

September 27, 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: September 23-25, 2013

Trip Dates:	September 23-25, 2013
EDI Field Staff:	Dawn Hansen, Danny Skookum, Caleb Light
Tasks:	Hydrology and Water Quality

Field Summary

EDI completed the surface water quality sampling and hydrometric monitoring at the Mount Nansen Site from September 23 to September 25th, 2013. Air temperatures during the trip ranged from -10°C to +5°C. Weather conditions were overcast with periodic snow squalls.

EDI visited all water quality sites and hydrometric stations. Water levels across most of the sites/stations were low to moderate and typical for the late fall period. The Brown-McDade pit lake was sampled once the active drilling crew completed daily activities and access could be granted.

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 trip (August 13-15th). Section 3 contains relevant photos of field conditions. Section 4 details additional monitoring program comments, noteworthy observations, and any changes to budget or scope moving forward.



1. Hydrology

All hydrometric stations were visited and site conditions documented. Stream discharge measurements were collected at each hydrometric station using the cross-sectional velocity-area method (*i.e.* mid-section method), the volumetric method, and/or the salt tracer method using a salt slug injection.

Water levels at all stations were typical of the late fall period, with discharges in Dome Creek showing moderate water levels (H-DC-DX+105, H-DC-M, and H-DC-R). Station H-DC-DX flow was too low for hydrometric measurement at the station, but volumetrically measured at the culvert immediately downstream.

Erosion of the bank upstream of the H-VC-REF station was marginally reduced compared to previous visits. Sloughing materials are actively washed downstream and the station remains relatively stable. Stilling well anchors may have to be relocated and established once erosion and sloughing materials reaches those points.

Table 1 summarizes the hydrometric monitoring program station measurements completed and any additional relevant station details. Each data logger was downloaded at each continuous station and immediately redeployed following hydrometric monitoring. Site conditions at all stations were typical of the late fall period. Minor amounts of ice accumulation were observed at higher altitude stations along shorelines and calm sections of stream water.

Table 1. Hydrometric program details.

Hydrology program dates:	September 23-24, 2013
Weather at time of monitoring:	Weather conditions were partly cloudy to overcast, with temperatures between -10°C to +2°C. Light snow precipitation events occurred throughout the monitoring event.

Station	Hydrometric Measurement Type	Notes & Comments
ATM-DC2/DC4	None	Both atmospheric barologgers downloaded.
H-DC-DX	Not Possible	Water levels low, hydrometric measurement taken at culvert immediately downstream.
H-DC-DX+105	Salt Slug	Water levels moderate. Salt tracer method used to measure stream discharge. Drive point piezometers installed along margins of station location by AMEC/AE crew.
H-DC-D1b	Salt Slug	Flow levels were low. Salt tracer discharge measurement taken.
H-DC-U1	Salt Slug	Water levels seasonally low. Salt tracer method used to estimate discharge.
H-DC-U2	Salt Slug	Water levels were low with moderate turbidity. Salt tracer method used to estimate discharge through existing channel.
H-DC-B	Salt Slug	Minor amounts of stilling well silt accumulation cleared. Salt tracer method used to estimate stream discharge. Earth Tek Drilling using



