

June 19, 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: June 10-12, 2013

Trip Dates:	June 10 to 12, 2013
EDI Field Staff:	Joel MacFabe, Brodie Smith, Danny Skookum
Tasks:	Hydrology and Water Quality

Field Summary

EDI completed the surface water quality sampling and hydrometric monitoring at the Mount Nansen site from June 10 to June 12, 2013. Air temperatures during the trip ranged from 8 °C to 18 °C. Weather conditions were a mix of sun and cloud with the occasional period of light rain. Vegetation was greening up with leaves now on the deciduous shrubs and trees.

EDI visited all water quality sites and hydrometric stations. Water levels across all of the sites/stations were typical of this time of year, with some ice remaining in the Dome Creek valley. Small quantities of ice still remain over some portions of the channel along Dome Creek, including the upper valley (H/WQ-DC-U1, H/WQ-DC-U2, H/WQ-DC-D1b) and at the Mount Nansen Road crossing (H/WQ-DC-R). The tailings pond, the Brown-McDade Pit lake and the seepage pond were all ice-free. The seepage pond was sampled as per the request from AAM. The Dry Creek (WQ-DRY) water quality site was also sampled to represent the spring sample (note this site is sampled three times per year: spring, summer and fall).

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 is an appendix of water quality parameters that exceeded guidelines and/or the Mount Nansen Effluent Quality Standards from the previous sampling trips (May 21-23, 2013 and May 27-29, 2013) as well as the ALS lab and Yukon Government (YG) Environmental Health Services analysis reports. 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

Stream discharge measurements were collected using the cross-sectional velocity-area method, alternatively termed the 'mid-section method'. Point velocities were collected at 60% of the stream depth in discretized 'panels' along a stream cross section. Each panel and point velocity measurement is selected such that each panel represents less than 10% of total stream discharge. Where channel conditions did not permit the use of the cross sectional area, salt tracer methods were used. Salt solutions of varying concentrations were slug-injected into the stream with specific conductivity measured at a point downstream. Changes in stream water specific conductivity and conservation of mass is used to estimate stream discharge.

All hydrometric stations were visited and site conditions documented. Table 1 summarizes the hydrometric program monitoring station measurements completed and any additional relevant station details. The data loggers at all continuous stations were downloaded and re-deployed following hydrometric monitoring.

Site conditions at most stations appear to be standard for this time of year. Of note, the hydrometric station at H-DC-U1 is within a braided, ice-containing channel and remained unsuitable for stream discharge measurement. A station was re-deployed at H-DC-R since the channel was now ice-free and suitable for station construction.

Table 1. Hydrometric program details.

Hydrology program dates:	June 10 to 12, 2013	
Weather at time of monitoring:	Weather conditions were mostly overcast with the occasional rain shower, with temperatures between 10°C to 18°C.	
Site	Hydrometric Measurement Type	Notes & Comments
ATM-DC2/DC4	None	Both atmospheric barologgers downloaded.
H-DC-DX	Salt Slug	Water flowing in very small channel. Salt tracer method for stream discharge measurement used.
H-DC-DX+105	Salt Slug	Salt tracer method used to measure stream discharge.
H-DC-D1b	Salt Slug	Flowing channel is well developed and visually appears moderate to high discharge. Stream is flowing through and under thick ice (Photo 2). Channel appears to resume previous years' path and goes subsurface. Salt tracer discharge measurement taken.
H-DC-U1	None	Creek remains frozen to substrate at this location. Complex braided channels are developing on and within the ice. Conditions are not suitable for gauging.



Site	Hydrometric Measurement Type	Notes & Comments
H-DC-U2	Salt Slug	Salt tracer method used to estimate discharge through existing channel. Channel flow levels moderate, flowing through vegetation and under ice (Photo 3).
H-DC-B	Salt Slug	Salt tracer method used to estimate stream discharge. Logger shifted to account for minor silting of stilling well. Logger downloaded.
H-DC-M	Salt Slug	Flow levels moderate, salt tracer used to estimate stream discharge. Logger downloaded.
H-DC-R	Salt Slug	Continuous station re-installed for open water season, as channel was ice free (Photo 12). Salt tracer method used to estimate discharge. Channel divided upstream of stilling well and travels through submerged vegetation. Some challenges with stream discharge measurement. No clearly defined channel capturing all flows. Data under review.
H-VC-REF	ADV	Flow levels moderate, with area-velocity method used to estimate discharge. Stilling well silting, logger raised 0.038 m. Logger downloaded.
H-VC-U	ADV	Station conditions are unchanged from previous visit (Photo 7). Water levels are moderate. Discharge measurement completed using the mid-section method. Logger downloaded.
H-BC	Salt Slug	Station stage levels moderate with bed and suspended sediment load moderate (Photo 8). Salt tracer used to measure discharge. No silting within stilling well. Logger downloaded.
H-VC-DBC	ADV	Stream channel conditions unchanged from previous visit. Water level stage is moderate. Mid-section method used to measure discharge. Logger downloaded.
H-VC-UMN	ADV	Channel conditions unchanged from previous visit, with flows moderate. Mid-section method used to measure discharge. Logger downloaded.
H-MN	Salt Slug	Channel at station is free of ice with moderate water level stage (Photo 9). A salt tracer was used to measure discharge. A water level logger retrofit was deployed at the station and surveyed. Logger downloaded.
H-VC-R	ADV	Stream bed eroded beneath and around stilling well following high-flows. Stream flow normal to moderate. Did not affect logger. Mid-section method used to estimate discharge. Logger downloaded.
H-SEEP	Volumetric	A volumetric measurement was made at the pipe discharge. Flow rate and total volume was recorded from the flow meter. Staff gauge reading (0.292) was recorded.
H-TP	None	Pond is now ice free (Photo 4). New staff gauge installed by DES, read 1.185 m. EDI placed graduation markings on long PVC pipe beside staff gauge for easy future measurement.
H-PC-U	Salt Slug	Water level moderate at station. Significant quantities of water flowing under and around the weir structure. Salt tracer method used to estimate discharge. Logger downloaded.
H-PC-DSP	Salt Slug	Station conditions unchanged from previous visit. The salt tracer method was used to estimate discharge. Logger downloaded.



2. Water Quality

Water quality samples were collected from all monitoring stations with the exception of WQ-MS-S-08. No water was observed at the WQ-MS-S-08 location and therefore this site could not be sampled (Photo 1). This observation is consistent with the previous sampling event.

Most stations were ice free with the exception of WQ-DC-R, WQ-DC-D1b (Photo 2), WQ-DC-U1 and WQ-DC-U2 (Photo 3). The tailings pond (Photo 4), Brown-McDade pit lake (Photo 5) and seepage pond were all ice free. Water samples were collected from the pit lake for the first time since April 16-17, 2013, as unsafe ice conditions prevented sampling during May.

Water samples were collected from the seepage pond, as per request from AAM (Photo 6). The purpose of this sampling was to determine the water quality and ensure compliance with guidelines/standards prior to emptying the pond and discharging it into Dome Creek. One sample was collected from the surface and another from a depth of 2.0 m. The total depth of the pond was 2.3 m. A water quality profile was also conducted at 0.25 m intervals for pH, specific conductance, water temperature and dissolved oxygen.

All water quality samples were delivered to ALS on Thursday, June 13, 2013. Bacteriological samples collected from the pump house well were submitted to YG Environmental Health Services on Thursday, June 13, 2013.

This report includes analytical results from samples collected on May 21-23, 2013 and May 27-29, 2013 (Appendix A) as well as copies of the ALS Certificate of Analysis (Appendix B) and copies of the YG Environmental Health Services results (Appendix C).

WQ Sampling dates:	June 11-12, 2013
Weather at time of sampling:	Conditions ranged from 8 °C to 12 °C, with partly sunny skies and the occasional light precipitation event.

Site	Sampled? (Yes / No)	Notes / Explanations
WQ-PIT1	Yes	Pit lake was ice free, sample collected at surface. Water levels noticeably low (Photo 5).
WQ-PIT2	Yes	Pit lake was ice free, sample collected from the middle (2 m). Water levels noticeably low (Photo 5).
WQ-PIT3	Yes	Pit lake was ice free, sample collected from bottom (3.8 m). Water levels noticeably low (Photo 5).
WQ-SEEP	Yes	Site conditions were normal for time of year.
WQ-TP	Yes	Pond was ice free and conditions were normal for time of year (Photo 4).
WQ-DC-DX	Yes	Creek was ice free, water levels were moderate and turbidity was moderate.
WQ-DC-DX+105	Yes	Site conditions normal for time of year, water levels moderate with turbidity light to moderate.



Site	Sampled? (Yes / No)	Notes / Explanations
WQ-DC-D1b	Yes	Stream flowing over and under ice (ice thickness ~50 cm) (Photo 2). Significant ice was still remaining in old tailings pond upstream.
WQ-DC-U1	Yes	Creek remained ice covered in most sections with ice thicknesses up to 35 cm. Sample was collected from open water area 2 m downstream from regular sampling location. Water levels were moderate and water was clear.
WQ-DC-U2	Yes	Creek remained ice covered in some sections with ice thicknesses up to 50 cm (Photo 3). Sample was collected from open water area. Water levels were low and water was clear.
WQ-DC-U	Yes	Channel was ice free, water levels were moderate with light to moderate turbidity.
WQ-DC-R	Yes	Ice remained over sampling location (ice thickness 10 cm). Sampled approximately 4 m downstream in an open water section. Water levels were moderate to high.
WQ-VC-REF	Yes	Site conditions normal for time of year, water levels were moderate with light turbidity.
WQ-VC-U	Yes	Site conditions normal for time of year, water levels were moderate with light turbidity (Photo 7).
WQ-BC	Yes	Site conditions normal for time of year, water levels were moderate with moderate turbidity (Photo 8).
WQ-VC-DBC	Yes	Site conditions normal for time of year, water levels were moderate with light turbidity.
WQ-VC-UMN	Yes	Site conditions normal for time of year, water levels were moderate with light to moderate turbidity.
WQ-MN	Yes	Site conditions normal for time of year, channel was ice free and flow levels were moderate with moderate turbidity (Photo 9).
WQ-VC-R	Yes	Site conditions normal for time of year, sampling location was completely ice free with moderate flow levels and clear to light turbidity.
WQ-PW	Yes	Bacteriological and drinking water samples collected from discharge pipe.
WQ-PC-U	Yes	Site conditions normal for time of year, moderate flow levels and clear water.
WQ-PC-D	Yes	Site conditions normal for time of year, moderate flow levels and clear water.
WQ-ADIT-SEEP	Yes	Seep was flowing and entering Pony Creek upstream of WQ-PC-D location.
WQ-MS-S-08	No	Seep was dry at time of sampling (Photo 1).
WQ-MS-S-03	Yes	Seep was flowing in lower part of ditch; site was ice and snow free.
WQ-DRY	Yes	Spring water quality sample was collected from reference creek. Water levels were moderate and all ice and snow had melted (Photo 10). Samples will be taken again once in the summer and fall.
WQ-SP-1	Yes	Seepage pond sample collected from surface of pond. One time sampling event (Photo 6).



Site	Sampled? (Yes / No)	Notes / Explanations
WQ-SP-2	Yes	Seepage pond sample collected from depth of 2 m. One time sampling event (Photo 6).
Quality Assurance / Quality Control Samples		
Field Replicate A	Yes	Collected from WQ-VC-UMN.
Field Replicate B	Yes	Collected from WQ-DC-DX.
Field Blank	Yes	Samples prepared with laboratory-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. WQ-MS-S-08 sampling location showing dry conditions.



Photo 2. The H/WQ-DC-D1b location showing persistent ice cover over some portions of the creek.



Photo 3.

The H/WQ-DC-U2 location looking downstream towards tailings pond, showing persistent ice cover over some portions of the creek.



Photo 4.

H/WQ-TP location showing ice free conditions.



Photo 5. WQ-PIT site location showing ice free conditions and relatively low water levels.



Photo 6. The WQ-SP sampling location showing conditions on seepage pond.



Photo 7. WQ-VC-U sampling location, looking downstream to Back Creek confluence.



Photo 8. H/WQ-BC location looking downstream.



Photo 9. The H/WQ-MN location looking downstream.



Photo 10. The WQ-DRY reference sampling location, looking upstream.



Photo 11. New placer excavations in upper Pony Creek near H-PC-U.



Photo 12. Continuous hydrometric station re-installed at H-DC-R site as channel is now ice free.



4. Additional Trip Information/Comments

Any changes to project scope (i.e. additional sites sampled):	A one-time sampling event of the seepage pond (WQ-SP) was conducted on June 11, 2013 at the request of AAM. This involved two water quality samples (including associated lab fees) and time spent sampling and conducting a water quality profile at 0.25 meter intervals. See potential budget implications below.
Any alterations to sample scheduling:	No alterations to the sampling schedule
Any events resulting in changes to budget:	The seepage pond sampling will result in slight additions to the cost of the June 10-12, 2013 trip, reflected as higher lab fees, consumables, and personnel hours. It is not expected that this additional sampling will require a scope change as the additional costs are relatively small, but for your information these expected increase are broken down below as follows: Estimated Lab Fees: \$977.10 - 2 samples plus 5% mark-up Additional Personnel Hours: \$260.00 - 1hr biologist, 1.5hr environmental technician, and 1hr field assistant Disbursements:\$30.00 - Consumables for two additional samples
Additional Comments:	The EDI field crew noticed recent placer activity with excavations downstream of H-PC-U. Excavations do not appear to affect stream flow or water quality (Photo 11). However, placer activities may encroach on the H-PC-U monitoring station.
Wildlife Sightings:	None
Site concerns including safety concerns:	None



Appendix A:
Water Quality Parameter Guideline Exceedances
May 21 - 23, 2013 and May 27-29, 2013



Table A-1. Water Quality Parameter Guideline Exceedances; May 21-23, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-01 WQ-SEEP 5/22/2013	0167-130522-02 WQ-SEEP-r 5/22/2013	0167-130522-03 WQ-MS-S-03 5/22/2013	0167-130522-04 WQ-DC-DX+105 5/22/2013	0167-130522-05 WQ-TP 5/22/2013	0167-130522-06 WQ-DC-U 5/22/2013	0167-130522-09 WQ-VC-U-r 5/22/2013	0167-130522-16 WQ-VC-U 5/22/2013	0167-130522-17 WQ-VC-DBC 5/22/2013
Temperature (in-situ)	°C	-	-	-	2.4	-	0.7	1.8	3.2	0	-	0.1	0.2
Specific Conductivity (in-situ)	µS/cm	-	-	-	1412	-	1160	273.7	492.4	100.5	-	114.1	119
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.13	-	6.93	7.09	7.65	7.18	-	7.49	7.45
Turbidity (in-situ)	NTU	-	-	-	39	-	29.2	29.1	5.59	1.39	-	17.73	37.9
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1400	1400	1180	282	410	103	119	119	125
Hardness (as CaCO3)	mg/L	-	-	0.5	733	731	716	141	189	50.6	60.9	61.6	63.9
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.43	7.45	7.63	7.52	7.21	7.36	7.81	7.77	7.79
Total Suspended Solids	mg/L	-	50	3	32.3	40.2	74.9	62.8	7	<3.0	58.9	48.1	140
Total Dissolved Solids	mg/L	-	-	10	1130	1090	918	216	298	109	103	99	106
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	216	212	256	49.5	16.3	24.6	51.4	53.9	54
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
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
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	216	212	256	49.5	16.3	24.6	51.4	53.9	54
Ammonia, Total (as N)	mg/L	-	-	0.005	4.42	3.9	0.0954	0.0142	0.116	0.0116	0.0052	0.0064	0.0113
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	<0.20	<0.20	0.056	0.067	0.023	0.041	0.041	0.043
Nitrate (as N)	mg/L	3	-	0.005	1.15	1.16	<0.050	<0.0050	0.0244	<0.0050	0.0642	0.0646	0.0626
Nitrite (as N)	mg/L	0.06	-	0.001	0.042	0.043	<0.010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	604	601	461	88.9	175	23.6	8.43	8.44	11.1
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	0.0065	0.0053	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	0.0263	0.0241	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.29	0.22
Thiocyanate (SCN)	mg/L	-	-	0.5	2.96	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	0.0463	0.0447	0.0984	1.37	0.128	0.173	0.829	0.948	2.51
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00069	0.00068	0.0161	0.00549	0.0167	0.00031	0.00013	0.00015	0.00049
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0505	0.049	0.1	0.0335	0.0413	0.00285	0.00185	0.002	0.0105
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0575	0.0611	0.022	0.0479	0.00928	0.0288	0.0619	0.0645	0.0975
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
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
Boron (B)-Total	mg/L	-	-	0.01	0.076	0.071	<0.010	<0.010	0.015	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	0.000514	0.000505	0.00413	0.00321	0.00279	0.000076	0.000074	0.000061	0.000256
Calcium (Ca)-Total	mg/L	-	-	0.05	222	218	180	37.9	62.7	14.7	14.9	15.7	17.1
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.00152	0.00056	0.00072	0.00183	0.00019	0.00023	0.00125	0.00185	0.00335
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00774	0.00747	0.00173	0.0008	0.00058	0.00012	0.00055	0.00061	0.00149
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0075	0.00587	0.00326	0.00744	0.0289	0.00215	0.0042	0.00564	0.00698
Iron (Fe)-Total	mg/L	0.3	1	0.01	12.8	12.7	3.14	2.28	0.373	0.246	1.26	1.36	3.54
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000439	0.000434	0.0073	0.014	0.0132	0.000245	0.00135	0.00137	0.00768
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00058	0.00053	0.00905	0.00214	0.0012	<0.00050	0.00085	0.00075	0.00166
Magnesium (Mg)-Total	mg/L	-	-	0.1	42	41.5	62.9	11.2	9.42	3.35	5.36	5.58	5.93
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	5.45	5.45	2.13	0.271	0.941	0.0338	0.0529	0.0608	0.16
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
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.00131	0.000984	0.000476	0.000145	0.000421	0.000051	0.000307	0.000446	0.000516
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00249	0.0024	0.00278	0.00789	0.00115	0.00075	0.00611	0.00141	0.00272
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	0.079	<0.050	<0.050	0.053	0.056	0.135
Potassium (K)-Total	mg/L	-	-	0.1	6.14	6.18	3.65	3.2	2.46	1.4	1.01	1.03	1.43



