L)	6.41	6.20	6.04	6.51	6.65
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	4.64	2.28	2.83	12.7	4.80
	Strontium (Sr)-Dissolved (mg/L)	0.434	0.258	0.268	0.492	0.419
	Sulfur (S)-Dissolved (mg/L)	144	6.48	12.2	155	141
	Thallium (Tl)-Dissolved (mg/L)	0.000074	<0.000010	<0.000010	<0.000010	0.000101
	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)	0.00378	0.000549	0.000577	0.00186	0.00432
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.775	0.0024	0.0021	0.0049	0.662

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1379353-21 Water 17-OCT-13 08:52 0167-131017-024	L1379353-22 Water 17-OCT-13 08:52 0167-131017-023	L1379353-23 Water 17-OCT-13 12:35 TRAVEL BLANK	L1379353-24 Water 17-OCT-13 07:51 FIELD BLANK	L1379353-25 Water 17-OCT-13 08:40 0167-131017-30
Grouping	Analyte					
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)	0.00052	0.00052		<0.00050	
	Magnesium (Mg)-Dissolved (mg/L)	8.15	8.08		<0.10	
	Manganese (Mn)-Dissolved (mg/L)	0.0375	0.0373		<0.000050	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010		<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000343	0.000330		<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050		<0.050	
	Potassium (K)-Dissolved (mg/L)	0.59	0.57		<0.10	
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	
	Silicon (Si)-Dissolved (mg/L)	6.32	6.31		<0.050	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010		<0.000010	
	Sodium (Na)-Dissolved (mg/L)	2.19	2.19		<0.050	
	Strontium (Sr)-Dissolved (mg/L)	0.255	0.256		<0.00020	
	Sulfur (S)-Dissolved (mg/L)	5.42	5.50		<0.50	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010		<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010		<0.010	
	Uranium (U)-Dissolved (mg/L)	0.000495	0.000485		<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0014	0.0013		<0.0010	

* 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)
Duplicate	Cyanate	DLIS	L1379353-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cyanate	DLIS	L1379353-13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24
Duplicate	Mercury (Hg)-Total	DLM	L1379353-23, -24
Matrix Spike	Ammonia, Total (as N)	MS-B	L1379353-10, -11, -12, -13, -14, -15, -16, -18, -21, -22, -24
Matrix Spike	Barium (Ba)-Total	MS-B	L1379353-16, -17, -18, -19, -20, -21, -22
Matrix Spike	Sodium (Na)-Total	MS-B	L1379353-16, -17, -18, -19, -20, -21, -22
Matrix Spike	Strontium (Sr)-Total	MS-B	L1379353-16, -17, -18, -19, -20, -21, -22
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1379353-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -24, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
DLIS	Detection Limit Adjusted: Insufficient Sample
DLM	Detection Limit Adjusted due to sample matrix effects.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-MAN-WR	Water	Alkalinity by Manual Titration	APHA 2320
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.			
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, 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.			

Reference Information

CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
<p>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.</p>			
CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
<p>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.</p>			
COLOUR-TRUE-WR	Water	Colour (True) by Spectrometer	APHA 2120
<p>"This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Aparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit."</p>			
EC-MAN-WR	Water	Conductivity by Meter	APHA 2510 (B)
<p>This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using an electrode.</p>			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
<p>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.</p>			
HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7
<p>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 or atomic absorption spectrophotometry (EPA Method 245.7).</p>			
HG-TOT-CVAFS-VA	Water	Total Mercury in Water by CVAFS	EPA 245.7
<p>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 or atomic absorption spectrophotometry (EPA Method 245.7).</p>			
HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7
<p>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 or atomic absorption spectrophotometry (EPA Method 245.7).</p>			
IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E
<p>Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.</p>			
<p>Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:</p>			
$\text{Ion Balance (\%)} = \frac{[\text{Cation Sum} - \text{Anion Sum}]}{[\text{Cation Sum} + \text{Anion Sum}]}$			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
<p>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).</p>			
MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B
<p>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).</p>			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
<p>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</p>			

Reference Information

filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-TOT-ICP-VA Water Total Metals 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 (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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).

MET-TOT-LOW-MS-VA Water Total Metals in Water by ICPMS(Low) EPA SW-846 3005A/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 either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

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-WR Water pH by Meter APHA 4500-H (B)

"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."

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-CALC-VA Water TDS (Calculated) APHA 1030E (20TH EDITION)

This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses".

TSS-MAN-WR Water Total Suspended Solids by Gravimetric APHA 2540 D

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

TURBIDITY-WR Water Turbidity by Nephelometer APHA 2130

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** 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:

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA

Reference Information

WT ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
VA ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2 3 4

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.