Station	Hydrometric Measurement Type	Notes & Comments
		water from Diversion Channel upstream of bride for drilling in the pit.
H-DC-M	Salt Slug	Minor sedimentation occurring in stilling well. Salt tracer used to estimate stream discharge. Logger downloaded and redeployed.
H-DC-R	Salt Slug	Water level moderate. Stilling well location continues to be subjected to silt accumulation and sediment deposition. Salt tracer used to estimate stream discharge.
H-VC-REF	ADV	Flow levels moderate and water clear. Area-velocity method used to estimate discharge. Logger downloaded and redeployed. Several Arctic Grayling observed while gauging.
H-VC-U	ADV	Water levels are moderate. Discharge measurement completed using the mid-section method. Logger downloaded and redeployed.
H-BC	Salt Slug	Water levels moderate and water very clear. Salt tracer used to measure discharge.
H-VC-DBC	ADV	Water level moderate. Stream water is clear with some silt accumulation. Mid-section method used to measure discharge. Logger downloaded and redeployed.
H-VC-UMN	ADV	Mid-section method used to measure discharge. Logger downloaded and redeployed.
H-MN	Salt Slug	Mid-section method used to measure discharge. Logger downloaded and redeployed.
H-VC-R	ADV	Stream flows moderate and relatively clear. Mid-section method used to estimate discharge. Logger downloaded and redeployed. Several fishes (arctic grayling) observed at station location.
H-SEEP	Volumetric	A volumetric measurement was made at the pipe discharge. Flow rate and total volume was recorded from the flow meter.
H-TP	None	Staff gauge reading recorded.
H-PC-U	Salt Slug	Moderate flow at station (Photo 6), with water continuing to be diverted around weir structure. Salt tracer was used to measure discharge. Logger downloaded and redeployed.
H-PC-DSP	Volumetric	Flow level is very low. A volumetric measurement was collected from the culvert upstream of the station. Logger downloaded and redeployed.

2. Water Quality

Water quality samples were collected from all monitoring sites with the exception of WQ-ADIT-SEEP and WQ-MS-S-03 which were both dry. Water levels were moderate to low at all other sites. The Brown-McDade pit lake was sampled at three depths during this trip (Photo 8). Samples were also collected from the Dry Creek station (WQ-DRY).



All water quality samples were delivered to ALS on Wednesday, September 25th, 2013. Bacteriological samples collected from the pump house well were submitted to YG Environmental Health Services on Wednesday September 25th, 2013.

This memo includes analytical results from samples collected during the August 13-15, 2013 trip (Appendix A) as well as copies of the ALS Certificate of Analysis (Appendix B). There are no results for the bacteriological sample collected from the pump house well during the August 2013 trip as the lab is closed on Fridays which was when the samples returned to Whitehorse.

Table 2. Water quality sampling program details.

WQ Sampling dates:	September 24-25, 2013	
Weather at time of sampling:	Weather conditions were overcast, with temperatures between -10°C to +5°C during sampling.	
Site	Sampled? (Yes/No)	Notes / Explanations
WQ-PIT1	Yes	Samples taken from surface. Dissolved oxygen (DO) 10.16 mg/L
WQ-PIT2	Yes	Samples taken from 3 m depth. DO 9.44 mg/L.
WQ-PIT3	Yes	Samples taken from 6 m depth. DO 5.98 mg/L.
WQ-SEEP	Yes	Conditions normal, collected samples.
WQ-TP	Yes	Conditions normal for this time of year.
WQ-DC-DX	Yes	Water levels were moderate with low turbidity (Photo 3).
WQ-DC-DX+105	Yes	Water levels moderate with low turbidity.
WQ-DC-D1b	Yes	Water levels were moderate.
WQ-DC-U1	Yes	Water levels were moderate and turbidity low.
WQ-DC-U2	Yes	Water levels moderate with elevated visual turbidity.
WQ-DC-U	Yes	Water levels moderate with moderate turbidity.
WQ-DC-R	Yes	Water levels were moderate with low turbidity.
WQ-VC-REF	Yes	Site conditions normal for time of year, water levels were moderate with moderately clear water.
WQ-VC-U	Yes	Site conditions normal for time of year, water levels were moderate with clear water.
WQ-BC	Yes	Site conditions normal for time of year, water levels were low with no turbidity.
WQ-VC-DBC	Yes	Site conditions normal for time of year, water levels were moderate with no turbidity.
WQ-VC-UMN	Yes	Site conditions normal for time of year, water levels were moderate with no turbidity.
WQ-MN	Yes	Site conditions normal for time of year with moderate water levels and low turbidity.