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Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00018	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	6.16	6.11	6.45	5.14	0.963	2.09	4.49	4.83	7.61
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000041	0.000045	0.000068	0.000312	0.000395	0.000015	0.000022	0.000035	0.000086
Sodium (Na)-Total	mg/L	-	-	0.05	38.3	36.3	4.64	1.2	2.32	1.12	1.46	1.57	1.78
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.684	0.64	0.426	0.102	0.137	0.102	0.168	0.185	0.176
Sulfur (S)-Total	mg/L	-	-	0.5	204	203	153	29.6	59.6	8.1	2.98	3.11	3.94
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	0.00011	0.00008	0.000063	<0.000010	0.000013	0.000013	0.000044
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
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	0.053	<0.010	<0.010	0.036	0.04	0.107
Uranium (U)-Total	mg/L	-	-	0.00001	0.00212	0.00201	0.00363	0.000627	0.000158	0.000113	0.000516	0.00055	0.000682
Vanadium (V)-Total	mg/L	-	-	0.001	0.0021	0.0018	<0.0010	0.005	<0.0010	<0.0010	0.0026	0.0029	0.0069
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0107	0.0107	1.2	0.457	0.289	0.0079	0.0084	0.0086	0.0236
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0127	0.0139	0.0021	0.0796	0.0302	0.135	0.069	0.0643	0.0676
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00059	0.00059	0.0157	0.00308	0.014	0.00027	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0325	0.0325	0.0764	0.00895	0.0207	0.00247	0.00038	0.00036	0.0006
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0546	0.0543	0.019	0.0288	0.00796	0.0272	0.0487	0.0467	0.0464
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
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
Boron (B)-Dissolved	mg/L	-	-	0.01	0.071	0.072	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	0.000368	0.000374	0.00342	0.00253	0.00252	0.000063	0.000025	0.000027	0.000046
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	224	223	185	38.3	60.4	14.8	15.5	15.7	16.7
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00036	0.00032	<0.00010	0.00014	<0.00010	0.00016	0.00014	0.00013	0.00013
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00766	0.00753	0.00158	0.00019	0.00052	<0.00010	<0.00010	<0.00010	0.00011
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00254	0.00244	0.00037	0.00392	0.022	0.00188	0.00262	0.00262	0.0028
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	9.43	9.44	2.53	0.158	0.108	0.187	0.136	0.135	0.14
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	<0.000050	0.000558	0.000367	0.00143	0.000087	<0.000050	<0.000050	0.000064
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00054	0.00059	0.00912	0.00129	0.00111	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	42	42.1	61.6	10.9	9.15	3.34	5.41	5.43	5.36
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	5.35	5.19	1.9	0.226	0.836	0.0307	0.0212	0.0209	0.0444
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
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.00101	0.00101	0.000324	0.000082	0.00038	<0.000050	0.000257	0.000254	0.000302
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	0.00233	0.00237	0.00242	0.0015	0.00104	0.00066	0.00064	0.00057	0.00067
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
Potassium (K)-Dissolved	mg/L	-	-	0.1	6.36	6.42	3.62	2.98	2.35	1.36	0.94	0.92	0.91
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00018	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.02	5.99	6.06	2.8	0.698	2.02	3.58	3.6	3.58
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	0.00002	0.000067	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	37.7	38	4.57	1.09	2.28	1.12	1.47	1.49	1.5
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.663	0.662	0.426	0.0939	0.129	0.0973	0.17	0.169	0.167
Sulfur (S)-Dissolved	mg/L	-	-	0.5	199	200	149	29.5	57	7.89	3.09	3.06	3.92
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	0.000092	0.000018	0.000054	<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
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
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.00197	0.00209	0.00343	0.000527	0.000143	0.000108	0.000393	0.000399	0.000436
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.0011	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0084	0.0085	1.22	0.443	0.266	0.0063	0.002	0.0013	0.0016



Table A-1. Water Quality Parameter Guideline Exceedances; May 21-23, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-18 WQ-DC-R 5/22/2013	0167-130522-19 WQ-VC-UMN 5/22/2013	0167-130522-20 WQ-VC-R 5/22/2013	0167-130522-21 WQ-PC-D 5/22/2013	0167-130522-23 WQ-DC-U 5/22/2013	0167-130522-24 WQ-ADIT-SEEP 5/22/2013	0167-130522-25 WQ-DC-U2 5/22/2013	TRAVEL Trip Blank 5/22/2013
Temperature (in-situ)	°C	-	-	-	0	0	0	1.7	0.5	1.8	0	
Specific Conductivity (in-situ)	µS/cm	-	-	-	736	165.7	147.3	105.3	633.5	112.2	601.2	
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	8.01	7.53	6.66	7.25	7.86	7.8	7.89	
Turbidity (in-situ)	NTU	-	-	-	19.84	10.83	9.73	13.92	120	2.38	51.1	
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	755	170	154	111	649	107	617	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	405	85.6	75	53.5	354	52.9	339	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.04	7.89	7.85	7.51	7.94	7.42	7.98	5.59
Total Suspended Solids	mg/L	-	50	3	41.3	11.4	8	5.3	732	<3.0	113	<3.0
Total Dissolved Solids	mg/L	-	-	10	577	139	126	120	491	124	463	<10
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	120	58.8	53.2	25.3	103	24.4	104	<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
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	120	58.8	53.2	25.3	103	24.4	104	<1.0
Ammonia, Total (as N)	mg/L	-	-	0.005	0.547	0.0203	0.0168	0.0062	0.0076	0.0084	0.0746	0.0141
Chloride (Cl)	mg/L	-	-	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.073	0.041	0.045	0.023	0.058	0.038	0.062	<0.020
Nitrate (as N)	mg/L	3	-	0.005	0.168	0.0687	0.0607	<0.0050	0.0601	<0.0050	0.0086	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	0.0059	<0.0010	<0.0010	<0.0010	0.0023	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	284	27.3	23.7	26.3	243	25.3	224	<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
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	0.29	<0.20	<0.20	0.2	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	0.57	<0.50	0.54	<0.50	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	0.533	0.588	0.693	0.206	6.71	0.167	1.72	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00235	0.00035	0.00041	0.00074	0.00548	0.00038	0.00853	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.022	0.00342	0.00424	0.0046	0.0648	0.00278	0.0594	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0594	0.0597	0.0603	0.0267	0.152	0.0274	0.0557	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	<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
Boron (B)-Total	mg/L	-	-	0.01	0.02	<0.010	<0.010	<0.010	0.019	<0.010	0.019	<0.010
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	0.00046	0.000094	0.000102	0.000211	0.00135	0.000088	0.00178	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	98.5	22	19.7	15.6	91.4	15.6	81.5	<0.050
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.00193	0.00187	0.00097	0.00031	0.0109	0.00034	0.00382	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00158	0.00043	0.00049	<0.00010	0.00475	<0.00010	0.00121	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00563	0.00499	0.00407	0.0062	0.018	0.00262	0.0103	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	3.42	0.819	1.13	0.285	15.4	0.215	4.8	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.00293	0.0014	0.0021	0.00153	0.0194	0.000433	0.0203	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0018	0.00071	0.00082	<0.00050	0.00629	<0.00050	0.00378	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	34.7	7.36	6.58	3.6	35.6	3.52	34.7	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	1.3	0.113	0.125	0.00633	1.16	0.005	0.775	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000035	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.000611	0.000667	0.000392	0.000052	0.000499	0.000073	0.000564	<0.000050
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00162	0.00109	0.00127	0.00075	0.00906	0.00074	0.00247	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	0.607	<0.050	0.122	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.03	1.28	1.31	1.52	3.43	1.43	2.87	<0.10



Table A-1. Water Quality Parameter Guideline Exceedances; May 21-23, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-18 WQ-DC-R 5/22/2013	0167-130522-19 WQ-VC-UMN 5/22/2013	0167-130522-20 WQ-VC-R 5/22/2013	0167-130522-21 WQ-PC-D 5/22/2013	0167-130522-23 WQ-DC-U 5/22/2013	0167-130522-24 WQ-ADIT-SEEP 5/22/2013	0167-130522-25 WQ-DC-U2 5/22/2013	TRAVEL Trip Blank 5/22/2013
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00013	<0.00010	<0.00010	<0.00010	0.00039	<0.00010	0.00023	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	4.03	5	5	2.45	12.5	2.33	5.39	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000058	0.000024	0.000035	0.000036	0.000324	0.00002	0.000346	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	7.97	2.08	1.98	1.21	4.2	1.26	2.55	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.333	0.194	0.164	0.102	0.295	0.102	0.23	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	95.2	9.41	8.18	8.97	81.8	8.71	77.3	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000016	0.000011	0.000015	<0.000010	0.000109	<0.000010	0.000071	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.023	0.017	0.022	<0.010	0.292	<0.010	0.085	<0.010
Uranium (U)-Total	mg/L	-	-	0.00001	0.00136	0.000539	0.000514	0.000101	0.00175	0.000098	0.00133	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	0.0026	0.0018	0.0021	<0.0010	0.0248	<0.0010	0.0074	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0609	0.0081	0.0098	0.0195	0.198	0.0116	0.236	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0543	0.0619	0.0748	0.126	0.0425	0.129	0.0134	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00194	0.00026	0.00024	0.00056	0.00341	0.00032	0.00538	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00994	0.00162	0.00153	0.00284	0.00588	0.00209	0.00753	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0492	0.049	0.0487	0.0249	0.0322	0.0257	0.0256	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<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	-
Boron (B)-Dissolved	mg/L	-	-	0.01	0.018	<0.010	<0.010	<0.010	0.014	<0.010	0.016	-
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	0.000249	0.000063	0.000058	0.000192	0.000278	0.000064	0.000557	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	103	22.3	19.5	15.6	86.3	15.4	79.6	-
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00015	0.00012	0.00017	0.00017	<0.00010	0.00019	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00129	0.00018	0.00022	<0.00010	0.00064	<0.00010	0.00038	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00179	0.00282	0.00288	0.00591	0.00164	0.00233	0.00187	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	1.3	0.164	0.297	0.156	0.576	0.157	0.213	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000144	0.000098	0.000108	0.000456	0.000207	0.000082	0.000304	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00149	<0.00050	<0.00050	<0.00050	0.0019	<0.00050	0.00256	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	36	7.28	6.38	3.53	33.6	3.51	34.1	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	1.18	0.0842	0.0968	0.00405	0.773	0.00177	0.665	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000322	0.000309	0.000293	<0.000050	0.000194	<0.000050	0.000159	-
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	0.001	0.00069	0.00082	0.00074	0.00075	0.00071	0.00062	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	3.07	1.12	1.13	1.44	2.49	1.44	2.59	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.0001	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	0.00015	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.27	3.79	3.55	2.28	2.51	2.24	2.37	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	8.17	2.18	2.02	1.22	3.64	1.21	2.31	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.326	0.178	0.162	0.0997	0.254	0.0975	0.21	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	97.1	9.35	8.12	8.94	81.9	8.53	75.4	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<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	-
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.00132	0.000478	0.000443	0.000087	0.00115	0.000089	0.000982	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.039	0.0043	0.0042	0.0187	0.0461	0.009	0.114	-



Table A-1. Water Quality Parameter Guideline Exceedances; May 21-23, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit
Temperature (in-situ)	°C	-	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-
Turbidity (in-situ)	NTU	-	-	-
Colour, True	CU	15	-	5
Conductivity	µS/cm	-	-	2
Hardness (as CaCO3)	mg/L	-	-	0.5
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1
Total Suspended Solids	mg/L	-	50	3
Total Dissolved Solids	mg/L	-	-	10
Turbidity	NTU	-	-	0.1
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1
Alkalinity, Total (as CaCO3)	mg/L	-	-	1
Ammonia, Total (as N)	mg/L	-	-	0.005
Chloride (Cl)	mg/L	-	-	0.5
Fluoride (F)	mg/L	0.12	-	0.02
Nitrate (as N)	mg/L	3	-	0.005
Nitrite (as N)	mg/L	0.06	-	0.001
Sulfate (SO4)	mg/L	-	-	0.5
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005
Cyanide, Total	mg/L	-	0.3	0.005
Cyanate	mg/L	-	-	0.2
Thiocyanate (SCN)	mg/L	-	-	0.5
Aluminum (Al)-Total	mg/L	0.005	-	0.003
Antimony (Sb)-Total	mg/L	-	0.15	0.0001
Arsenic (As)-Total	mg/L	0.005	-	0.0001
Barium (Ba)-Total	mg/L	-	1	0.00005
Beryllium (Be)-Total	mg/L	-	-	0.0001
Bismuth (Bi)-Total	mg/L	-	-	0.0005
Boron (B)-Total	mg/L	-	-	0.01
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001
Calcium (Ca)-Total	mg/L	-	-	0.05
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001
Cobalt (Co)-Total	mg/L	-	-	0.0001
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005
Iron (Fe)-Total	mg/L	0.3	1	0.01
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005
Lithium (Li)-Total	mg/L	-	-	0.0005
Magnesium (Mg)-Total	mg/L	-	-	0.1
Manganese (Mn)-Total	mg/L	-	0.5	0.00005
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005
Phosphorus (P)-Total	mg/L	-	-	0.05
Potassium (K)-Total	mg/L	-	-	0.1

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

- Mount Nansen Effluent Discharge Standards

Color Key: Exceeds CCME Guideline

Exceeds MN Effluent Discharge Standards

Exceeds both CCME and MN Standards

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



Table A-1. Water Quality Parameter Guideline Exceedances; May 21-23, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit
Selenium (Se)-Total	mg/L	0.001	-	0.0001
Silicon (Si)-Total	mg/L	-	-	0.05
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001
Sodium (Na)-Total	mg/L	-	-	0.05
Strontium (Sr)-Total	mg/L	-	-	0.0002
Sulfur (S)-Total	mg/L	-	-	0.5
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001
Tin (Sn)-Total	mg/L	-	-	0.0001
Titanium (Ti)-Total	mg/L	-	-	0.01
Uranium (U)-Total	mg/L	-	-	0.00001
Vanadium (V)-Total	mg/L	-	-	0.001
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003
Dissolved Metals Filtration Location		-	-	n/a
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001
Barium (Ba)-Dissolved	mg/L	-	-	0.00005
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005
Boron (B)-Dissolved	mg/L	-	-	0.01
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001
Calcium (Ca)-Dissolved	mg/L	-	-	0.05
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005
Lithium (Li)-Dissolved	mg/L	-	-	0.0005
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005
Phosphorus (P)-Dissolved	mg/L	-	-	0.05
Potassium (K)-Dissolved	mg/L	-	-	0.1
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001
Silicon (Si)-Dissolved	mg/L	-	-	0.05
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001
Sodium (Na)-Dissolved	mg/L	-	-	0.05
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002
Sulfur (S)-Dissolved	mg/L	-	-	0.5
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001
Tin (Sn)-Dissolved	mg/L	-	-	0.0001
Titanium (Ti)-Dissolved	mg/L	-	-	0.01
Uranium (U)-Dissolved	mg/L	-	-	0.00001
Vanadium (V)-Dissolved	mg/L	-	-	0.001
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001