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company: EDI	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other	<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days) <input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Contact: Meghan Marianovic	Email 1: mmarianovic@edynamics.com		<input type="radio"/> Analysis Request		
Address: 2195 - 2nd Ave	Email 2:		Please indicate below Filtered, Preserved or both (F, P, F/P)		
Y1A 3T8	Email 3:				
Phone: 867-393-4882	Fax: 867-393-4882				
Invoice To Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Client / Project Information				
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Job #: Mount Nansen 13-Y-0167				
Company: EDI Environmental Dynamics Inc	PO / A/E:				
Contact: Shannon Jenner sjenner@edynamics.com	LSD:				
Address: 2195 - 2nd Ave, Y1A 3T8	Quote #: Q38399				
Phone: 867-393-4882	ALS Contact:				
Lab Work Order # (lab use only)	ALS		Sampler: <i>DH + SM</i>		
Sample Identification (This description will appear on the report)		Date (dd-mm-yy)	Time (hh:mm)	Sample Type	
14	0167-1310 16 - 021	16-OCT-13	19:49	Water	X
15	0167-1310 16 - 004	16-OCT-13	13:30	Water	X
16	0167-1310 16 - 019	16-OCT-13	19:05	Water	X
17	0167-1310 16 - 005	16-OCT-13	12:31	Water	X
18	0167-1310 16 - 007	16-OCT-13	09:35	Water	X
19	0167-1310 16 - 003	16-OCT-13	11:03	Water	X
20	0167-1310 16 - 010	16-OCT-13	19:05	Water	X
21	0167-1310 17-024	17-OCT-13	8:52	Water	X
22	0167-13017-023	17-OCT-13	8:52	Water	X

Special Instructions / Regulations with water or land 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: <i>[Signature]</i>	Date (dd-mm-yy): 17-Oct-13	Time (hh:mm): 07:51	Received by: <i>[Signature]</i>	Date: 17-Oct-13	Time: 12:35
			Temperature: 0.2, 0.4°C	Verified by:	Date:
					Time:
			Observations: Yes / No ?		
			If Yes add SIF		



Appendix C:
YG Bacteriological Results
October 15-17, 2013



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

**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 Megan Marjanovic Phone 867 393 4882
Personne-ressource Megan Marjanovic Téléphone 867 393 4882
Mailing address ENVIRONMETAL Dynamics inc Fax 867 393 4883
Adresse postale 295 second Ave Whitehorse YT Télécopieur 867 393 4883
Postal code Y1A 3T8
Code postal Y1A 3T8
First Nation, Municipal or Business Name ENVIRONMENTAL Dynamics inc
Nom de la Première nation, de la municipalité ou de l'entreprise ENVIRONMENTAL Dynamics inc
Agent _____ Fax _____
Agent _____ Télécopieur _____

Sampling Location • Lieu de la prise d'échantillon

Municipal Address WQ PW (NANSEN) Subdivision _____
Adresse municipale WQ PW (NANSEN) Lotissement _____
Legal Description Lot _____ Quad _____ Plan no. _____
Designation officielle Lot _____ Quadrilatère _____ 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 JM/DS/DH Date 131017 Time 08:40 am
Échantillon prélevé par JM/DS/DH Date 131017 Heure 08:40 pm
YY/MM/DD • AA/MM/JJ

Sampling Site (e.g., kitchen tap) WQ PW
Point d'échantillonnage (ex. : robinet de cuisine) WQ PW
Is this a Resample from a Previous Test? Yes No Previous Sample Number _____
Est-ce un deuxième échantillon d'un test antérieur? Oui Non Numéro de l'échantillon précédent _____

Sample Supply / Source d'approvisionnement en eau

Public Supply Bulk Water Distributor Business Private Residence
Municipal - par canalisation Municipal - par camion Privé - entreprise Privé - résidence

Sample Source / Provenance de l'échantillon

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

Water Treatment / Traitement de l'eau

Is the Water Chlorinated? Yes No Free Available Chlorine _____ p.p.m.
L'eau contient-elle du chlore? Oui Non Chlore libre disponible _____ mg/L

Other Treatment Systems (e.g., UV, softener, filter) _____
Autre dispositif de traitement (ex. : désinfection aux rayons UV, adoucisseur d'eau, filtre) _____

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

Receipt of Sample 13-10-17 Time 12:20 am By SS
Réception de l'échantillon Date 13-10-17 Heure 12:20 (pm) Par SS
YY/MM/DD • AA/MM/JJ

Condition of Sample Satisfactory Unsatisfactory Details 2.8°C
État de l'échantillon Satisfaisant Non satisfaisant Précisez 2.8°C

Incubation 13-10-17 Time 12:50 am By SS Incubator 2
Incubation Date 13-10-17 Heure 12:50 (pm) Par SS Incubateur 2
YY/MM/DD • AA/MM/JJ

Analysis Completed 13-10-18 Time 2:20 am By SS
Analyse terminée Date 13-10-18 Heure 2:20 (pm) Par SS
YY/MM/DD • AA/MM/JJ

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

Total Coliforms/Coliformes totaux

Present / Présence Absent / Absence

E. coli/E. coli

Present / Présence Absent / Absence

Comments / Commentaires

Report Authorized By SS Position WLT Date 13-10-18
Rapport autorisé par SS Poste WLT Date 13-10-18
YY/MM/DD • AA/MM/JJ

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

YG(4649)NC3 Rev.11/2010

Sample Number **54083**
Numéro de l'échantillon **54083**