Site	Sampled? (Yes/No)	Notes / Explanations
WQ-VC-R	Yes	Site conditions normal for time of year with moderate flow levels and low turbidity.
WQ-PW	Yes	Bacteriological sample and drinking water samples collected from discharge pipe.
WQ-PC-U	Yes	Moderate to low flow observed entering pond at sampling location. Water samples collected.
WQ-PC-D	Yes	Low flows present in creek. Sample collected.
WQ-ADIT-SEEP	No	Seep was dry. No samples collected.
WQ-MS-S-08	Yes	No water produced from seep location. Entire area has been graded/disturbed from on-going remedial work. No sample collected.
WQ-MS-S-03	Yes	Ditch had been excavated and shaped. Flowing water present within ditch. Sample collected.
WQ-DRY	No	Sample collected from Dry Creek. Site conditions typical for the season.
Quality Assurance/Quality Control Samples		
Field Replicate A	Yes	Collected from WQ-SEEP.
Field Replicate B	Yes	Collected from WQ-PC-D.
Field Blank	Yes	Samples prepared with lab-supplied de-ionized water at the site.
Trip Blank	Yes	Samples provided by lab and were transported to and from site.



3. Trip Photographs



Photo 1. H-MN station at moderate to low flows.



Photo 2. The H-VC-UMN station at moderate flows.



Photo 3. The H/WQ-DC-DX location showing low to moderate flows with newly installed drive point piezometers within the channel.



Photo 4. H-DC-M station showing moderate water levels and staked position of new drive point piezometer installations.



Photo 5. The H-VC-DBC station showing moderate water levels and low turbidity.



Photo 6. H-PC-U station showing looking downstream with moderate flow levels. Location in the mid-ground of the image is the proposed new weir location.



Photo 7. WQ-Adit Seep and WQ-PC-D sites. No flow was observed at WQ-Adit Seep.



Photo 8. The Brown-McDade pit lake, conditions on September 24, 2013.



Photo 9. H-DC-DX/DX+105 gauging station location at moderate levels and newly installed drive point piezometers.



4. Additional Trip Information/Comments

Any changes to project scope (i.e. additional sites sampled):	No changes at this time.
Any alterations to sample scheduling:	This monitoring trip was completed approximately one week from 'typical' sampling event timing. No other significant alterations to sample scheduling.
Any events resulting in changes to budget:	No events anticipated.
Additional Comments:	<p>Weir at H-PC-U hydrometric station should be re-located immediately downstream where proper use of the weir can be utilized. This work may be undertaken during the October field trip if the site conditions permit.</p> <p>Crew noticed multiple drive-point piezometers installed near the Dome Creek and Pony Creek hydrometric stations prior to hydrometric monitoring. These are not expected to have an impact of hydraulic flows.</p>
Wildlife Sightings:	Arctic grayling observed in Victoria Creek.
Site concerns including safety concerns:	None