Table A-2. Water Quality Parameter Guideline Exceedances; May 27 and 29, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130529-013	0167-130529-008	0167-130529-015	0167-130529-022	0167-130529-002	0167-130529-019	0167-130529-020	0167-130529-016	0167-130529-017	0167-130528-021	0167-130528-023	0167-130528-007
				WQ Site ID	WQ-DC-DX	WQ-DC-D1	WQ-MS-S-03	WQ-DC-D1b	WQ-DC-DX+105	WQ-SEEP	WQ-TP	WQ-DC-U2	WQ-DC-U	WQ-VC-R	WQ-VC-UMN	WQ-PC-D
				Date Sampled	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/28/2013	5/28/2013	5/28/2013
				Detection Limit												
Temperature (in-situ)	°C	-	-	-	1.5	2.0	1.4	0.1	7.3	2.9	10.3	0.7	1.1	2.4	3.1	3.1
Specific Conductivity (in-situ)	µS/cm	-	-	-	143.2	501.1	1229.0	1003.0	296.2	1384.0	695.0	809.9	838.1	64.3	72.2	90.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.25	7.62	6.83	7.70	6.99	6.65	7.30	7.66	7.29	6.06	6.83	7.08
Turbidity (in-situ)	NTU	-	-	-	45.1	14.2	2.60	16.4	266.0	25.9	-	13.4	13.3	61.7	60.5	1.82
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	128	469	1150	934	286	1290	703	982	813	67.9	68.8	87.8
Hardness (as CaCO3)	mg/L	-	-	0.5	68	271	735	584	152	705	352	547	461	33.2	35.5	43
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.28	7.87	7.27	8.03	7.39	7.13	7.62	7.95	7.95	7.42	7.43	7.41
Total Suspended Solids	mg/L	-	50	3	181	62.9	10.9	40.6	383	33.1	10.3	61.8	73.9	225	195	7.2
Total Dissolved Solids	mg/L	-	-	10	101	349	951	782	213	1060	527	750	651	65	71	94
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	39.9	105	276	153	70.3	214	44.4	141	124	25.3	25.5	24.4
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	39.9	105	276	153	70.3	214	44.4	141	124	25.3	25.5	24.4
Ammonia, Total (as N)	mg/L	-	-	0.005	0.0274	0.0108	0.086	0.168	0.0151	3.85	0.311	0.0963	0.358	0.0214	0.02	0.0058
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50	<5.0	<5.0	<0.50	<5.0	<0.50	<2.5	<2.5	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.037	0.076	0.47	<0.20	0.089	0.33	0.102	0.1	<0.10	0.047	0.044	0.05
Nitrate (as N)	mg/L	3	-	0.005	0.0257	0.0249	<0.050	<0.050	0.0288	1.08	0.0767	0.032	0.096	0.0293	0.0294	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	0.0035	0.0019	<0.010	<0.010	0.0028	0.04	0.0028	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	34.7	159	476	437	82.4	636	313	412	344	9.23	10.7	19.4
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	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0337	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<2.0	<0.20	<0.20	<0.20	<0.20	0.3	<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	3.66	<0.50	<0.50	0.56	<0.50	0.54	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	4.35	1.08	0.0483	0.542	11.4	0.0672	0.227	0.815	0.783	3.8	3.27	0.17
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00301	0.00585	0.0173	0.0104	0.00544	0.0007	0.0313	0.0048	0.00277	0.00057	0.00054	0.00072
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0409	0.0401	0.0925	0.05	0.107	0.0504	0.117	0.0154	0.0141	0.0124	0.0105	0.0031
Barium (Ba)-Total	mg/L	-	1	0.00005	0.098	0.0306	0.0185	0.0309	0.168	0.0609	0.0148	0.0516	0.0547	0.101	0.0839	0.0254
Beryllium (Be)-Total	mg/L	-	-	0.0001	0.00017	<0.00010	<0.00010	<0.00010	0.00035	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00012	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	0.031	<0.010	0.038	0.023	0.02	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	0.000211	0.00228	0.00339	0.00192	0.00183	0.000458	0.00287	0.000315	0.000213	0.000353	0.000261	0.000191
Calcium (Ca)-Total	mg/L	-	-	0.05	19.7	68.9	194	135	42.5	213	99.5	126	110	10.5	10.4	12.5
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.0063	0.00145	0.00011	0.00084	0.0128	0.00175	0.00028	0.00153	0.00248	0.00497	0.00414	0.00028
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00192	0.00078	0.00157	0.00062	0.006	0.00704	0.00114	0.0009	0.00132	0.00253	0.00209	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0107	0.00571	0.00093	0.00529	0.0279	0.00632	0.0365	0.0033	0.00417	0.0106	0.00933	0.00536
Iron (Fe)-Total	mg/L	0.3	1	0.01	5.79	2.03	3.2	2.38	18.8	13	1.13	1.83	2.83	5.91	4.84	0.312
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.00761	0.00923	0.00572	0.0137	0.0147	0.000654	0.047	0.00152	0.00143	0.00944	0.00784	0.000814
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00248	0.00335	0.00972	0.00437	0.00731	<0.00050	0.00217	0.00372	0.00206	0.00203	0.0017	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	6.17	21.2	64.2	53.2	15.7	40.8	21.9	53.2	41.1	3.77	3.69	2.81
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.104	0.405	1.97	0.844	0.584	5.29	1.48	0.726	0.937	0.232	0.176	0.0109
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.000013	<0.000010	<0.000010	<0.000010	0.000053	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.000161	0.000204	0.000362	0.00023	0.000314	0.00134	0.000901	0.000291	0.000586	0.00046	0.000461	0.000069
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00354	0.00196	0.00262	0.00142	0.00756	0.00235	0.00183	0.00164	0.00168	0.00381	0.00312	0.00063
Phosphorus (P)-Total	mg/L	-	-	0.05	0.168	0.061	<0.050	<0.050	0.271	<0.050	<0.050	0.056	0.057	0.265	0.183	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.16	2.51	3.66	3.43	3.99	5.7	5.14	3.34	2.81	1.29	1.23	0.9
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00012	<0.00010	<0.00010	0.00028	0.00021	0.00021	<0.00010	0.00027	0.0002	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	8.79	5.32	6.53	4.55	21.4	6.21	1.64	4.99	4.46	7.4	6.73	2.55
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000194	0.000159	0.000047	0.000235	0.000511	0.000056	0.001	0.000047	0.000036	0.000113	0.00011	0.000023
Sodium (Na)-Total	mg/L	-	-	0.05	1.34	2.22	4.84	3.73	1.81	36	6.98	4.4	5.99	1.1	1.1	1.16
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0693	0.169	0.44	0.335	0.119	0.654	0.248	0.344	0.321	0.0866	0.0876	0.0854
Sulfur (S)-Total	mg/L	-	-	0.5	11.1	52.1	160	137	28.1	194	103	131	110	3.18	3.65	6.45
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000148	0.000067	0.0001									



Table A-2. Water Quality Parameter Guideline Exceedances; May 27 and 29, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130529-013	0167-130529-008	0167-130529-015	0167-130529-022	0167-130529-002	0167-130529-019	0167-130529-020	0167-130529-016	0167-130529-017	0167-130528-021	0167-130528-023	0167-130528-007
				WQ Site ID	WQ-DC-DX	WQ-DC-D1	WQ-MS-S-03	WQ-DC-D1b	WQ-DC-DX+105	WQ-SEEP	WQ-TP	WQ-DC-U2	WQ-DC-U	WQ-VC-R	WQ-VC-UMN	WQ-PC-D
				Date Sampled	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/29/2013	5/28/2013
				Detection Limit												
Vanadium (V)-Total	mg/L	-	-	0.001	0.0174	0.0038	<0.0010	0.0022	0.0424	0.0022	<0.0010	0.0038	0.0041	0.0113	0.0091	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.031	0.424	1.15	0.371	0.312	0.0108	0.257	0.0671	0.0292	0.0327	0.0267	0.0152
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	0.0262	0.0137	0.002	0.007	0.0413	0.0105	0.0244	0.0115	0.0503	0.104	0.102	0.0862
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00108	0.00416	0.0157	0.0077	0.00281	0.00052	0.0243	0.00472	0.00263	0.00013	0.00015	0.00056
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00446	0.00972	0.07	0.0112	0.0053	0.0297	0.0422	0.00686	0.00735	0.00095	0.00089	0.0022
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0385	0.0163	0.0177	0.02	0.0375	0.0562	0.0111	0.0383	0.0423	0.0245	0.0247	0.0237
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	0.03	<0.010	0.066	0.035	0.021	0.019	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	0.000011	0.000994	0.00172	0.00075	0.000698	0.000285	0.00245	0.000112	0.00007	0.000045	0.00005	0.000158
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	18.9	72.8	191	143	40.9	215	104	129	115	9.06	9.61	12.6
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00013	<0.00010	<0.00010	<0.00010	0.00015	0.00028	<0.00010	<0.00010	0.00013	0.00016	0.00014	0.00019
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00018	0.00019	0.00143	0.00038	0.00025	0.00665	0.0011	0.00044	0.00099	0.00015	0.00015	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00165	0.00251	0.0002	0.00162	0.00402	0.00196	0.0243	0.00099	0.00118	0.00308	0.00303	0.00466
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.773	0.081	2.7	0.204	0.153	7.61	0.17	0.168	1.02	0.27	0.182	0.158
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000081	0.000144	0.00035	0.000134	0.00012	<0.000050	0.00291	0.000212	0.00011	0.000168	0.000153	0.000222
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	0.00275	0.00879	0.00422	0.00064	<0.00050	0.00216	0.00333	0.00167	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	5.07	21.7	62.5	55.1	12.1	41	22.3	54.4	42.3	2.57	2.79	2.8
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0538	0.312	1.84	0.763	0.244	5.05	1.46	0.637	0.937	0.035	0.0314	0.0085
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	0.000068	0.000185	0.000335	0.000194	0.000107	0.00092	0.000867	0.00023	0.000289	0.000181	0.000184	0.000061
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	<0.00050	0.00093	0.00237	0.00085	0.00086	0.00203	0.00169	0.00065	0.00093	0.00059	0.00055	0.00063
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	2.64	2.38	3.67	3.51	1.89	5.7	5.09	3.42	2.82	0.7	0.73	0.9
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	0.0003	<0.00010	0.00021	<0.00010	0.00023	0.00016	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.72	3.88	6.28	3.67	3.06	5.94	1.23	3.94	3.51	2.06	2.06	2.42
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	0.000011	0.000024	0.000024	0.000015	<0.000010	0.000023	0.000121	<0.000010	0.000021	0.000035	0.000011	0.000041
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.2	2.15	4.7	3.86	1.54	34.7	6.95	4.35	6.3	0.849	0.875	1.14
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0611	0.168	0.412	0.336	0.0963	0.629	0.251	0.34	0.328	0.0697	0.0744	0.0809
Sulfur (S)-Dissolved	mg/L	-	-	0.5	11.5	54.2	154	140	28.8	192	104	132	112	3.16	3.67	6.5
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000032	0.000092	0.000023	0.000024	<0.000010	0.000114	<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	-	-	0.00001	0.00004	0.00109	0.00347	0.00167	0.000653	0.00183	0.000415	0.00168	0.00144	0.000193	0.0002	0.000074
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0016	0.302	1.1	0.275	0.191	0.0086	0.227	0.0452	0.0197	0.0025	0.003	0.0123



Table A-2. Water Quality Parameter Guideline Exceedances; May 27 and 29, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130528-009	0167-130528-026	0167-130528-024	0167-130528-006	0167-130528-012	0167-130528-003	TRAVEL	0167-130528-031	0167-130528-010	0167-130528-001	0167-130528-014	0167-130528-025
				WQ Site ID	WQ-VC-DBC	H-VC-U	WQ-BC	WQ-VC-REF	WQ-PC-D-r	WQ-DC-R	TRAVEL BLANK	FIELD BLANK	WQ-ADIT-SEEP	WQ-PC-U	WQ-DC-U1	WQ-MN
				Date Sampled	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013
Detection Limit																
Temperature (in-situ)	°C	-	-	-	6.1	6.1	7.0	5.9	-	0.9	-	-	2.5	1.0	0.0	0.6
Specific Conductivity (in-situ)	µS/cm	-	-	-	50.7	47.5	86.5	47.0	-	622.8	-	-	88.0	89.6	463.0	45.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.06	7.03	7.28	7.05	-	7.46	-	-	7.03	7.08	7.37	6.38
Turbidity (in-situ)	NTU	-	-	-	56.5	39.9	346.0	46.4	-	44.5	-	-	1.91	2.34	0.99	26.3
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	49.6	44.9	80.9	43.8	86.9	589	<2.0	<2.0	84.1	84.6	612	43.9
Hardness (as CaCO3)	mg/L	-	-	0.5	27	25.5	42.8	24.4	44.7	333	-	<0.50	43.2	42.7	358	21.7
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.4	7.37	7.48	7.36	7.41	7.89	5.85	5.83	7.39	7.27	7.73	7.07
Total Suspended Solids	mg/L	-	50	3	231	121	1090	269	57.2	77.2	<3.0	<3.0	<3.0	7.2	5.2	62.5
Total Dissolved Solids	mg/L	-	-	10	59	53	93	51	84	442	<10	<10	84	82	476	72
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	22.8	23.1	28.8	22.8	24.6	96.8	1.1	<1.0	23.6	24	91.2	21.2
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	22.8	23.1	28.8	22.8	24.6	96.8	1.1	<1.0	23.6	24	91.2	21.2
Ammonia, Total (as N)	mg/L	-	-	0.005	0.0159	0.0123	0.0726	0.0131	0.0059	0.378	0.0238	<0.0050	0.0058	0.006	0.0097	0.0611
Chloride (Cl)	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	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.045	0.039	0.069	0.043	0.045	0.076	<0.020	<0.020	0.038	0.037	0.041	0.029
Nitrate (as N)	mg/L	3	-	0.005	0.0244	0.027	0.0527	0.0237	<0.0050	0.0731	<0.0050	<0.0050	<0.0050	<0.0050	0.0062	0.0269
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	0.0022	<0.0010	<0.0010	0.0048	<0.0010	<0.0010	<0.0010	<0.0010	0.0018	0.0044
Sulfate (SO4)	mg/L	-	-	0.5	4.06	3.04	14.2	3.01	19.5	233	<0.50	<0.50	18.6	18.1	255	2.06
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	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	0.34	<0.20	<0.20	<0.20	<0.20	<0.20	<2.0	<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	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	3.76	3.41	17.2	3.72	0.19	0.921	<0.0030	<0.0030	0.138	0.14	0.0715	1.13
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00051	0.00038	0.00229	0.00043	0.00068	0.00258	<0.00010	<0.00010	0.0004	0.00041	0.00234	0.00026
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0114	0.00814	0.076	0.00934	0.0034	0.047	<0.00010	<0.00010	0.00248	0.00285	0.00796	0.0048
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0924	0.0841	0.346	0.0915	0.0254	0.0597	<0.000050	<0.000050	0.0264	0.0271	0.0313	0.0788
Beryllium (Be)-Total	mg/L	-	-	0.0001	0.00015	0.00013	0.00072	0.00014	<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	0.00124	<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	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	0.018	<0.010
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	0.000325	0.00029	0.00178	0.000293	0.000192	0.000314	<0.000010	<0.000010	0.000064	0.000037	0.000105	0.000101
Calcium (Ca)-Total	mg/L	-	-	0.05	8.5	8.03	19.8	7.81	13.2	86.6	<0.050	<0.050	12.7	12.7	86.8	6.46
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.00603	0.0047	0.029	0.00522	0.00033	0.00197	<0.00010	<0.00010	0.00026	0.00023	0.00016	0.00261
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00221	0.0021	0.0104	0.00233	0.0001	0.00131	<0.00010	<0.00010	<0.00010	0.00015	0.00057	0.00159
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0112	0.00988	0.043	0.0109	0.00577	0.00426	<0.00050	<0.00050	0.00223	0.00186	0.0013	0.00536
Iron (Fe)-Total	mg/L	0.3	1	0.01	5.55	5.18	25.7	5.6	0.332	4.17	<0.010	<0.010	0.295	0.471	0.405	5.4
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.00905	0.00635	0.0662	0.00716	0.000838	0.00572	<0.000050	<0.000050	0.000362	0.000212	0.000465	0.000839
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00196	0.00231	0.0132	0.00264	<0.00050	0.00137	<0.00050	<0.00050	<0.00050	<0.00050	0.00196	0.00064
Magnesium (Mg)-Total	mg/L	-	-	0.1	3.04	3	8.78	2.88	2.93	26.3	<0.10	<0.10	2.84	2.85	34.9	1.93
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.16	0.128	0.891	0.137	0.011	1.04	<0.000050	<0.000050	0.00841	0.0618	0.301	0.442
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	0.000019	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.000629	0.000406	0.00151	0.000751	0.000063	0.000322	<0.000050	<0.000050	0.000057	0.000063	0.000211	0.000285
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00362	0.00323	0.0191	0.00714	0.00068	0.00177	<0.00050	<0.00050	0.00061	0.0007	0.00074	0.00323
Phosphorus (P)-Total	mg/L	-	-	0.05	0.205	0.189	0.974	0.198	<0.050	0.076	<0.050	<0.050	<0.050	<0.050	<0.050	0.068
Potassium (K)-Total	mg/L	-	-	0.1	1.2	1.32	4.39	1.1	0.94	2.38	<0.10	<0.10	0.93	0.91	2.57	1.2
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	0.00016	0.00016
Silicon (Si)-Total	mg/L	-	-	0.05	7.35	6.95	30.3	7.1	2.69	4.13	<0.050	<0.050	2.57	2.56	2.69	4.79
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.00015	0.000129	0.000916	0.000147	0.00003	0.000112	<0.000010	<0.000010	0.000014	0.000016	0.000014	0.000022
Sodium (Na)-Total	mg/L	-	-	0.05	0.966	0.869	2.29	0.884	1.16	5.03	<0.050	<0.050	1.19	1.21	2.58	1.16
Strontium (Sr)-Total	mg/L	-	-	0.0												