Appendix A:
Water Quality Parameter Guideline Exceedances
August 13-15, 2013



Table A-1. Water Quality Parameter Guideline Exceedances; August 13-15, 2013 trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130814-009	0167-130814-012	0167-130814-016	0167-130814-003	0167-130814-008	0167-130814-013	0167-130814-005	0167-130814-011	0167-130814-021	0167-130814-015	0167-130814-006	0167-130814-007	0167-130814-002										
				WQ Site ID	WQ-PC-D	WQ-TP	WQ-MS-S-03-r	WQ-MS-S-08	WQ-PC-U	WQ-DC-U1	WQ-MN	WQ-SEEP	WQ-DC-U	WQ-DC-DX+105	WQ-DC-R	WQ-VC-R	WQ-VC-UMN	Date Sampled	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013
Temperature (in-situ)	°C	-	-	-	7.1	18.8	-	2.5	8.3	9.7	5.3	9.2	13.2	0.8	7.3	6.9	6.6										
Specific Conductivity (in-situ)	µS/cm	-	-	-	482.3	1309.0	-	1591.0	376.0	1262.0	85.2	1717.0	1361.0	1227.0	1168.0	221.4	238.8										
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.25	8.53	-	7.42	7.40	7.86	7.89	7.39	8.06	7.06	7.73	7.97	7.88										
Turbidity (in-situ)	NTU	-	-	-	0.95	4.38	-	4.12	4.57	2.03	15.40	54.70	22.80	3.11	49.30	4.13	3.21										
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-										
Conductivity	µS/cm	-	-	2	454	1250	1150	1470	368	1200	84.9	1520	1310	1130	1130	192	238										
Hardness (as CaCO3)	mg/L	-	-	0.5	245	709	727	951	188	745	43.1	874	758	678	620	107	116										
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.11	8.15	8.06	7.59	7.89	7.82	7.45	7.68	7.96	7.99	7.84	7.94	7.93										
Total Suspended Solids	mg/L	-	50	3	<3.0	3.9	4.8	13.3	4.6	<3.0	<3.0	20.5	11	<3.0	8.5	<3.0	<3.0										
Total Dissolved Solids	mg/L	-	-	10	358	1070	1020	1350	276	1070	110	1410	1130	981	965	162	160										
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-										
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	134	84.4	264	321	84.2	221	42.2	249	222	283	202	84.7	87.5										
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	<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	<1.0										
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	134	84.4	264	321	84.2	221	42.2	249	222	283	202	84.7	87.5										
Ammonia, Total (as N)	mg/L	-	-	0.005	0.0056	0.0135	0.0236	0.151	0.0072	0.0213	0.0289	4.07	1.26	0.0207	0.788	0.0067	0.0169										
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0										
Fluoride (F)	mg/L	0.12	-	0.02	0.062	0.26	0.32	<0.20	0.056	<0.20	0.067	<0.20	<0.20	0.34	0.2	0.057	0.056										
Nitrate (as N)	mg/L	3	-	0.005	0.21	<0.050	<0.050	0.127	<0.0050	<0.050	0.0301	1.19	0.424	<0.050	0.602	0.0585	0.0687										
Nitrite (as N)	mg/L	0.06	-	0.001	0.002	<0.010	<0.010	<0.010	<0.0010	<0.010	0.001	0.035	0.024	<0.010	0.035	0.0016	0.0017										
Sulfate (SO4)	mg/L	-	-	0.5	125	671	477	673	107	558	2.27	753	596	454	487	30.6	34.5										
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0138	<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	0.065	0.0139	<0.0050	<0.0050	<0.0050	<0.0050										
Cyanate	mg/L	-	-	0.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	1.11	<2.0	0.29	<2.0	<2.0										
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.14	<0.50	<0.50	<0.50	<0.50	<0.50										
Aluminum (Al)-Total	mg/L	0.005	-	0.003	0.023	0.0179	0.0042	0.0674	0.0244	0.0319	0.123	0.0185	0.162	0.0039	0.101	0.0468	0.0415										
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00754	0.0471	0.0189	0.00401	0.00041	0.00244	0.00014	0.00059	0.00125	0.0137	0.00109	0.00019	0.0002										
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00511	0.11	0.0679	0.465	0.0024	0.0109	0.00321	0.0446	0.024	0.0296	0.0411	0.00228	0.00216										
Barium (Ba)-Total	mg/L	-	1	0.00005	0.031	0.00905	0.015	0.0143	0.058	0.0388	0.0793	0.0739	0.0721	0.0118	0.0706	0.0684	0.0662										
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010										
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050										
Boron (B)-Total	mg/L	-	-	0.01	<0.010	0.094	<0.010	0.01	<0.010	0.037	<0.010	0.08	0.042	<0.010	0.032	<0.010	<0.010										
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	0.00274	0.000731	0.00439	0.00104	0.000031	0.000013	0.000038	0.00053	0.000119	0.00539	0.000084	0.000026	0.000026										
Calcium (Ca)-Total	mg/L	-	-	0.05	71.8	208	185	219	55.3	171	12.1	261	190	174	159	27.8	30.2										
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.0002	0.00016	0.00016	0.00022	0.00022	0.00021	0.00074	0.00052	0.00049	0.00015	0.00052	0.00027	0.00027										
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	0.00072	0.00119	0.003	0.00013	0.00032	0.00125	0.00797	0.00275	0.00052	0.00239	0.00024	0.00015										
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0161	0.0195	0.00055	0.00124	0.00092	0.0009	0.00242	0.00532	0.00215	<0.00050	0.00189	0.00179	0.00174										
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.029	0.204	1.39	5.32	0.172	0.793	3.45	8.68	2.67	0.269	5.14	0.539	0.227										
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.0011	0.00424	0.000731	0.00633	0.00005	<0.000050	0.000069	0.000092	0.000174	0.000053	0.00061	0.000095	0.000089										
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00137	0.00674	0.0088	0.00753	0.00052	0.00423	0.00071	0.00052	0.00239	0.00822	0.00142	0.00066	0.00073										
Magnesium (Mg)-Total	mg/L	-	-	0.1	16.8	47.4	63.1	97	12.4	77.1	3.18	52.7	61.2	54.7	9.1	9.87	9.87										
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0631	0.149	1.34	2.94	0.031	0.215	0.331	5.44	2.24	1.15	2.04	0.115	0.105										
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010										
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.00008	0.00198	0.000405	0.000258	0.00067	0.000324	0.000303	0.00104	0.000624	0.000401	0.000578	0.000419	0.000431										
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00083	0.00092	0.00083	0.00092	0.00086	0.00086	0.00281	0.00081	0.00151	0.00194	0.00143	0.00068	<0.00050										
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050										
Potassium (K)-Total	mg/L	-	-	0.1	0.96	12.8	3.57	4.86	0.35	3.43	0.75	6.76	4.19	3.63	3.45	0.74	0.73										
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	0.00014	0.00021	0.00012	<0.00010	0.00011	<0.00010	<0.00010										
Silicon (Si)-Total	mg/L	-	-	0.05	6.42	1.7	6.18	6.15	6.63	5.62	7.86	6.15	5.93	6.17	6.16	6.06	5.79										
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000036	0.000127	<0.000010	0.00013	<0.000010	<0.000010	<0.000010	0.000034	0.000013	<0.000010	0.000014	<0.000010	<0.000010										
Sodium (Na)-Total	mg/L	-	-	0.05	4.21	17.2	4.87	7.54	4.21	6.71	1.99	39.9	18.7	5.11	16.8	3.05	3.12										
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.483	0.568	0.455	0.541	0.41	0.476	0.0697	0.822	0.663	0.45	0.57	0.275	0.292										
Sulfur (S)-Total	mg/L	-	-	0.5	41.8	220	156	217	36.4	179	1.09	248	194	150	160	10.6	11.8										
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000012	0.000289	0.000118	0.00009	<0.000010	<0.000010	<0.000010	0.000014	<0.000010	0.000112	<0.000010	<0.000010	<0.000010										
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010										
Titanium (Ti)-Total	mg/L	-</																									