Table A-2. Water Quality Parameter Guideline Exceedances; May 27 and 29, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130528-009	0167-130528-026	0167-130528-024	0167-130528-006	0167-130528-012	0167-130528-003	TRAVEL	0167-130528-031	0167-130528-010	0167-130528-001	0167-130528-014	0167-130528-025
				WQ Site ID	WQ-VC-DBC	H-VC-U	WQ-BC	WQ-VC-REF	WQ-PC-D-r	WQ-DC-R	TRAVEL BLANK	FIELD BLANK	WQ-ADIT-SEEP	WQ-PC-U	WQ-DC-U1	WQ-MN
				Date Sampled	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013	5/28/2013
				Detection Limit												
Vanadium (V)-Total	mg/L	-	-	0.001	0.0106	0.0098	0.0536	0.011	<0.0010	0.005	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0076
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0308	0.0272	0.164	0.0303	0.0157	0.0377	<0.0030	<0.0030	0.0061	0.0045	0.0216	0.0105
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0967	0.0953	0.0986	0.0967	0.0842	0.0289	-	<0.0010	0.0815	0.092	0.0554	0.122
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	0.00031	<0.00010	0.00053	0.00179	-	<0.00010	0.00037	0.00034	0.00245	0.00016
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00077	0.00056	0.00283	0.00056	0.00226	0.0155	-	<0.00010	0.00188	0.00211	0.00625	0.00258
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0236	0.0235	0.0197	0.0226	0.024	0.0393	-	<0.000050	0.0245	0.0255	0.0303	0.0522
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
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
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.013	-	<0.010	<0.010	<0.010	<0.015	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	0.000043	0.000029	0.00011	0.000035	0.000149	0.000044	-	<0.000010	0.000049	0.000027	0.000049	0.000024
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	7.43	6.9	12.4	6.7	13.2	88.9	-	<0.050	12.7	12.5	86.1	5.98
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00014	0.00014	0.00019	0.00014	0.00016	0.00016	-	<0.00010	0.00018	0.00017	<0.00010	0.00039
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00015	0.00015	0.00022	0.00018	<0.00010	0.00078	-	<0.00010	<0.00010	0.00012	0.00052	0.00082
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00314	0.00309	0.00398	0.00319	0.00458	0.00086	-	<0.00020	0.00189	0.00164	0.00084	0.00228
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.21	0.224	0.258	0.206	0.16	0.6	-	<0.010	0.158	0.228	0.217	3.28
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000138	0.000118	0.00062	0.000112	0.000215	0.000216	-	<0.000050	0.000065	0.000077	0.000166	0.000237
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00087	-	<0.00050	<0.00050	<0.00050	0.00201	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	2.05	2.01	2.83	1.86	2.88	27	-	<0.10	2.81	2.81	34.8	1.64
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0256	0.0218	0.0749	0.0245	0.00801	0.915	-	<0.000050	0.00548	0.0569	0.28	0.348
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
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000172	0.000171	0.000447	0.00015	<0.000050	0.000287	-	<0.000050	0.000058	0.000052	0.000187	0.000182
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	0.00054	0.00051	0.00091	0.00053	0.0006	0.00073	-	<0.00050	0.00059	0.00064	0.00063	0.00173
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
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.7	0.75	0.93	0.68	0.91	2.34	-	<0.10	0.92	0.88	2.5	1.03
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	0.00015	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.08	1.99	2.6	1.99	2.51	2.66	-	<0.050	2.44	2.42	2.59	3.35
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	0.000018	<0.000010	0.00003	<0.000010	<0.000010	0.000092	-	<0.000010	0.000033	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	0.851	0.675	1.13	0.647	1.15	5.16	-	<0.050	1.15	1.19	2.72	1.11
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0613	0.0652	0.0683	0.0553	0.0808	0.237	-	<0.00020	0.0772	0.0773	0.213	0.0313
Sulfur (S)-Dissolved	mg/L	-	-	0.5	1.46	1.15	4.76	1.14	6.56	78.8	-	<0.50	6.07	5.97	84.3	0.86
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<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
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
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.000166	0.000181	0.00028	0.00017	0.000073	0.00101	-	<0.000010	0.000078	0.000091	0.00096	0.000111
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	0.0029
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0013	0.0031	0.0021	0.0011	0.0126	0.0099	-	<0.0010	0.0048	0.0042	0.02	0.0049



Table A-2. Water Quality Parameter Guideline Exceedances; May 27 and 29, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled	0167-130529-018 WQ-DC-U-r 5/29/2013	0167-130529-030 WQ-PW 5/29/2013
				Detection Limit		
Temperature (in-situ)	°C	-	-	-	-	2.0
Specific Conductivity (in-situ)	µS/cm	-	-	-	-	433.2
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	-	6.42
Turbidity (in-situ)	NTU	-	-	-	-	0.31
Colour, True	CU	15	-	5	-	<5.0
Conductivity	µS/cm	-	-	2	850	401
Hardness (as CaCO3)	mg/L	-	-	0.5	462	219
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.93	7.60
Total Suspended Solids	mg/L	-	50	3	42.1	-
Total Dissolved Solids	mg/L	-	-	10	614	225
Turbidity	NTU	-	-	0.1	-	<0.10
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	126	-
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	126	-
Ammonia, Total (as N)	mg/L	-	-	0.005	0.362	-
Chloride (Cl)	mg/L	-	-	0.5	<2.5	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.10	0.093
Nitrate (as N)	mg/L	3	-	0.005	0.089	0.15
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0050	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	343	41
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	0.5	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	0.631	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00272	<0.00050
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0126	0.00038
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0516	0.095
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	0.019	<0.10
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	0.000182	<0.00020
Calcium (Ca)-Total	mg/L	-	-	0.05	108	50.5
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.00229	<0.0020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.0012	-
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0046	<0.0010
Iron (Fe)-Total	mg/L	0.3	1	0.01	2.44	<0.030
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.00103	0.00062
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00246	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	41.2	22.6
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.936	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.00020
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.000632	-
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00151	-
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	2.8	0.91
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00018	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	4.24	-
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000037	-
Sodium (Na)-Total	mg/L	-	-	0.05	5.95	5.1
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.323	-
Sulfur (S)-Total	mg/L	-	-	0.5	106	-
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000012	-
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	0.027	-
Uranium (U)-Total	mg/L	-	-	0.00001	0.00151	0.0023

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

- Mount Nansen Effluent Discharge Standards

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

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



Table A-2. Water Quality Parameter Guideline Exceedances; May 27 and 29, 2013

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled	0167-130529-018 WQ-DC-U-r 5/29/2013	0167-130529-030 WQ-PW 5/29/2013
				Detection Limit		
Vanadium (V)-Total	mg/L	-	-	0.001	0.0033	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0252	<0.050
Dissolved Metals Filtration Location		-	-	n/a	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0471	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00268	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0074	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0431	-
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	0.018	-
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	0.000073	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	113	-
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00011	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00094	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00114	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.994	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000079	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00216	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	43.4	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.937	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.0003	-
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	0.00087	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	2.89	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00015	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.54	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	7.78	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.325	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	110	-
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	-	-	0.00001	0.00144	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0149	-



Appendix B:
ALS Analytical Reports



ENVIRONMENTAL DYNAMICS INC.

ATTN: Lyndsay Doetzel

3-478 Range Road

Whitehorse YT Y1A 3A2

Date Received: 23-MAY-13

Report Date: 06-JUN-13 10:24 (MT)

Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1305590

Project P.O. #: NOT SUBMITTED

Job Reference: MOUNT NANSEN 13-Y-0167

C of C Numbers: 1, 2, 3

Legal Site Desc:

Can Dang
Senior Account Manager

[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		L1305590-1 Water 22-MAY-13 12:00 0167-130522-21	L1305590-2 Water 22-MAY-13 12:00 0167-130522-06	L1305590-3 Water 22-MAY-13 12:00 0167-130522-03	L1305590-4 Water 22-MAY-13 12:00 0167-130522-25	L1305590-5 Water 22-MAY-13 12:00 0167-130522-24
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	111	103	1180	617	107
	Hardness (as CaCO3) (mg/L)	53.5	50.6	716	339	52.9
	pH (pH)	7.51	7.36	7.63	7.98	7.42
	Total Suspended Solids (mg/L)	5.3	<3.0	74.9	113	<3.0
	Total Dissolved Solids (mg/L)	120	109	918	463	124
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	25.3	24.6	256	104	24.4
	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)	25.3	24.6	256	104	24.4
	Ammonia, Total (as N) (mg/L)	0.0062	0.0116	0.0954	0.0746	0.0084
	Chloride (Cl) (mg/L)	<0.50	<0.50	<5.0 ^{DLA}	<0.50	<0.50
	Fluoride (F) (mg/L)	0.023	0.023	<0.20 ^{DLA}	0.062	0.038
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.050 ^{DLA}	0.0086	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.010 ^{DLA}	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	26.3	23.6	461	224	25.3
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)	0.57	<0.50	<0.50	<0.50	0.54
Total Metals	Aluminum (Al)-Total (mg/L)	0.206	0.173	0.0984	1.72	0.167
	Antimony (Sb)-Total (mg/L)	0.00074	0.00031	0.0161	0.00853	0.00038
	Arsenic (As)-Total (mg/L)	0.00460	0.00285	0.100	0.0594	0.00278
	Barium (Ba)-Total (mg/L)	0.0267	0.0288	0.0220	0.0557	0.0274
	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	<0.010	<0.010	0.019	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000211	0.000076	0.00413	0.00178	0.000088
	Calcium (Ca)-Total (mg/L)	15.6	14.7	180	81.5	15.6
	Chromium (Cr)-Total (mg/L)	0.00031	0.00023	0.00072	0.00382	0.00034
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00012	0.00173	0.00121	<0.00010
	Copper (Cu)-Total (mg/L)	0.00620	0.00215	0.00326	0.0103	0.00262
	Iron (Fe)-Total (mg/L)	0.285	0.246	3.14	4.80	0.215
	Lead (Pb)-Total (mg/L)	0.00153	0.000245	0.00730	0.0203	0.000433
	Lithium (Li)-Total (mg/L)	<0.00050	<0.00050	0.00905	0.00378	<0.00050
	Magnesium (Mg)-Total (mg/L)	3.60	3.35	62.9	34.7	3.52

* 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		L1305590-6 Water 22-MAY-13 12:00 0167-130522-04	L1305590-7 Water 22-MAY-13 12:00 0167-130522-23	L1305590-8 Water 22-MAY-13 12:00 0167-130522-18	L1305590-9 Water 22-MAY-13 12:00 0167-130522-19	L1305590-10 Water 22-MAY-13 12:00 0167-130522-20
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	282	649	755	170	154
	Hardness (as CaCO3) (mg/L)	141	354	405	85.6	75.0
	pH (pH)	7.52	7.94	8.04	7.89	7.85
	Total Suspended Solids (mg/L)	62.8	732	41.3	11.4	8.0
	Total Dissolved Solids (mg/L)	216	491	577	139	126
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	49.5	103	120	58.8	53.2
	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)	49.5	103	120	58.8	53.2
	Ammonia, Total (as N) (mg/L)	0.0142	0.0076	0.547	0.0203	0.0168
	Chloride (Cl) (mg/L)	<0.50	<0.50	0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.056	0.058	0.073	0.041	0.045
	Nitrate (as N) (mg/L)	<0.0050	0.0601	0.168	0.0687	0.0607
	Nitrite (as N) (mg/L)	<0.0010	0.0023	0.0059	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	88.9	243	284	27.3	23.7
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	0.29	<0.20
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	1.37	6.71	0.533	0.588	0.693
	Antimony (Sb)-Total (mg/L)	0.00549	0.00548	0.00235	0.00035	0.00041
	Arsenic (As)-Total (mg/L)	0.0335	0.0648	0.0220	0.00342	0.00424
	Barium (Ba)-Total (mg/L)	0.0479	0.152	0.0594	0.0597	0.0603
	Beryllium (Be)-Total (mg/L)	<0.00010	0.00023	<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	0.019	0.020	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.00321	0.00135	0.000460	0.000094	0.000102
	Calcium (Ca)-Total (mg/L)	37.9	91.4	98.5	22.0	19.7
	Chromium (Cr)-Total (mg/L)	0.00183	0.0109	0.00193	0.00187	0.00097
	Cobalt (Co)-Total (mg/L)	0.00080	0.00475	0.00158	0.00043	0.00049
	Copper (Cu)-Total (mg/L)	0.00744	0.0180	0.00563	0.00499	0.00407
	Iron (Fe)-Total (mg/L)	2.28	15.4	3.42	0.819	1.13
	Lead (Pb)-Total (mg/L)	0.0140	0.0194	0.00293	0.00140	0.00210
	Lithium (Li)-Total (mg/L)	0.00214	0.00629	0.00180	0.00071	0.00082
	Magnesium (Mg)-Total (mg/L)	11.2	35.6	34.7	7.36	6.58

* 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		L1305590-11 Water 22-MAY-13 12:00 0167-130522-10	L1305590-12 Water 22-MAY-13 12:00 0167-130522-09	L1305590-13 Water 22-MAY-13 12:00 0167-130522-02	L1305590-14 Water 22-MAY-13 12:00 0167-130522-01	L1305590-15 Water 22-MAY-13 12:00 0167-130522-08
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	152	119	1400	1400	48.4
	Hardness (as CaCO3) (mg/L)	75.1	60.9	731	733	24.7
	pH (pH)	7.78	7.81	7.45	7.43	7.19
	Total Suspended Solids (mg/L)	367	58.9	40.2	32.3	5.8
	Total Dissolved Solids (mg/L)	140	103	1090	1130	83
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	46.6	51.4	212	216	22.4
	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)	46.6	51.4	212	216	22.4
	Ammonia, Total (as N) (mg/L)	0.0271	0.0052	3.90	4.42	0.0204
	Chloride (Cl) (mg/L)	<0.50	<0.50	<5.0 ^{DLA}	<5.0 ^{DLA}	<0.50
	Fluoride (F) (mg/L)	0.057	0.041	<0.20 ^{DLA}	<0.20 ^{DLA}	0.025
	Nitrate (as N) (mg/L)	0.0588	0.0642	1.16	1.15	<0.0050
	Nitrite (as N) (mg/L)	0.0017	<0.0010	0.043	0.042	<0.0010
	Sulfate (SO4) (mg/L)	27.0	8.43	601	604	1.75
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	0.0053	0.0065	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	0.0241	0.0263	<0.0050
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	3.00	2.96	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	6.99	0.829	0.0447	0.0463	0.324
	Antimony (Sb)-Total (mg/L)	0.00142	0.00013	0.00068	0.00069	0.00016
	Arsenic (As)-Total (mg/L)	0.0371	0.00185	0.0490	0.0505	0.00239
	Barium (Ba)-Total (mg/L)	0.171	0.0619	0.0611	0.0575	0.0594
	Beryllium (Be)-Total (mg/L)	0.00027	<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	0.071	0.076	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000792	0.000074	0.000505	0.000514	0.000042
	Calcium (Ca)-Total (mg/L)	22.8	14.9	218	222	6.48
	Chromium (Cr)-Total (mg/L)	0.00978	0.00125	0.00056	0.00152	0.00073
	Cobalt (Co)-Total (mg/L)	0.00410	0.00055	0.00747	0.00774	0.00090
	Copper (Cu)-Total (mg/L)	0.0176	0.00420	0.00587	0.00750	0.00339
	Iron (Fe)-Total (mg/L)	10.6	1.26	12.7	12.8	1.97
	Lead (Pb)-Total (mg/L)	0.0274	0.00135	0.000434	0.000439	0.000263
	Lithium (Li)-Total (mg/L)	0.00457	0.00085	0.00053	0.00058	<0.00050
	Magnesium (Mg)-Total (mg/L)	7.11	5.36	41.5	42.0	1.87

* 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		L1305590-16 Water 22-MAY-13 12:00 0167-130522-16	L1305590-17 Water 22-MAY-13 12:00 0167-130522-17	L1305590-18 Water 22-MAY-13 12:00 0167-130522-07	L1305590-19 Water 22-MAY-13 12:00 0167-130522-05	L1305590-20 Water 22-MAY-13 12:00 0167-130522-14
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	119	125	112	410	89.8
	Hardness (as CaCO3) (mg/L)	61.6	63.9	57.5	189	43.8
	pH (pH)	7.77	7.79	7.78	7.21	7.35
	Total Suspended Solids (mg/L)	48.1	140	43.8	7.0	4.0
	Total Dissolved Solids (mg/L)	99	106	97	298	106
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	53.9	54.0	49.8	16.3	23.0
	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)	53.9	54.0	49.8	16.3	23.0
	Ammonia, Total (as N) (mg/L)	0.0064	0.0113	0.0060	0.116	0.0062
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.041	0.043	0.039	0.067	0.040
	Nitrate (as N) (mg/L)	0.0646	0.0626	0.0605	0.0244	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	0.0010	<0.0010
	Sulfate (SO4) (mg/L)	8.44	11.1	8.36	175	17.8
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)	0.29	0.22	<0.20	<0.20	<0.20
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	0.74
Total Metals	Aluminum (Al)-Total (mg/L)	0.948	2.51	0.916	0.128	0.144
	Antimony (Sb)-Total (mg/L)	0.00015	0.00049	0.00014	0.0167	0.00057
	Arsenic (As)-Total (mg/L)	0.00200	0.0105	0.00182	0.0413	0.00524
	Barium (Ba)-Total (mg/L)	0.0645	0.0975	0.0586	0.00928	0.0164
	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	<0.010	<0.010	0.015	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000061	0.000256	0.000083	0.00279	0.000040
	Calcium (Ca)-Total (mg/L)	15.7	17.1	14.4	62.7	12.3
	Chromium (Cr)-Total (mg/L)	0.00185	0.00335	0.00212	0.00019	0.00031
	Cobalt (Co)-Total (mg/L)	0.00061	0.00149	0.00053	0.00058	0.00012
	Copper (Cu)-Total (mg/L)	0.00564	0.00698	0.00596	0.0289	0.00219
	Iron (Fe)-Total (mg/L)	1.36	3.54	1.29	0.373	0.191
	Lead (Pb)-Total (mg/L)	0.00137	0.00768	0.00120	0.0132	0.000312
	Lithium (Li)-Total (mg/L)	0.00075	0.00166	0.00078	0.00120	<0.00050
	Magnesium (Mg)-Total (mg/L)	5.58	5.93	5.02	9.42	3.31