Table A-1. Water Quality Parameter Guideline Exceedances; August 13-15, 2013 trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130814-009	0167-130814-012	0167-130814-016	0167-130814-003	0167-130814-008	0167-130814-013	0167-130814-005	0167-130814-011	0167-130814-021	0167-130814-015	0167-130814-006	0167-130814-007	0167-130814-002
				WQ Site ID	WQ-PC-D	WQ-TP	WQ-MS-S-03-r	WQ-PC-U	WQ-DC-U1	WQ-MN	WQ-SEEP	WQ-DC-U	WQ-DC-DX+105	WQ-DC-R	WQ-VC-R	WQ-VC-UMN	
				Date Sampled	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013
				Detection Limit													
Barium (Ba)-Dissolved	mg/L	-	-	0.0005	0.0306	0.0084	0.0176	0.0127	0.0557	0.038	0.075	0.07	0.0673	0.0114	0.0614	0.066	0.0648
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	<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	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	0.086	<0.010	<0.010	<0.010	0.032	<0.010	0.074	0.037	<0.010	0.029	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	0.00269	0.000451	0.00218	0.000148	0.000028	0.000011	0.000029	0.000387	0.000069	0.000373	0.000032	0.000021	0.000021
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	71.2	205	186	220	55	169	12	262	194	170	158	27.9	30.1
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.0001	<0.00010	<0.00010	<0.00010	0.00012	0.00012	0.00058	0.00035	0.00015	<0.00010	0.00021	0.00015	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	0.00066	0.00104	0.0028	0.00013	0.00029	0.00115	0.008	0.00261	0.0005	0.00219	0.00022	0.00012
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.0157	0.0142	0.00033	<0.00020	0.00078	0.00071	0.00211	0.00293	0.00113	<0.00020	0.00084	0.00136	0.00123
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.01	0.018	0.937	4.31	0.096	0.556	2.24	4.65	0.497	0.101	0.949	0.291	0.064
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000726	0.000295	0.00028	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00136	0.00675	0.00881	0.00805	<0.00050	0.00412	0.00091	0.00051	0.00226	0.00825	0.00145	0.00069	0.00081
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	16.3	47.5	63.4	97.6	12.2	78.2	3.18	53.6	66.3	61.4	55	9.06	9.86
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0628	0.0843	1.22	2.87	0.0308	0.205	0.315	5.5	2.1	1.13	1.91	0.105	0.0986
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	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000073	0.00193	0.000353	0.000241	0.000072	0.000319	0.000292	0.000991	0.000619	0.000371	0.000515	0.000391	0.000414
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	0.00078	0.00079	0.00201	0.00138	<0.00050	0.00077	0.00252	0.00271	0.00123	0.00194	0.00117	0.00061	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.95	12.3	3.65	4.73	0.34	3.41	0.74	6.86	4.2	3.47	3.35	0.72	0.75
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	0.00011	0.00022	0.00012	<0.00010	0.00011	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.39	1.64	6.19	5.91	6.48	5.61	7.85	6.11	5.67	6.06	5.69	6.04	5.85
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	0.000014	0.000033	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	4.2	16.6	4.81	7.19	4.14	6.54	2	39.7	4.14	18.6	4.95	16.2	3.07
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.466	0.55	0.451	0.515	0.388	0.467	0.067	0.819	0.659	0.44	0.548	0.264	0.288
Sulfur (S)-Dissolved	mg/L	-	-	0.5	40.8	214	150	210	35	176	1.07	243	193	145	157	10.5	11.6
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000011	0.000284	0.000094	0.000065	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	0.000104	<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	<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	<0.010
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.000855	0.000995	0.00432	0.00398	0.000295	0.00199	0.000162	0.00316	0.00243	0.00468	0.00193	0.000501	0.00057
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.23	0.0161	0.929	0.0909	0.0024	0.0062	0.0027	0.0063	0.0025	0.843	0.0018	<0.0010	0.0011



Table A-1. Water Quality Parameter Guideline Exceedances; August 13-15, 2013 trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130815-032	0167-130814-023	0167-130814-027	0167-130814-028	0167-130814-029	0167-130814-030	0167-130814-026	0167-130814-010	0167-130814-024	0167-130814-025	0167-130814-019	0167-130814-014	0167-130814-022
					WQ-SP-Surface 8/15/2013	WQ-VC-DBC 8/14/2013	WQ-PIT-1 8/14/2013	WQ-PIT-2 8/14/2013	WQ-PIT-3 8/14/2013	WQ-PW 8/15/2013	WQ-VC-REF 8/14/2013	WQ-SEEP-r 8/14/2013	WQ-VC-U 8/14/2013	WQ-BC 8/14/2013	WQ-DC-DX 8/14/2013	WQ-DC-U2 8/14/2013	WQ-DC-D1b 8/14/2013
Temperature (in-situ)	°C	-	-	-	9.0	6.0	15.3	14.0	14.7	1.4	7.3	-	6.0	9.3	5.3	8.6	10.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	1270.0	194.2	1610.0	1606.0	1295.0	370.9	185.3	-	187.6	336.8	476.1	1181.0	1433.0
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.74	7.77	8.13	7.20	8.02	7.90	7.30	-	7.74	8.31	7.55	7.77	8.10
Turbidity (in-situ)	NTU	-	-	-	-	1.78	2.79	0.79	1.23	0.33	1.59	-	1.68	1.41	39.30	60.30	8.01
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	<5.0	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1190	199	1490	1770	1550	366	192	1570	187	330	460	1130	1380
Hardness (as CaCO3)	mg/L	-	-	0.5	-	95	966	990	1300	189	91.3	909	92.7	169	241	692	883
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.9	7.81	8.05	7.65	7.85	7.74	7.92	7.58	7.78	8.12	7.41	7.74	8.04
Total Suspended Solids	mg/L	-	50	3	-	<3.0	<3.0	3.7	<3.0	-	<3.0	20.7	<3.0	<3.0	25.3	235	12.3
Total Dissolved Solids	mg/L	-	-	10	-	125	1430	1700	1420	204	132	1410	133	221	348	959	1260
Turbidity	NTU	-	-	0.1	-	-	-	-	-	<0.10	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	230	87.9	149	187	148	-	80.7	247	84.7	113	80.3	211	275
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	230	87.9	149	187	148	167	80.7	247	84.7	113	80.3	211	275
Ammonia, Total (as N)	mg/L	-	-	0.005	0.912	0.0075	0.0084	<0.0050	0.005	<0.0050	3.96	<0.0050	0.0074	0.0082	0.184	0.133	
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<0.50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.055	0.28	0.28	0.28	0.106	0.053	<0.20	0.053	0.082	0.061	<0.20	0.21
Nitrate (as N)	mg/L	3	-	0.005	0.916	0.051	<0.050	<0.050	<0.050	0.145	0.0532	1.14	0.053	<0.0050	0.0393	0.107	0.1
Nitrite (as N)	mg/L	0.06	-	0.001	0.02	<0.0010	<0.010	<0.010	<0.010	<0.0010	<0.0010	0.028	<0.0010	<0.0010	<0.0010	0.012	<0.010
Sulfate (SO4)	mg/L	-	-	0.5	495	17.7	868	1030	855	34.8	14.4	753	15.2	68.6	163	491	647
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	-	<0.0050	-	-	-	-	<0.0050	0.0095	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	-	<0.0050	-	-	-	-	<0.0050	0.0444	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	-	<0.20	-	-	-	-	<0.20	2.22	<0.20	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	-	<0.50	-	-	-	-	<0.50	3.14	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	-	0.0453	0.0095	0.0306	0.0097	<0.010	0.0478	0.0209	0.0471	0.0193	0.285	3.59	0.119
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	-	0.00011	0.00449	0.00368	0.00458	<0.00050	<0.00010	0.00061	0.00011	0.00022	0.00156	0.00354	0.00784
Arsenic (As)-Total	mg/L	0.005	-	0.0001	-	0.00059	0.00873	0.013	0.00871	0.00038	0.00051	0.0463	0.00049	0.00236	0.0116	0.0314	0.0307
Barium (Ba)-Total	mg/L	-	1	0.00005	-	0.0643	0.0147	0.0116	0.0141	0.084	0.0632	0.0739	0.0652	0.066	0.0626	0.125	0.026
Beryllium (Be)-Total	mg/L	-	-	0.0001	-	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	-	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	0.083	<0.010	<0.010	<0.010	0.028	0.055
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	-	0.000025	0.00305	0.00434	0.00307	<0.00020	0.000019	0.000551	0.000023	0.000126	0.000043	0.000391	0.000868
Calcium (Ca)-Total	mg/L	-	-	0.05	-	24.8	258	314	273	43.3	24	272	24.4	49	67.3	153	204
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	-	0.00024	0.00012	0.0002	0.0002	<0.0020	0.00021	0.00054	0.00022	0.00024	0.00058	0.00687	0.00032