* 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		L1305590-21 Water 23-MAY-13 12:00 0167-130522-13	L1305590-22 Water 22-MAY-13 12:00 TRAVEL BLANK	L1305590-23 Water 23-MAY-13 12:00 0167-130523-15[#30-DW SAMPLE]		
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)			<5.0		
	Conductivity (uS/cm)	<2.0	<2.0	404		
	Hardness (as CaCO3) (mg/L)	<0.50		207		
	pH (pH)	5.86	5.59	8.08		
	Total Suspended Solids (mg/L)	<3.0	<3.0			
	Total Dissolved Solids (mg/L)	<10	<10	237		
	Turbidity (NTU)			<0.10		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0	170		
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0141			
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50		
	Fluoride (F) (mg/L)	<0.020	<0.020	0.091		
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.148		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		
	Sulfate (SO4) (mg/L)	<0.50	<0.50	40.4		
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050			
	Cyanide, Total (mg/L)	<0.0050	<0.0050			
	Cyanate (mg/L)	<0.20	<0.20			
	Thiocyanate (SCN) (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	<0.010		
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00050		
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	0.00039		
	Barium (Ba)-Total (mg/L)	<0.000050	<0.000050	0.094		
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050			
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.10		
	Cadmium (Cd)-Total (mg/L)	<0.000010	<0.000010	<0.00020		
	Calcium (Ca)-Total (mg/L)	<0.050	<0.050	46.2		
	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.0020		
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.0010		
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.030		
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.00059		
	Lithium (Li)-Total (mg/L)	<0.00050	<0.00050			
	Magnesium (Mg)-Total (mg/L)	<0.10	<0.10	22.3		

* 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		L1305590-1 Water 22-MAY-13 12:00 0167-130522-21	L1305590-2 Water 22-MAY-13 12:00 0167-130522-06	L1305590-3 Water 22-MAY-13 12:00 0167-130522-03	L1305590-4 Water 22-MAY-13 12:00 0167-130522-25	L1305590-5 Water 22-MAY-13 12:00 0167-130522-24
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)	0.00633	0.0338	2.13	0.775	0.00500
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.000052	0.000051	0.000476	0.000564	0.000073
	Nickel (Ni)-Total (mg/L)	0.00075	0.00075	0.00278	0.00247	0.00074
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	0.122	<0.050
	Potassium (K)-Total (mg/L)	1.52	1.40	3.65	2.87	1.43
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00023	<0.00010
	Silicon (Si)-Total (mg/L)	2.45	2.09	6.45	5.39	2.33
	Silver (Ag)-Total (mg/L)	0.000036	0.000015	0.000068	0.000346	0.000020
	Sodium (Na)-Total (mg/L)	1.21	1.12	4.64	2.55	1.26
	Strontium (Sr)-Total (mg/L)	0.102	0.102	0.426	0.230	0.102
	Sulfur (S)-Total (mg/L)	8.97	8.10	153	77.3	8.71
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	0.000110	0.000071	<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	0.085	<0.010
	Uranium (U)-Total (mg/L)	0.000101	0.000113	0.00363	0.00133	0.000098
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0074	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0195	0.0079	1.20	0.236	0.0116
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.126	0.135	0.0021	0.0134	0.129
	Antimony (Sb)-Dissolved (mg/L)	0.00056	0.00027	0.0157	0.00538	0.00032
	Arsenic (As)-Dissolved (mg/L)	0.00284	0.00247	0.0764	0.00753	0.00209
	Barium (Ba)-Dissolved (mg/L)	0.0249	0.0272	0.0190	0.0256	0.0257
	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	0.016	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000192	0.000063	0.00342	0.000557	0.000064
	Calcium (Ca)-Dissolved (mg/L)	15.6	14.8	185	79.6	15.4
	Chromium (Cr)-Dissolved (mg/L)	0.00017	0.00016	<0.00010	<0.00010	0.00019
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	0.00158	0.00038	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00591	0.00188	0.00037	0.00187	0.00233
	Iron (Fe)-Dissolved (mg/L)	0.156	0.187	2.53	0.213	0.157
	Lead (Pb)-Dissolved (mg/L)	0.000456	0.000087	0.000558	0.000304	0.000082
	Lithium (Li)-Dissolved (mg/L)	<0.00050	<0.00050	0.00912	0.00256	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	3.53	3.34	61.6	34.1	3.51
	Manganese (Mn)-Dissolved (mg/L)	0.00405	0.0307	1.90	0.665	0.00177
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1305590-6 Water 22-MAY-13 12:00 0167-130522-04	L1305590-7 Water 22-MAY-13 12:00 0167-130522-23	L1305590-8 Water 22-MAY-13 12:00 0167-130522-18	L1305590-9 Water 22-MAY-13 12:00 0167-130522-19	L1305590-10 Water 22-MAY-13 12:00 0167-130522-20
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)	0.271	1.16	1.30	0.113	0.125
	Mercury (Hg)-Total (mg/L)	<0.000010	0.000035	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.000145	0.000499	0.000611	0.000667	0.000392
	Nickel (Ni)-Total (mg/L)	0.00789	0.00906	0.00162	0.00109	0.00127
	Phosphorus (P)-Total (mg/L)	0.079	0.607	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	3.20	3.43	3.03	1.28	1.31
	Selenium (Se)-Total (mg/L)	<0.00010	0.00039	0.00013	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	5.14	12.5	4.03	5.00	5.00
	Silver (Ag)-Total (mg/L)	0.000312	0.000324	0.000058	0.000024	0.000035
	Sodium (Na)-Total (mg/L)	1.20	4.20	7.97	2.08	1.98
	Strontium (Sr)-Total (mg/L)	0.102	0.295	0.333	0.194	0.164
	Sulfur (S)-Total (mg/L)	29.6	81.8	95.2	9.41	8.18
	Thallium (Tl)-Total (mg/L)	0.000080	0.000109	0.000016	0.000011	0.000015
	Tin (Sn)-Total (mg/L)	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.053	0.292	0.023	0.017	0.022
	Uranium (U)-Total (mg/L)	0.000627	0.00175	0.00136	0.000539	0.000514
	Vanadium (V)-Total (mg/L)	0.0050	0.0248	0.0026	0.0018	0.0021
	Zinc (Zn)-Total (mg/L)	0.457	0.198	0.0609	0.0081	0.0098
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0796	0.0425	0.0543	0.0619	0.0748
	Antimony (Sb)-Dissolved (mg/L)	0.00308	0.00341	0.00194	0.00026	0.00024
	Arsenic (As)-Dissolved (mg/L)	0.00895	0.00588	0.00994	0.00162	0.00153
	Barium (Ba)-Dissolved (mg/L)	0.0288	0.0322	0.0492	0.0490	0.0487
	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	0.014	0.018	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.00253	0.000278	0.000249	0.000063	0.000058
	Calcium (Ca)-Dissolved (mg/L)	38.3	86.3	103	22.3	19.5
	Chromium (Cr)-Dissolved (mg/L)	0.00014	<0.00010	0.00015	0.00012	0.00017
	Cobalt (Co)-Dissolved (mg/L)	0.00019	0.00064	0.00129	0.00018	0.00022
	Copper (Cu)-Dissolved (mg/L)	0.00392	0.00164	0.00179	0.00282	0.00288
	Iron (Fe)-Dissolved (mg/L)	0.158	0.576	1.30	0.164	0.297
	Lead (Pb)-Dissolved (mg/L)	0.000367	0.000207	0.000144	0.000098	0.000108
	Lithium (Li)-Dissolved (mg/L)	0.00129	0.00190	0.00149	<0.00050	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	10.9	33.6	36.0	7.28	6.38
	Manganese (Mn)-Dissolved (mg/L)	0.226	0.773	1.18	0.0842	0.0968
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1305590-11 Water 22-MAY-13 12:00 0167-130522-10	L1305590-12 Water 22-MAY-13 12:00 0167-130522-09	L1305590-13 Water 22-MAY-13 12:00 0167-130522-02	L1305590-14 Water 22-MAY-13 12:00 0167-130522-01	L1305590-15 Water 22-MAY-13 12:00 0167-130522-08
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)	0.528	0.0529	5.45	5.45	0.330
	Mercury (Hg)-Total (mg/L)	0.000040	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.00108	0.000307	0.000984	0.00131	0.000219
	Nickel (Ni)-Total (mg/L)	0.00748	0.00611	0.00240	0.00249	0.00205
	Phosphorus (P)-Total (mg/L)	0.297	0.053	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	2.56	1.01	6.18	6.14	1.38
	Selenium (Se)-Total (mg/L)	0.00011	<0.00010	0.00019	0.00018	<0.00010
	Silicon (Si)-Total (mg/L)	15.2	4.49	6.11	6.16	3.19
	Silver (Ag)-Total (mg/L)	0.000307	0.000022	0.000045	0.000041	<0.000010
	Sodium (Na)-Total (mg/L)	2.21	1.46	36.3	38.3	1.09
	Strontium (Sr)-Total (mg/L)	0.157	0.168	0.640	0.684	0.0377
	Sulfur (S)-Total (mg/L)	9.12	2.98	203	204	0.87
	Thallium (Tl)-Total (mg/L)	0.000134	0.000013	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	0.00013	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.254	0.036	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00135	0.000516	0.00201	0.00212	0.000143
	Vanadium (V)-Total (mg/L)	0.0197	0.0026	0.0018	0.0021	0.0030
	Zinc (Zn)-Total (mg/L)	0.0677	0.0084	0.0107	0.0107	0.0060
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0874	0.0690	0.0139	0.0127	0.158
	Antimony (Sb)-Dissolved (mg/L)	0.00029	<0.00010	0.00059	0.00059	0.00013
	Arsenic (As)-Dissolved (mg/L)	0.00240	0.00038	0.0325	0.0325	0.00193
	Barium (Ba)-Dissolved (mg/L)	0.0377	0.0487	0.0543	0.0546	0.0564
	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	0.072	0.071	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000159	0.000025	0.000374	0.000368	0.000028
	Calcium (Ca)-Dissolved (mg/L)	21.4	15.5	223	224	6.74
	Chromium (Cr)-Dissolved (mg/L)	0.00021	0.00014	0.00032	0.00036	0.00025
	Cobalt (Co)-Dissolved (mg/L)	0.00023	<0.00010	0.00753	0.00766	0.00086
	Copper (Cu)-Dissolved (mg/L)	0.00442	0.00262	0.00244	0.00254	0.00275
	Iron (Fe)-Dissolved (mg/L)	0.198	0.136	9.44	9.43	1.65
	Lead (Pb)-Dissolved (mg/L)	0.000353	<0.000050	<0.000050	<0.000050	0.000153
	Lithium (Li)-Dissolved (mg/L)	<0.00050	<0.00050	0.00059	0.00054	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	5.23	5.41	42.1	42.0	1.91
	Manganese (Mn)-Dissolved (mg/L)	0.178	0.0212	5.19	5.35	0.336
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1305590-16 Water 22-MAY-13 12:00 0167-130522-16	L1305590-17 Water 22-MAY-13 12:00 0167-130522-17	L1305590-18 Water 22-MAY-13 12:00 0167-130522-07	L1305590-19 Water 22-MAY-13 12:00 0167-130522-05	L1305590-20 Water 22-MAY-13 12:00 0167-130522-14
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)	0.0608	0.160	0.0514	0.941	0.0296
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.000446	0.000516	0.000470	0.000421	<0.000050
	Nickel (Ni)-Total (mg/L)	0.00141	0.00272	0.00160	0.00115	0.00051
	Phosphorus (P)-Total (mg/L)	0.056	0.135	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	1.03	1.43	1.00	2.46	3.04
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	4.83	7.61	4.47	0.963	2.39
	Silver (Ag)-Total (mg/L)	0.000035	0.000086	0.000027	0.000395	0.000032
	Sodium (Na)-Total (mg/L)	1.57	1.78	1.41	2.32	0.628
	Strontium (Sr)-Total (mg/L)	0.185	0.176	0.164	0.137	0.0418
	Sulfur (S)-Total (mg/L)	3.11	3.94	2.97	59.6	6.28
	Thallium (Tl)-Total (mg/L)	0.000013	0.000044	0.000013	0.000063	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.040	0.107	0.031	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000550	0.000682	0.000541	0.000158	0.000023
	Vanadium (V)-Total (mg/L)	0.0029	0.0069	0.0030	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0086	0.0236	0.0080	0.289	0.0054
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0643	0.0676	0.0686	0.0302	0.0703
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.0140	0.00045
	Arsenic (As)-Dissolved (mg/L)	0.00036	0.00060	0.00035	0.0207	0.00425
	Barium (Ba)-Dissolved (mg/L)	0.0467	0.0464	0.0450	0.00796	0.0150
	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	0.012	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000027	0.000046	0.000027	0.00252	0.000033
	Calcium (Ca)-Dissolved (mg/L)	15.7	16.7	14.8	60.4	12.1
	Chromium (Cr)-Dissolved (mg/L)	0.00013	0.00013	0.00014	<0.00010	0.00017
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00011	0.00011	0.00052	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00262	0.00280	0.00279	0.0220	0.00178
	Iron (Fe)-Dissolved (mg/L)	0.135	0.140	0.149	0.108	0.082
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000064	<0.000050	0.00143	0.000061
	Lithium (Li)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00111	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	5.43	5.36	4.96	9.15	3.29
	Manganese (Mn)-Dissolved (mg/L)	0.0209	0.0444	0.0186	0.836	0.0212
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1305590-21	L1305590-22	L1305590-23		
		Description	Water	Water	Water		
		Sampled Date	23-MAY-13	22-MAY-13	23-MAY-13		
		Sampled Time	12:00	12:00	12:00		
		Client ID	0167-130522-13	TRAVEL BLANK	0167-130523-15[#30-DW SAMPLE]		
Grouping	Analyte						
WATER							
Total Metals	Manganese (Mn)-Total (mg/L)	<0.000050	<0.000050	<0.0020			
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.00020			
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050				
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050				
	Potassium (K)-Total (mg/L)	<0.10	<0.10	0.90			
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.0010			
	Silicon (Si)-Total (mg/L)	<0.050	<0.050				
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010				
	Sodium (Na)-Total (mg/L)	<0.050	<0.050	5.4			
	Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020				
	Sulfur (S)-Total (mg/L)	<0.50	<0.50				
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010				
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010	0.00230			
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010				
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.050			
Dissolved Metals	Dissolved Metals Filtration Location	FIELD					
	Aluminum (Al)-Dissolved (mg/L)	<0.0010					
	Antimony (Sb)-Dissolved (mg/L)	<0.00010					
	Arsenic (As)-Dissolved (mg/L)	<0.00010					
	Barium (Ba)-Dissolved (mg/L)	<0.000050					
	Beryllium (Be)-Dissolved (mg/L)	<0.00010					
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050					
	Boron (B)-Dissolved (mg/L)	<0.010					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010					
	Calcium (Ca)-Dissolved (mg/L)	<0.050					
	Chromium (Cr)-Dissolved (mg/L)	<0.00010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00010					
	Copper (Cu)-Dissolved (mg/L)	<0.00020					
	Iron (Fe)-Dissolved (mg/L)	<0.010					
	Lead (Pb)-Dissolved (mg/L)	<0.000050					
	Lithium (Li)-Dissolved (mg/L)	<0.00050					
	Magnesium (Mg)-Dissolved (mg/L)	<0.10					
	Manganese (Mn)-Dissolved (mg/L)	<0.000050					
	Mercury (Hg)-Dissolved (mg/L)	<0.000010					

* 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		L1305590-1 Water 22-MAY-13 12:00 0167-130522-21	L1305590-2 Water 22-MAY-13 12:00 0167-130522-06	L1305590-3 Water 22-MAY-13 12:00 0167-130522-03	L1305590-4 Water 22-MAY-13 12:00 0167-130522-25	L1305590-5 Water 22-MAY-13 12:00 0167-130522-24
Grouping	Analyte					
WATER						
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	0.000324	0.000159	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00074	0.00066	0.00242	0.00062	0.00071
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	1.44	1.36	3.62	2.59	1.44
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00015	<0.00010
	Silicon (Si)-Dissolved (mg/L)	2.28	2.02	6.06	2.37	2.24
	Silver (Ag)-Dissolved (mg/L)	0.000012	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.22	1.12	4.57	2.31	1.21
	Strontium (Sr)-Dissolved (mg/L)	0.0997	0.0973	0.426	0.210	0.0975
	Sulfur (S)-Dissolved (mg/L)	8.94	7.89	149	75.4	8.53
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000092	0.000015	<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)	0.000087	0.000108	0.00343	0.000982	0.000089
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0187	0.0063	1.22	0.114	0.0090

* 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		L1305590-6 Water 22-MAY-13 12:00 0167-130522-04	L1305590-7 Water 22-MAY-13 12:00 0167-130522-23	L1305590-8 Water 22-MAY-13 12:00 0167-130522-18	L1305590-9 Water 22-MAY-13 12:00 0167-130522-19	L1305590-10 Water 22-MAY-13 12:00 0167-130522-20
Grouping	Analyte					
WATER						
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	0.000082	0.000194	0.000322	0.000309	0.000293
	Nickel (Ni)-Dissolved (mg/L)	0.00150	0.00075	0.00100	0.00069	0.00082
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	2.98	2.49	3.07	1.12	1.13
	Selenium (Se)-Dissolved (mg/L)	<0.00010	0.00012	0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	2.80	2.51	3.27	3.79	3.55
	Silver (Ag)-Dissolved (mg/L)	0.000020	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.09	3.64	8.17	2.18	2.02
	Strontium (Sr)-Dissolved (mg/L)	0.0939	0.254	0.326	0.178	0.162
	Sulfur (S)-Dissolved (mg/L)	29.5	81.9	97.1	9.35	8.12
	Thallium (Tl)-Dissolved (mg/L)	0.000018	<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)	0.000527	0.00115	0.00132	0.000478	0.000443
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.443	0.0461	0.0390	0.0043	0.0042

* 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		L1305590-11 Water 22-MAY-13 12:00 0167-130522-10	L1305590-12 Water 22-MAY-13 12:00 0167-130522-09	L1305590-13 Water 22-MAY-13 12:00 0167-130522-02	L1305590-14 Water 22-MAY-13 12:00 0167-130522-01	L1305590-15 Water 22-MAY-13 12:00 0167-130522-08
Grouping	Analyte					
WATER						
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	0.000605	0.000257	0.00101	0.00101	0.000174
	Nickel (Ni)-Dissolved (mg/L)	0.00099	0.00064	0.00237	0.00233	0.00185
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	1.18	0.94	6.42	6.36	1.39
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	0.00019	0.00018	<0.00010
	Silicon (Si)-Dissolved (mg/L)	3.48	3.58	5.99	6.02	3.07
	Silver (Ag)-Dissolved (mg/L)	0.000016	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.77	1.47	38.0	37.7	1.07
	Strontium (Sr)-Dissolved (mg/L)	0.135	0.170	0.662	0.663	0.0364
	Sulfur (S)-Dissolved (mg/L)	9.26	3.09	200	199	0.86
	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)	0.000671	0.000393	0.00209	0.00197	0.000125
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	0.0011	0.0011	0.0019
	Zinc (Zn)-Dissolved (mg/L)	0.0026	0.0020	0.0085	0.0084	0.0039

* 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		L1305590-16 Water 22-MAY-13 12:00 0167-130522-16	L1305590-17 Water 22-MAY-13 12:00 0167-130522-17	L1305590-18 Water 22-MAY-13 12:00 0167-130522-07	L1305590-19 Water 22-MAY-13 12:00 0167-130522-05	L1305590-20 Water 22-MAY-13 12:00 0167-130522-14
Grouping	Analyte					
WATER						
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	0.000254	0.000302	0.000239	0.000380	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00057	0.00067	0.00057	0.00104	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.92	0.91	0.88	2.35	3.03
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	3.60	3.58	3.37	0.698	2.26
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	0.000067	0.000016
	Sodium (Na)-Dissolved (mg/L)	1.49	1.50	1.41	2.28	0.602
	Strontium (Sr)-Dissolved (mg/L)	0.169	0.167	0.161	0.129	0.0405
	Sulfur (S)-Dissolved (mg/L)	3.06	3.92	3.03	57.0	6.09
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	0.000054	<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)	0.000399	0.000436	0.000382	0.000143	0.000018
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0013	0.0016	0.0015	0.266	0.0041

* 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		L1305590-21 Water 23-MAY-13 12:00 0167-130522-13	L1305590-22 Water 22-MAY-13 12:00 TRAVEL BLANK	L1305590-23 Water 23-MAY-13 12:00 0167-130523-15[#30-DW SAMPLE]		
Grouping	Analyte					
WATER						
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	<0.10				
	Selenium (Se)-Dissolved (mg/L)	<0.00010				
	Silicon (Si)-Dissolved (mg/L)	<0.050				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	<0.050				
	Strontium (Sr)-Dissolved (mg/L)	<0.00020				
	Sulfur (S)-Dissolved (mg/L)	<0.50				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	<0.000010				
	Vanadium (V)-Dissolved (mg/L)	<0.0010				
	Zinc (Zn)-Dissolved (mg/L)	<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	Barium (Ba)-Total	DLA	L1305590-23
Duplicate	Boron (B)-Total	DLA	L1305590-23
Duplicate	Iron (Fe)-Total	DLA	L1305590-23
Duplicate	Zinc (Zn)-Total	DLA	L1305590-23
Duplicate	Aluminum (Al)-Total	DLA	L1305590-23
Duplicate	Cadmium (Cd)-Total	DLA	L1305590-23
Duplicate	Chromium (Cr)-Total	DLA	L1305590-23
Duplicate	Lead (Pb)-Total	DLA	L1305590-23
Duplicate	Selenium (Se)-Total	DLA	L1305590-23
Matrix Spike	Sulfate (SO4)	MS-B	L1305590-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1305590-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1305590-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1305590-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1305590-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1305590-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1305590-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
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

Reference Information

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

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

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

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

Reference Information

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

Chain of Custody Numbers:

1	2	3
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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 wwwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

CCC#

Page ____ of ____

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Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)																																			
Company: EDI				☒ Standard ☐ Other				☒ Regular (Standard Turnaround Times - Business Days)																																			
Contact: Lyndsay Doetzel				☒ PDF ☒ Excel ☐ Digital ☐ Fax				☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																																			
Address: 2195 - 2nd Ave				Email 1: ldoetzel@edynamics.com				☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT																																			
Y1A 3T8				Email 2:				☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT																																			
Phone: 867-393-4882				Fax:				Analysis Request																																			
Invoice To Same as Report?				☒ Yes ☐ No				Please indicate below Filtered, Preserved or both (F, P, F/P)																																			
Hardcopy of Invoice with Report?				☐ Yes ☐ No																																							
Company:				Job #: Mount Nansen 13-Y-0167																																							
Contact:				PO / AFE:																																							
Address:				LSD:																																							
Phone:				Quote #: Q38399																																							
Fax:																																											
Lab Work Order # (lab use only)				ALS Contact:				Sampler:				MM, LG, MK, DS																															
Sample #				Sample Identification (This description will appear on the report)				Date (dd-mm-yy)		Time (hh:mm)		Sample Type		ALK-PCT-VA																													
0167-130522-20								22 MAY 13				Water		X				X																									
0167-130522-10								22 MAY 13				Water		X				X																									
0167-130522-09								22 MAY 13				Water		X				X																									
0167-130522-02								22 MAY 13				Water		X				X																									
0167-130522-01								22 MAY 13				Water		X				X																									
0167-130522-08								22 MAY 13				Water		X				X																									
0167-130522-16								22 MAY 13				Water		X				X																									
0167-130522-17								22 MAY 13				Water		X				X																									
0167-130522-07								22 MAY 13				Water		X				X																									
Special Insti																																											
L1305590-COFC																																											
SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)																																			
Released by: [Signature]				Date (dd-mm-yy) 23 May 13				Time (hh:mm)				Received by:				Date:				Time:				Temperature: °C				Verified by:				Date:				Time:				Observations: Yes / No ? If Yes add SIF			



Chain of Custody / Analytical Request Form

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#333

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GENE 18.01 Front



ENVIRONMENTAL DYNAMICS INC.

ATTN: Lyndsay Doetzel

3-478 Range Road

Whitehorse YT Y1A 3A2

Date Received: 29-MAY-13

Report Date: 11-JUN-13 10:43 (MT)

Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1308840

Project P.O. #: NOT SUBMITTED

Job Reference: MOUNT NANSEN 13-Y-0167

C of C Numbers: 1, 2, 3, 4

Legal Site Desc:

Comments: Please note for ALS identified sample L1308840-5, the Total and Dissolved metal bottles were switched due to sample label mix up as confirmed by the client.

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		L1308840-1 Water 29-MAY-13 12:00 0167-130529-013	L1308840-2 Water 29-MAY-13 12:00 0167-130529-008	L1308840-3 Water 29-MAY-13 12:00 0167-130529-015	L1308840-4 Water 29-MAY-13 12:00 0167-130529-022	L1308840-5 Water 29-MAY-13 12:00 0167-130529-002
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	128	469	1150	934	286
	Hardness (as CaCO3) (mg/L)	68.0	271	735	584	152
	pH (pH)	7.28	7.87	7.27	8.03	7.39
	Total Suspended Solids (mg/L)	181	62.9	10.9	40.6	383
	Total Dissolved Solids (mg/L)	101	349	951	782	213
	Turbidity (NTU)					
Leachable Anions & Nutrients	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	39.9	105	276	153	70.3
	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 (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	39.9	105	276	153	70.3
	Ammonia, Total (as N) (mg/L)	0.0274	0.0108	0.086	0.168	0.0151
	Chloride (Cl) (mg/L)	<0.50	<0.50	<5.0 ^{DLA}	<5.0 ^{DLA}	<0.50
	Fluoride (F) (mg/L)	0.037	0.076	0.47	<0.20 ^{DLA}	0.089
	Nitrate (as N) (mg/L)	0.0257	0.0249	<0.050 ^{DLA}	<0.050 ^{DLA}	0.0288
	Nitrite (as N) (mg/L)	0.0035	0.0019	<0.010 ^{DLA}	<0.010 ^{DLA}	0.0028
	Sulfate (SO4) (mg/L)	34.7	159	476	437	82.4
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)	<2.0 ^{DLIS}	<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)	4.35	1.08	0.0483	0.542	11.4
	Antimony (Sb)-Total (mg/L)	0.00301	0.00585	0.0173	0.0104	0.00544
	Arsenic (As)-Total (mg/L)	0.0409	0.0401	0.0925	0.0500	0.107
	Barium (Ba)-Total (mg/L)	0.0980	0.0306	0.0185	0.0309	0.168
	Beryllium (Be)-Total (mg/L)	0.00017	<0.00010	<0.00010	<0.00010	0.00035
	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	0.031	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000211	0.00228	0.00339	0.00192	0.00183
	Calcium (Ca)-Total (mg/L)	19.7	68.9	194	135	42.5
	Chromium (Cr)-Total (mg/L)	0.00630	0.00145	0.00011	0.00084	0.0128
	Cobalt (Co)-Total (mg/L)	0.00192	0.00078	0.00157	0.00062	0.00600

* 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		L1308840-6 Water 29-MAY-13 12:00 0167-130529-019	L1308840-7 Water 29-MAY-13 12:00 0167-130529-020	L1308840-8 Water 29-MAY-13 12:00 0167-130529-016	L1308840-9 Water 29-MAY-13 12:00 0167-130529-017	L1308840-10 Water 28-MAY-13 12:00 0167-130528-021
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	1290	703	982	813	67.9
	Hardness (as CaCO3) (mg/L)	705	352	547	461	33.2
	pH (pH)	7.13	7.62	7.95	7.95	7.42
	Total Suspended Solids (mg/L)	33.1	10.3	61.8	73.9	225
	Total Dissolved Solids (mg/L)	1060	527	750	651	65
	Turbidity (NTU)					
Leachable Anions & Nutrients	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	214	44.4	141	124	25.3
	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 (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	214	44.4	141	124	25.3
	Ammonia, Total (as N) (mg/L)	3.85	0.311	0.0963	0.358	0.0214
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<0.50	<2.5 ^{DLA}	<2.5 ^{DLA}	<0.50
	Fluoride (F) (mg/L)	0.33	0.102	0.10	<0.10 ^{DLA}	0.047
	Nitrate (as N) (mg/L)	1.08	0.0767	0.032	0.096	0.0293
	Nitrite (as N) (mg/L)	0.040	0.0028	<0.0050 ^{DLA}	<0.0050 ^{DLA}	<0.0010
	Sulfate (SO4) (mg/L)	636	313	412	344	9.23
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	0.0337	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanate (mg/L)	<0.20	0.30	<0.20	<0.20	<0.20
	Thiocyanate (SCN) (mg/L)	3.66	<0.50	<0.50	0.56	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0672	0.227	0.815	0.783	3.80
	Antimony (Sb)-Total (mg/L)	0.00070	0.0313	0.00480	0.00277	0.00057
	Arsenic (As)-Total (mg/L)	0.0504	0.117	0.0154	0.0141	0.0124
	Barium (Ba)-Total (mg/L)	0.0609	0.0148	0.0516	0.0547	0.101
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00015
	Bismuth (Bi)-Total (mg/L)	<0.00050	0.00061	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	0.071	0.038	0.023	0.020	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000458	0.00287	0.000315	0.000213	0.000353
	Calcium (Ca)-Total (mg/L)	213	99.5	126	110	10.5
	Chromium (Cr)-Total (mg/L)	0.00175	0.00028	0.00153	0.00248	0.00497
	Cobalt (Co)-Total (mg/L)	0.00704	0.00114	0.00090	0.00132	0.00253

* 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		L1308840-11 Water 28-MAY-13 12:00 0167-130528-023	L1308840-12 Water 28-MAY-13 12:00 0167-130528-007	L1308840-13 Water 28-MAY-13 12:00 0167-130528-009	L1308840-14 Water 28-MAY-13 12:00 0167-130528-026	L1308840-15 Water 28-MAY-13 12:00 0167-130528-024
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	68.8	87.8	49.6	44.9	80.9
	Hardness (as CaCO3) (mg/L)	35.5	43.0	27.0	25.5	42.8
	pH (pH)	7.43	7.41	7.40	7.37	7.48
	Total Suspended Solids (mg/L)	195	7.2	231	121	1090
	Total Dissolved Solids (mg/L)	71	94	59	53	93
	Turbidity (NTU)					
Leachable Anions & Nutrients	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	25.5	24.4	22.8	23.1	28.8
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	25.5	24.4	22.8	23.1	28.8
	Ammonia, Total (as N) (mg/L)	0.0200	0.0058	0.0159	0.0123	0.0726
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.044	0.050	0.045	0.039	0.069
	Nitrate (as N) (mg/L)	0.0294	<0.0050	0.0244	0.0270	0.0527
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0022
	Sulfate (SO4) (mg/L)	10.7	19.4	4.06	3.04	14.2
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	0.34
	Thiocyanate (SCN) (mg/L)	0.54	<0.50	<0.50	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	3.27	0.170	3.76	3.41	17.2
	Antimony (Sb)-Total (mg/L)	0.00054	0.00072	0.00051	0.00038	0.00229
	Arsenic (As)-Total (mg/L)	0.0105	0.00310	0.0114	0.00814	0.0760
	Barium (Ba)-Total (mg/L)	0.0839	0.0254	0.0924	0.0841	0.346
	Beryllium (Be)-Total (mg/L)	0.00012	<0.00010	0.00015	0.00013	0.00072
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00124
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000261	0.000191	0.000325	0.000290	0.00178
	Calcium (Ca)-Total (mg/L)	10.4	12.5	8.50	8.03	19.8
	Chromium (Cr)-Total (mg/L)	0.00414	0.00028	0.00603	0.00470	0.0290
	Cobalt (Co)-Total (mg/L)	0.00209	<0.00010	0.00221	0.00210	0.0104

* 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		L1308840-16 Water 28-MAY-13 12:00 0167-130528-006	L1308840-17 Water 28-MAY-13 12:00 0167-130528-012	L1308840-18 Water 28-MAY-13 12:00 0167-130528-003	L1308840-19 Water 28-MAY-13 12:00 TRAVEL BLANK	L1308840-20 Water 28-MAY-13 12:00 0167-130528-026
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	43.8	86.9	589	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	24.4	44.7	333		<0.50
	pH (pH)	7.36	7.41	7.89	5.85	5.83
	Total Suspended Solids (mg/L)	269	57.2	77.2	<3.0	<3.0
	Total Dissolved Solids (mg/L)	51	84	442	<10	<10
	Turbidity (NTU)					
Leachable Anions & Nutrients	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	22.8	24.6	96.8	1.1	<1.0
	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 (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	22.8	24.6	96.8	1.1	<1.0
	Ammonia, Total (as N) (mg/L)	0.0131	0.0059	0.378	0.0238 ^{RRV}	<0.0050 ^{RRV}
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.043	0.045	0.076	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.0237	<0.0050	0.0731	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0048	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	3.01	19.5	233	<0.50	<0.50
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)	3.72	0.190	0.921	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	0.00043	0.00068	0.00258	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00934	0.00340	0.0470	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	0.0915	0.0254	0.0597	<0.000050	<0.000050
	Beryllium (Be)-Total (mg/L)	0.00014	<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	0.012	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000293	0.000192	0.000314	<0.000010	<0.000010
	Calcium (Ca)-Total (mg/L)	7.81	13.2	86.6	<0.050	<0.050
	Chromium (Cr)-Total (mg/L)	0.00522	0.00033	0.00197	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00233	0.00010	0.00131	<0.00010	<0.00010

* 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		L1308840-21 Water 28-MAY-13 12:00 0167-130528-010	L1308840-22 Water 28-MAY-13 12:00 0167-130528-001	L1308840-23 Water 28-MAY-13 12:00 0167-130528-014	L1308840-24 Water 28-MAY-13 12:00 0167-130528-025	L1308840-25 Water 29-MAY-13 12:00 0167-130529-018
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	84.1	84.6	612	43.9	850
	Hardness (as CaCO3) (mg/L)	43.2	42.7	358	21.7	462
	pH (pH)	7.39	7.27	7.73	7.07	7.93
	Total Suspended Solids (mg/L)	<3.0	7.2	5.2	62.5	42.1
	Total Dissolved Solids (mg/L)	84	82	476	72	614
	Turbidity (NTU)					
Leachable Anions & Nutrients	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	23.6	24.0	91.2	21.2	126
	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 (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	23.6	24.0	91.2	21.2	126
	Ammonia, Total (as N) (mg/L)	0.0058	0.0060	0.0097	0.0611	0.362
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<2.5 ^{DLA}
	Fluoride (F) (mg/L)	0.038	0.037	0.041	0.029	<0.10 ^{DLA}
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0062	0.0269	0.089
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0018	0.0044	<0.0050 ^{DLA}
	Sulfate (SO4) (mg/L)	18.6	18.1	255	2.06	343
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)	<2.0 ^{DLIS}	<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)	0.138	0.140	0.0715	1.13	0.631
	Antimony (Sb)-Total (mg/L)	0.00040	0.00041	0.00234	0.00026	0.00272
	Arsenic (As)-Total (mg/L)	0.00248	0.00285	0.00796	0.00480	0.0126
	Barium (Ba)-Total (mg/L)	0.0264	0.0271	0.0313	0.0788	0.0516
	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	<0.010	0.018	<0.010	0.019
	Cadmium (Cd)-Total (mg/L)	0.000064	0.000037	0.000105	0.000101	0.000182
	Calcium (Ca)-Total (mg/L)	12.7	12.7	86.8	6.46	108
	Chromium (Cr)-Total (mg/L)	0.00026	0.00023	0.00016	0.00261	0.00229
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00015	0.00057	0.00159	0.00120

* 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	L1308840-26 Water 29-MAY-13 12:00 0167-130529-030				
Grouping	Analyte						
WATER							
Physical Tests	Colour, True (CU)	<5.0					
	Conductivity (uS/cm)	401					
	Hardness (as CaCO3) (mg/L)	219					
	pH (pH)	7.60					
	Total Suspended Solids (mg/L)						
	Total Dissolved Solids (mg/L)	225					
	Turbidity (NTU)	<0.10					
Leachable Anions & Nutrients	Anion Sum (meq/L)	4.35					
	Cation Sum (meq/L)	4.62					
	Cation - Anion Balance (%)	3.0					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)						
	Alkalinity, Carbonate (as CaCO3) (mg/L)						
	Alkalinity, Hydroxide (as CaCO3) (mg/L)						
	Alkalinity, Total (mg/L)	174					
	Alkalinity, Total (as CaCO3) (mg/L)						
	Ammonia, Total (as N) (mg/L)						
	Chloride (Cl) (mg/L)	<0.50					
	Fluoride (F) (mg/L)	0.093					
	Nitrate (as N) (mg/L)	0.150					
	Nitrite (as N) (mg/L)	<0.0010					
	Sulfate (SO4) (mg/L)	41.0					
Cyanides	Cyanide, Weak Acid Diss (mg/L)						
	Cyanide, Total (mg/L)						
	Cyanate (mg/L)						
	Thiocyanate (SCN) (mg/L)						
Total Metals	Aluminum (Al)-Total (mg/L)	<0.010					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	0.00038					
	Barium (Ba)-Total (mg/L)	0.095					
	Beryllium (Be)-Total (mg/L)						
	Bismuth (Bi)-Total (mg/L)						
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.00020					
	Calcium (Ca)-Total (mg/L)	50.5					
	Chromium (Cr)-Total (mg/L)	<0.0020					
	Cobalt (Co)-Total (mg/L)						

* 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		L1308840-1 Water 29-MAY-13 12:00 0167-130529-013	L1308840-2 Water 29-MAY-13 12:00 0167-130529-008	L1308840-3 Water 29-MAY-13 12:00 0167-130529-015	L1308840-4 Water 29-MAY-13 12:00 0167-130529-022	L1308840-5 Water 29-MAY-13 12:00 0167-130529-002
Grouping	Analyte					
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	0.0107	0.00571	0.00093	0.00529	0.0279
	Iron (Fe)-Total (mg/L)	5.79	2.03	3.20	2.38	18.8
	Lead (Pb)-Total (mg/L)	0.00761	0.00923	0.00572	0.0137	0.0147
	Lithium (Li)-Total (mg/L)	0.00248	0.00335	0.00972	0.00437	0.00731
	Magnesium (Mg)-Total (mg/L)	6.17	21.2	64.2	53.2	15.7
	Manganese (Mn)-Total (mg/L)	0.104	0.405	1.97	0.844	0.584
	Mercury (Hg)-Total (mg/L)	0.000013	<0.000010	<0.000010	<0.000010	0.000053
	Molybdenum (Mo)-Total (mg/L)	0.000161	0.000204	0.000362	0.000230	0.000314
	Nickel (Ni)-Total (mg/L)	0.00354	0.00196	0.00262	0.00142	0.00756
	Phosphorus (P)-Total (mg/L)	0.168	0.061	<0.050	<0.050	0.271
	Potassium (K)-Total (mg/L)	3.16	2.51	3.66	3.43	3.99
	Selenium (Se)-Total (mg/L)	0.00012	<0.00010	<0.00010	0.00028	0.00021
	Silicon (Si)-Total (mg/L)	8.79	5.32	6.53	4.55	21.4
	Silver (Ag)-Total (mg/L)	0.000194	0.000159	0.000047	0.000235	0.000511
	Sodium (Na)-Total (mg/L)	1.34	2.22	4.84	3.73	1.81
	Strontium (Sr)-Total (mg/L)	0.0693	0.169	0.440	0.335	0.119
	Sulfur (S)-Total (mg/L)	11.1	52.1	160	137	28.1
	Thallium (Tl)-Total (mg/L)	0.000148	0.000067	0.000101	0.000050	0.000409
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
	Titanium (Ti)-Total (mg/L)	0.155	0.051	<0.010	0.022	0.386
	Uranium (U)-Total (mg/L)	0.000395	0.00115	0.00370	0.00167	0.00113
	Vanadium (V)-Total (mg/L)	0.0174	0.0038	<0.0010	0.0022	0.0424
	Zinc (Zn)-Total (mg/L)	0.0310	0.424	1.15	0.371	0.312
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0262	0.0137	0.0020	0.0070	0.0413
	Antimony (Sb)-Dissolved (mg/L)	0.00108	0.00416	0.0157	0.00770	0.00281
	Arsenic (As)-Dissolved (mg/L)	0.00446	0.00972	0.0700	0.0112	0.00530
	Barium (Ba)-Dissolved (mg/L)	0.0385	0.0163	0.0177	0.0200	0.0375
	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	0.030	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000011	0.000994	0.00172	0.000750	0.000698
	Calcium (Ca)-Dissolved (mg/L)	18.9	72.8	191	143	40.9
	Chromium (Cr)-Dissolved (mg/L)	0.00013	<0.00010	<0.00010	<0.00010	0.00015
	Cobalt (Co)-Dissolved (mg/L)	0.00018	0.00019	0.00143	0.00038	0.00025
	Copper (Cu)-Dissolved (mg/L)	0.00165	0.00251	0.00020	0.00162	0.00402
	Iron (Fe)-Dissolved (mg/L)	0.773	0.081	2.70	0.204	0.153

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1308840-6 Water 29-MAY-13 12:00 0167-130529-019	L1308840-7 Water 29-MAY-13 12:00 0167-130529-020	L1308840-8 Water 29-MAY-13 12:00 0167-130529-016	L1308840-9 Water 29-MAY-13 12:00 0167-130529-017	L1308840-10 Water 28-MAY-13 12:00 0167-130528-021
Grouping	Analyte					
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	0.00632	0.0365	0.00330	0.00417	0.0106
	Iron (Fe)-Total (mg/L)	13.0	1.13	1.83	2.83	5.91
	Lead (Pb)-Total (mg/L)	0.000654	0.0470	0.00152	0.00143	0.00944
	Lithium (Li)-Total (mg/L)	<0.00050	0.00217	0.00372	0.00206	0.00203
	Magnesium (Mg)-Total (mg/L)	40.8	21.9	53.2	41.1	3.77
	Manganese (Mn)-Total (mg/L)	5.29	1.48	0.726	0.937	0.232
	Mercury (Hg)-Total (mg/L)	<0.000010	0.000013	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.00134	0.000901	0.000291	0.000586	0.000460
	Nickel (Ni)-Total (mg/L)	0.00235	0.00183	0.00164	0.00168	0.00381
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	0.056	0.057	0.265
	Potassium (K)-Total (mg/L)	5.70	5.14	3.34	2.81	1.29
	Selenium (Se)-Total (mg/L)	0.00021	<0.00010	0.00027	0.00020	<0.00010
	Silicon (Si)-Total (mg/L)	6.21	1.64	4.99	4.46	7.40
	Silver (Ag)-Total (mg/L)	0.000056	0.00100	0.000047	0.000036	0.000113
	Sodium (Na)-Total (mg/L)	36.0	6.98	4.40	5.99	1.10
	Strontium (Sr)-Total (mg/L)	0.654	0.248	0.344	0.321	0.0866
	Sulfur (S)-Total (mg/L)	194	103	131	110	3.18
	Thallium (Tl)-Total (mg/L)	<0.000010	0.000135	0.000018	0.000014	0.000054
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	0.038	0.035	0.129
	Uranium (U)-Total (mg/L)	0.00194	0.000425	0.00173	0.00149	0.000855
	Vanadium (V)-Total (mg/L)	0.0022	<0.0010	0.0038	0.0041	0.0113
	Zinc (Zn)-Total (mg/L)	0.0108	0.257	0.0671	0.0292	0.0327
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0105	0.0244	0.0115	0.0503	0.104
	Antimony (Sb)-Dissolved (mg/L)	0.00052	0.0243	0.00472	0.00263	0.00013
	Arsenic (As)-Dissolved (mg/L)	0.0297	0.0422	0.00686	0.00735	0.00095
	Barium (Ba)-Dissolved (mg/L)	0.0562	0.0111	0.0383	0.0423	0.0245
	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)	0.066	0.035	0.021	0.019	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000285	0.00245	0.000112	0.000070	0.000045
	Calcium (Ca)-Dissolved (mg/L)	215	104	129	115	9.06
	Chromium (Cr)-Dissolved (mg/L)	0.00028	<0.00010	<0.00010	0.00013	0.00016
	Cobalt (Co)-Dissolved (mg/L)	0.00665	0.00110	0.00044	0.00099	0.00015
	Copper (Cu)-Dissolved (mg/L)	0.00196	0.0243	0.00099	0.00118	0.00308
	Iron (Fe)-Dissolved (mg/L)	7.61	0.170	0.168	1.02	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		L1308840-11 Water 28-MAY-13 12:00 0167-130528-023	L1308840-12 Water 28-MAY-13 12:00 0167-130528-007	L1308840-13 Water 28-MAY-13 12:00 0167-130528-009	L1308840-14 Water 28-MAY-13 12:00 0167-130528-026	L1308840-15 Water 28-MAY-13 12:00 0167-130528-024
Grouping	Analyte					
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	0.00933	0.00536	0.0112	0.00988	0.0430
	Iron (Fe)-Total (mg/L)	4.84	0.312	5.55	5.18	25.7
	Lead (Pb)-Total (mg/L)	0.00784	0.000814	0.00905	0.00635	0.0662
	Lithium (Li)-Total (mg/L)	0.00170	<0.00050	0.00196	0.00231	0.0132
	Magnesium (Mg)-Total (mg/L)	3.69	2.81	3.04	3.00	8.78
	Manganese (Mn)-Total (mg/L)	0.176	0.0109	0.160	0.128	0.891
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000019
	Molybdenum (Mo)-Total (mg/L)	0.000461	0.000069	0.000629	0.000406	0.00151
	Nickel (Ni)-Total (mg/L)	0.00312	0.00063	0.00362	0.00323	0.0191
	Phosphorus (P)-Total (mg/L)	0.183	<0.050	0.205	0.189	0.974
	Potassium (K)-Total (mg/L)	1.23	0.90	1.20	1.32	4.39
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
	Silicon (Si)-Total (mg/L)	6.73	2.55	7.35	6.95	30.3
	Silver (Ag)-Total (mg/L)	0.000110	0.000023	0.000150	0.000129	0.000916
	Sodium (Na)-Total (mg/L)	1.10	1.16	0.966	0.869	2.29
	Strontium (Sr)-Total (mg/L)	0.0876	0.0854	0.0813	0.0817	0.139
	Sulfur (S)-Total (mg/L)	3.65	6.45	1.53	1.20	4.87
	Thallium (Tl)-Total (mg/L)	0.000046	<0.000010	0.000058	0.000048	0.000293
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00036
	Titanium (Ti)-Total (mg/L)	0.113	<0.010	0.128	0.121	0.653
	Uranium (U)-Total (mg/L)	0.000748	0.000083	0.000935	0.000984	0.00251
	Vanadium (V)-Total (mg/L)	0.0091	<0.0010	0.0106	0.0098	0.0536
	Zinc (Zn)-Total (mg/L)	0.0267	0.0152	0.0308	0.0272	0.164
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.102	0.0862	0.0967	0.0953	0.0986
	Antimony (Sb)-Dissolved (mg/L)	0.00015	0.00056	<0.00010	<0.00010	0.00031
	Arsenic (As)-Dissolved (mg/L)	0.00089	0.00220	0.00077	0.00056	0.00283
	Barium (Ba)-Dissolved (mg/L)	0.0247	0.0237	0.0236	0.0235	0.0197
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000050	0.000158	0.000043	0.000029	0.000110
	Calcium (Ca)-Dissolved (mg/L)	9.61	12.6	7.43	6.90	12.4
	Chromium (Cr)-Dissolved (mg/L)	0.00014	0.00019	0.00014	0.00014	0.00019
	Cobalt (Co)-Dissolved (mg/L)	0.00015	<0.00010	0.00015	0.00015	0.00022
	Copper (Cu)-Dissolved (mg/L)	0.00303	0.00466	0.00314	0.00309	0.00398
	Iron (Fe)-Dissolved (mg/L)	0.182	0.158	0.210	0.224	0.258

* 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		L1308840-16 Water 28-MAY-13 12:00 0167-130528-006	L1308840-17 Water 28-MAY-13 12:00 0167-130528-012	L1308840-18 Water 28-MAY-13 12:00 0167-130528-003	L1308840-19 Water 28-MAY-13 12:00 TRAVEL BLANK	L1308840-20 Water 28-MAY-13 12:00 0167-130528-026
Grouping	Analyte					
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	0.0109	0.00577	0.00426	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	5.60	0.332	4.17	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	0.00716	0.000838	0.00572	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.00264	<0.00050	0.00137	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	2.88	2.93	26.3	<0.10	<0.10
	Manganese (Mn)-Total (mg/L)	0.137	0.0110	1.04	<0.000050	<0.000050
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.000751	0.000063	0.000322	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)	0.00714	0.00068	0.00177	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	0.198	<0.050	0.076	<0.050	<0.050
	Potassium (K)-Total (mg/L)	1.10	0.94	2.38	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	0.00016	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	7.10	2.69	4.13	<0.050	<0.050
	Silver (Ag)-Total (mg/L)	0.000147	0.000030	0.000112	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.884	1.16	5.03	<0.050	<0.050
	Strontium (Sr)-Total (mg/L)	0.0816	0.0827	0.202	<0.00020	<0.00020
	Sulfur (S)-Total (mg/L)	1.25	6.68	76.6	<0.50	<0.50
	Thallium (Tl)-Total (mg/L)	0.000051	<0.000010	0.000018	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.125	<0.010	0.041	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00108	0.000086	0.000986	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)	0.0110	<0.0010	0.0050	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0303	0.0157	0.0377	<0.0030	<0.0030
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0967	0.0842	0.0289		<0.0010
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00053	0.00179		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00056	0.00226	0.0155		<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.0226	0.0240	0.0393		<0.000050
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		<0.00050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.013		<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000035	0.000149	0.000044		<0.000010
	Calcium (Ca)-Dissolved (mg/L)	6.70	13.2	88.9		<0.050
	Chromium (Cr)-Dissolved (mg/L)	0.00014	0.00016	0.00016		<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00018	<0.00010	0.00078		<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00319	0.00458	0.00086		<0.00020
	Iron (Fe)-Dissolved (mg/L)	0.206	0.160	0.600		<0.010

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1308840-21 Water 28-MAY-13 12:00 0167-130528-010	L1308840-22 Water 28-MAY-13 12:00 0167-130528-001	L1308840-23 Water 28-MAY-13 12:00 0167-130528-014	L1308840-24 Water 28-MAY-13 12:00 0167-130528-025	L1308840-25 Water 29-MAY-13 12:00 0167-130529-018
Grouping	Analyte					
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	0.00223	0.00186	0.00130	0.00536	0.00460
	Iron (Fe)-Total (mg/L)	0.295	0.471	0.405	5.40	2.44
	Lead (Pb)-Total (mg/L)	0.000362	0.000212	0.000465	0.000839	0.00103
	Lithium (Li)-Total (mg/L)	<0.00050	<0.00050	0.00196	0.00064	0.00246
	Magnesium (Mg)-Total (mg/L)	2.84	2.85	34.9	1.93	41.2
	Manganese (Mn)-Total (mg/L)	0.00841	0.0618	0.301	0.442	0.936
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000012	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.000057	0.000063	0.000211	0.000285	0.000632
	Nickel (Ni)-Total (mg/L)	0.00061	0.00070	0.00074	0.00323	0.00151
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	0.068	<0.050
	Potassium (K)-Total (mg/L)	0.93	0.91	2.57	1.20	2.80
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	0.00016	0.00016	0.00018
	Silicon (Si)-Total (mg/L)	2.57	2.56	2.69	4.79	4.24
	Silver (Ag)-Total (mg/L)	0.000014	0.000016	0.000014	0.000022	0.000037
	Sodium (Na)-Total (mg/L)	1.19	1.21	2.58	1.16	5.95
	Strontium (Sr)-Total (mg/L)	0.0727	0.0822	0.217	0.0359	0.323
	Sulfur (S)-Total (mg/L)	6.23	6.11	85.9	0.96	106
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000020	0.000012
	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	0.038	0.027
	Uranium (U)-Total (mg/L)	0.000077	0.000104	0.000982	0.000266	0.00151
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0076	0.0033
	Zinc (Zn)-Total (mg/L)	0.0061	0.0045	0.0216	0.0105	0.0252
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0815	0.0920	0.0554	0.122	0.0471
	Antimony (Sb)-Dissolved (mg/L)	0.00037	0.00034	0.00245	0.00016	0.00268
	Arsenic (As)-Dissolved (mg/L)	0.00188	0.00211	0.00625	0.00258	0.00740
	Barium (Ba)-Dissolved (mg/L)	0.0245	0.0255	0.0303	0.0522	0.0431
	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	0.015	<0.010	0.018
	Cadmium (Cd)-Dissolved (mg/L)	0.000049	0.000027	0.000049	0.000024	0.000073
	Calcium (Ca)-Dissolved (mg/L)	12.7	12.5	86.1	5.98	113
	Chromium (Cr)-Dissolved (mg/L)	0.00018	0.00017	<0.00010	0.00039	0.00011
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00012	0.00052	0.00082	0.00094
	Copper (Cu)-Dissolved (mg/L)	0.00189	0.00164	0.00084	0.00228	0.00114
	Iron (Fe)-Dissolved (mg/L)	0.158	0.228	0.217	3.28	0.994

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID				
		Description				
		Sampled Date				
		Sampled Time				
		Client ID				
Grouping	Analyte					
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	<0.0010				
	Iron (Fe)-Total (mg/L)	<0.030				
	Lead (Pb)-Total (mg/L)	0.00062				
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)	22.6				
	Manganese (Mn)-Total (mg/L)	<0.0020				
	Mercury (Hg)-Total (mg/L)	<0.00020				
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)	0.91				
	Selenium (Se)-Total (mg/L)	<0.0010				
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)	5.1				
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)	0.00230				
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)	<0.050				
Dissolved Metals	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					

* 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		L1308840-1 Water 29-MAY-13 12:00 0167-130529-013	L1308840-2 Water 29-MAY-13 12:00 0167-130529-008	L1308840-3 Water 29-MAY-13 12:00 0167-130529-015	L1308840-4 Water 29-MAY-13 12:00 0167-130529-022	L1308840-5 Water 29-MAY-13 12:00 0167-130529-002
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.000081	0.000144	0.000350	0.000134	0.000120
	Lithium (Li)-Dissolved (mg/L)	<0.00050	0.00275	0.00879	0.00422	0.00064
	Magnesium (Mg)-Dissolved (mg/L)	5.07	21.7	62.5	55.1	12.1
	Manganese (Mn)-Dissolved (mg/L)	0.0538	0.312	1.84	0.763	0.244
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000068	0.000185	0.000335	0.000194	0.000107
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00093	0.00237	0.00085	0.00086
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	2.64	2.38	3.67	3.51	1.89
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00030	<0.00010
	Silicon (Si)-Dissolved (mg/L)	2.72	3.88	6.28	3.67	3.06
	Silver (Ag)-Dissolved (mg/L)	0.000011	0.000024	0.000024	0.000015	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.20	2.15	4.70	3.86	1.54
	Strontium (Sr)-Dissolved (mg/L)	0.0611	0.168	0.412	0.336	0.0963
	Sulfur (S)-Dissolved (mg/L)	11.5	54.2	154	140	28.8
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000032	0.000092	0.000023	0.000024
	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)	0.000040	0.00109	0.00347	0.00167	0.000653
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0016	0.302	1.10	0.275	0.191

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1308840-6 Water 29-MAY-13 12:00 0167-130529-019	L1308840-7 Water 29-MAY-13 12:00 0167-130529-020	L1308840-8 Water 29-MAY-13 12:00 0167-130529-016	L1308840-9 Water 29-MAY-13 12:00 0167-130529-017	L1308840-10 Water 28-MAY-13 12:00 0167-130528-021
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00291	0.000212	0.000110	0.000168
	Lithium (Li)-Dissolved (mg/L)	<0.00050	0.00216	0.00333	0.00167	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	41.0	22.3	54.4	42.3	2.57
	Manganese (Mn)-Dissolved (mg/L)	5.05	1.46	0.637	0.937	0.0350
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000920	0.000867	0.000230	0.000289	0.000181
	Nickel (Ni)-Dissolved (mg/L)	0.00203	0.00169	0.00065	0.00093	0.00059
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	5.70	5.09	3.42	2.82	0.70
	Selenium (Se)-Dissolved (mg/L)	0.00021	<0.00010	0.00023	0.00016	<0.00010
	Silicon (Si)-Dissolved (mg/L)	5.94	1.23	3.94	3.51	2.06
	Silver (Ag)-Dissolved (mg/L)	0.000023	0.000121	<0.000010	0.000021	0.000035
	Sodium (Na)-Dissolved (mg/L)	34.7	6.95	4.35	6.30	0.849
	Strontium (Sr)-Dissolved (mg/L)	0.629	0.251	0.340	0.328	0.0697
	Sulfur (S)-Dissolved (mg/L)	192	104	132	112	3.16
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000114	<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)	0.00183	0.000415	0.00168	0.00144	0.000193
	Vanadium (V)-Dissolved (mg/L)	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0086	0.227	0.0452	0.0197	0.0025

* 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		L1308840-11 Water 28-MAY-13 12:00 0167-130528-023	L1308840-12 Water 28-MAY-13 12:00 0167-130528-007	L1308840-13 Water 28-MAY-13 12:00 0167-130528-009	L1308840-14 Water 28-MAY-13 12:00 0167-130528-026	L1308840-15 Water 28-MAY-13 12:00 0167-130528-024
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.000153	0.000222	0.000138	0.000118	0.000620
	Lithium (Li)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	2.79	2.80	2.05	2.01	2.83
	Manganese (Mn)-Dissolved (mg/L)	0.0314	0.00850	0.0256	0.0218	0.0749
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000184	0.000061	0.000172	0.000171	0.000447
	Nickel (Ni)-Dissolved (mg/L)	0.00055	0.00063	0.00054	0.00051	0.00091
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.73	0.90	0.70	0.75	0.93
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	2.06	2.42	2.08	1.99	2.60
	Silver (Ag)-Dissolved (mg/L)	0.000011	0.000041	0.000018	<0.000010	0.000030
	Sodium (Na)-Dissolved (mg/L)	0.875	1.14	0.851	0.675	1.13
	Strontium (Sr)-Dissolved (mg/L)	0.0744	0.0809	0.0613	0.0652	0.0683
	Sulfur (S)-Dissolved (mg/L)	3.67	6.50	1.46	1.15	4.76
	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)	0.000200	0.000074	0.000166	0.000181	0.000280
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0030	0.0123	0.0013	0.0031	0.0021

* 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		L1308840-16 Water 28-MAY-13 12:00 0167-130528-006	L1308840-17 Water 28-MAY-13 12:00 0167-130528-012	L1308840-18 Water 28-MAY-13 12:00 0167-130528-003	L1308840-19 Water 28-MAY-13 12:00 TRAVEL BLANK	L1308840-20 Water 28-MAY-13 12:00 0167-130528-026
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.000112	0.000215	0.000216		<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.00050	<0.00050	0.00087		<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	1.86	2.88	27.0		<0.10
	Manganese (Mn)-Dissolved (mg/L)	0.0245	0.00801	0.915		<0.000050
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000150	<0.000050	0.000287		<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00053	0.00060	0.00073		<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050		<0.050
	Potassium (K)-Dissolved (mg/L)	0.68	0.91	2.34		<0.10
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Silicon (Si)-Dissolved (mg/L)	1.99	2.51	2.66		<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	0.000092		<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.647	1.15	5.16		<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.0553	0.0808	0.237		<0.00020
	Sulfur (S)-Dissolved (mg/L)	1.14	6.56	78.8		<0.50
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		<0.010
	Uranium (U)-Dissolved (mg/L)	0.000170	0.000073	0.00101		<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0011	0.0126	0.0099		<0.0010

* 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		L1308840-21 Water 28-MAY-13 12:00 0167-130528-010	L1308840-22 Water 28-MAY-13 12:00 0167-130528-001	L1308840-23 Water 28-MAY-13 12:00 0167-130528-014	L1308840-24 Water 28-MAY-13 12:00 0167-130528-025	L1308840-25 Water 29-MAY-13 12:00 0167-130529-018
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.000065	0.000077	0.000166	0.000237	0.000079
	Lithium (Li)-Dissolved (mg/L)	<0.00050	<0.00050	0.00201	<0.00050	0.00216
	Magnesium (Mg)-Dissolved (mg/L)	2.81	2.81	34.8	1.64	43.4
	Manganese (Mn)-Dissolved (mg/L)	0.00548	0.0569	0.280	0.348	0.937
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000058	0.000052	0.000187	0.000182	0.000300
	Nickel (Ni)-Dissolved (mg/L)	0.00059	0.00064	0.00063	0.00173	0.00087
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.92	0.88	2.50	1.03	2.89
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	0.00015	<0.00010	0.00015
	Silicon (Si)-Dissolved (mg/L)	2.44	2.42	2.59	3.35	3.54
	Silver (Ag)-Dissolved (mg/L)	0.000033	<0.000010	<0.000010	<0.000010	<0.000010 ^{DTC}
	Sodium (Na)-Dissolved (mg/L)	1.15	1.19	2.72	1.11	7.78
	Strontium (Sr)-Dissolved (mg/L)	0.0772	0.0773	0.213	0.0313	0.325
	Sulfur (S)-Dissolved (mg/L)	6.07	5.97	84.3	0.86	110
	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)	0.000078	0.000091	0.000960	0.000111	0.00144
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0029	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0048	0.0042	0.0200	0.0049	0.0149

* 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		L1308840-26 Water 29-MAY-13 12:00 0167-130529-030				
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Phosphorus (P)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Sulfur (S)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					

* 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	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Method Blank	Manganese (Mn)-Total	MB-LOR	L1308840-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Mercury (Hg)-Total	MS-B	L1308840-26
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L1308840-26
Matrix Spike	Sodium (Na)-Total	MS-B	L1308840-26
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1308840-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -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
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MB-LOR	Method Blank exceeds ALS DQO. LORs adjusted for samples with positive hits below 5 times blank level.
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,			

Reference Information

Dionex 2003. Nitrate is detected by UV absorbance.

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

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

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

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

CN-CNO-WT Water Cyanate APHA 4500-CN-L

CN-SCN-VA Water Thiocyanate by Colour APHA 4500-CN CYANIDE

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

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

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

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

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

COLOUR-TRUE-WR Water Colour (True) by Spectrometer APHA 2120

"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. Apparent 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."

EC-MAN-WR Water Conductivity by Meter APHA 2510 (B)

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

HARDNESS-CALC-VA Water Hardness APHA 2340B

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

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

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

HG-TOT-CVAFS-VA Water Total Mercury in Water by CVAFS EPA 245.7

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

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

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

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

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.

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:

$$\text{Ion Balance (\%)} = [\text{Cation Sum} - \text{Anion Sum}] / [\text{Cation Sum} + \text{Anion Sum}]$$

Reference Information

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

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

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

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

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

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

Reference Information

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

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

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

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

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

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

Chain of Custody Numbers:

1	2	3	4
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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 wwwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC #

Page _____ of _____

Report To				Report Format / Distribution				Service Requested (Push for routine analysis subject to availability)				
Company:	EDI	☒ Standard	☐ Other	☒ Regular (Standard Turnaround Times - Business Days)								
Contact:	Lyndsay Doetzel	☒ PDF	☒ Excel	☐ Digital	☐ Fax				☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT			
Address:	2195 - 2nd Ave	Email 1: ldoetzel@edynamics.com							☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT			
	Y1A 3T8	Email 2:							☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT			
Phone:	867-393-4882	Fax:	Email 3:						Analysis Request			
Invoice To	Same as Report?	☒ Yes	☐ No	Client / Project Information					Please indicate below Filtered, Preserved or both (F, P, F/P)			
Hardcopy of Invoice with Report?	☐ Yes	☐ No	Job #:	Mount Nansen 13-Y-0167		P	P	P	P	F/P	P	
Company:			PO / AFE:									
Contact:			LSD:									
Address:												
Phone:		Fax:	Quote #:	Q38399								
			ALS Contact:									
Sample	Sample Identification (This description will appear on the report)		Date (dd-mm-yy)	Time (hh:mm)	Sample Type							
	0167-130529	013	29 May 13		Water	ALK-PCT-VA	X	X	X	X	X	6
	0167-130529	008			Water	ANIONS-ALL-IC-WR	X	X	X	X	X	6
	0167-130529	015			Water	CN-CNO-WT	X	X	X	X	X	6
	0167-130529	022			Water	CN-SCN-VA	X	X	X	X	X	6
	0167-130529	002			Water	CN-T-CFA-VA	X	X	X	X	X	6
	0167-130529	019			Water	CN-WAD-CFA-VA	X	X	X	X	X	6
	0167-130529	020			Water	EC-MAN-WR,PH-MAN-WR	X	X	X	X	X	6
	0167-130529	016			Water	MET-D-BCMDG-A	X	X	X	X	X	6
	0167-130529	017			Water	MET-T-BCMDG-VA	X	X	X	X	X	6
					Water	NH3-F-VA	X	X	X	X	X	6
					Water	TDS-VA,TSS-VA	X	X	X	X	X	6
Number of Containers												
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.												
Released by:	Date (dd-mm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:	Yes / No ? If Yes add SIF	
Meghan Marjanovic	29 May 2013			29-MAY-13	19:00	5.15/5.00						



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CCC#

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Appendix C:
YG Environmental Health Services Reports



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 LYNDSEY Doetzel Phone 393 4882
Personne-ressource LYNDSEY Doetzel Téléphone 393 4882
Mailing address 2195 Second Ave Fax 393 4883
Adresse postale Whitehorse YT Télécopieur 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 Subdivision
Adresse municipale WQ-PW 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/CL Date 130523 Time 0841 am
Échantillon prélevé par JM/DS/CL Date 130523 Heure 0841 am
YY/MM/DD • AA/MM/JJ
Sampling Site (e.g., kitchen tap) WELL (free flowing)
Point d'échantillonnage (ex. : robinet de cuisine) WELL (free flowing)
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) NA
Autre dispositif de traitement (ex. : désinfection aux rayons UV, adoucisseur d'eau, filtre) NA

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

Receipt of Sample 1305-23 Time 1000 am By SS
Réception de l'échantillon Date 1305-23 Heure 1000 am Par SS
YY/MM/DD • AA/MM/JJ
Condition of Sample ☒ Satisfactory ☐ Unsatisfactory Details 12 PC
État de l'échantillon ☒ Satisfaisant ☐ Non satisfaisant Précisez 12 PC
Incubation 13-05-23 Time 345 am By SS Incubator 1
Incubation Date 13-05-23 Heure 345 am Par SS Incubateur 1
YY/MM/DD • AA/MM/JJ
Analysis Completed 1305-24 Time 400 am By SS
Analyse terminée Date 1305-24 Heure 400 am 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 WLT Position WLT Date 1305-24
Rapport autorisé par WLT Poste WLT Date 1305-24
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

Sample Number 55072
Numéro de l'échantillon 55072



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

Contact Information • Coordonnées de la personne-ressource

Contact Person
Personne-ressource LYNDSEY DOETZEL Phone
Téléphone 393 4882

Mailing address
Adresse postale 2195 Second Ave Whitehorse Fax
Télécopieur 393 4883

ENVIRONMENTAL DYNAMICS Postal code
Code postal Y1A 3T8

First Nation, Municipal or Business Name
Nom de la Première nation, de la municipalité ou de l'entreprise

Agent Fax
Agent Télécopieur

Sampling Location • Lieu de la prise d'échantillon

Municipal Address
Adresse municipale WQ PW Subdivision
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
Échantillon prélevé par Joel MacFabe Date
Date 13 05 29 Time
Heure 15:36 am

Sampling Site (e.g., kitchen tap)
Point d'échantillonnage (ex. : robinet de cuisine) Well free flowing

Is this a Resample from a Previous Test?
Est-ce un deuxième échantillon d'un test antérieur? ☐ Yes
Oui ☒ No
Non Previous Sample Number
Numéro de l'échantillon précédent

Sample Supply / Source d'approvisionnement en eau

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

Sample Source / Provenance de l'échantillon

☐ Bore Well
Puits creusé ☐ Driven Well
Puits tubulaire ☒ Drilled Well
Puits foré à la sondeuse Depth of Well
Profondeur du puits

☐ Water Holding Tank
Réservoir d'eau ☐ Other (explain)
Autre (précisez)

Water Treatment / Traitement de l'eau

Is the Water Chlorinated?
L'eau contient-elle du chlore? ☐ Yes
Oui ☒ No
Non Free Available Chlorine
Chlore libre disponible p.p.m.
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
Réception de l'échantillon Date
Date 13-05-30 Time
Heure 11:00 am By
pm Par SS

Condition of Sample
État de l'échantillon ☒ Satisfactory
Satisfaisant ☐ Unsatisfactory
Non satisfaisant Details
Précisez 7.40C

Incubation
Incubation Date
Date 13-05-30 Time
Heure 11:00 am By
pm Par SS Incubator
Incubateur 4

Analysis Completed
Analyse terminée Date
Date 13-05-31 Time
Heure 3:00 am By
pm Par SS

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
Rapport autorisé par [Signature] Position
Poste WLT Date
Date 13-05-31

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

Sample Number
Numéro de l'échantillon : 53728