Cobalt (Co)-Total	mg/L	-	-	0.0001	-	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	0.00083	<0.00010	0.00026	0.00069	0.0022	0.00034
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	-	0.0019	0.0023	0.00353	0.00217	<0.0010	0.00198	0.00564	0.00184	0.0018	0.00186	0.0109	0.00162
Iron (Fe)-Total	mg/L	0.3	1	0.01	-	0.12	0.023	0.106	0.025	<0.030	0.132	8.55	0.122	0.146	1.55	6.76	1.07
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	-	0.000081	0.000414	0.0008	0.000415	0.0005	0.000074	0.000095	0.000075	0.000096	0.00072	0.00404	0.00401
Lithium (Li)-Total	mg/L	-	-	0.0005	-	0.00087	0.0074	0.00668	0.00566	-	0.00093	0.00087	0.00109	0.00146	0.00062	0.00599	0.00741
Magnesium (Mg)-Total	mg/L	-	-	0.1	-	8.17	74	84.4	71.8	19.8	7.97	53.5	8.1	11.7	17.6	67.4	91.1
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	-	0.0612	0.0253	0.0835	0.0258	<0.0020	0.031	5.83	0.0351	0.546	0.938	0.847	0.902
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.00020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	-	0.000457	0.0002	0.000129	0.000196	-	0.000409	0.00107	0.000405	0.00084	0.000101	0.000707	0.000276
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	0.00289	<0.00050	0.00067	0.00068	0.00503	0.00085
Phosphorus (P)-Total	mg/L	-	-	0.05	-	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	0.193	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	-	0.62	3.24	3.62	3.15	0.91	0.56	6.78	0.61	0.85	3.87	3.51	4.32
Selenium (Se)-Total	mg/L	0.001	-	0.0001	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	0.00021	<0.00010	<0.00010	<0.00010	0.0003	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	-	5.81	2.6	2.85	2.56	-	5.8	6.42	5.9	6.65	5.23	10.4	6.16
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	-	<0.000010	<0.000010	0.000016	<0.000010	-	<0.000010	0.000037	<0.000010	<0.000010	0.000015	0.000105	0.000038
Sodium (Na)-Total	mg/L	-	-	0.05	-	2.42	10.1	11.1	9.73	4.7	2.37	40.8	2.37	3.71	4.14	6.9	7.11
Strontium (Sr)-Total	mg/L	-	-	0.0002	-	0.28	0.894	1.09	0.957	-	0.278	0.831	0.277	0.321	0.211	0.5	0.573
Sulfur (S)-Total	mg/L	-	-	0.5	-	6.11	278	315	273	-	5.01	247	5.24	22.7	55.1	152	212
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	-	<0.000010	0.000089	0.000101	0.00009	-	<0.000010	0.000015	<0.000010	<0.000010	0.000015	0.000058	0.000046
Tin (Sn)-Total	mg/L	-	-	0.0001	-	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	-	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	0.01	0.163	<0.010
Uranium (U)-Total	mg/L	-	-	0.00001	-	0.000554	0.00336	0.00396	0.00334	0.00199	0.000536	0.00332	0.000507	0.00121	0.000145	0.0028	0.00293
Vanadium (V)-Total	mg/L	-	-	0.001	-	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	0.0016	<0.0010	<0.0010	0.0013	0.0169	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	-	<0.0030	0.292	0.419	0.297	<0.050	<0.0030	0.0077	<0.0030	<0.0030	0.0049	0.0599	0.238
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	-	0.0152	0.0016	0.0026	0.0126	-	0.0175	0.0085	0.0164	0.0068	0.0087	0.0276	0.0049
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	-	0.0001	0.00448	0.00375	0.00234	-	<0.00010	0.00055	<0.00010	0.00023	0.00146	0.00247	0.00734
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	-	0.00049	0.00803	0.00794	0.0118	-	0.00043	0.0244	0.00041	0.0021	0.00757	0.0062	0.0149



Table A-1. Water Quality Parameter Guideline Exceedances; August 13-15, 2013 trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130815-032	0167-130814-023	0167-130814-027	0167-130814-028	0167-130814-029	0167-130814-030	0167-130814-026	0167-130814-010	0167-130814-024	0167-130814-025	0167-130814-019	0167-130814-014	0167-130814-022
				WQ Site ID	WQ-SP-Surface	WQ-VC-DBC	WQ-PIT-1	WQ-PIT-2	WQ-PIT-3	WQ-PW	WQ-VC-REF	WQ-SEEP-r	WQ-VC-U	WQ-BC	WQ-DC-DX	WQ-DC-U2	WQ-DC-D1b
				Date Sampled	8/15/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/15/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013	8/14/2013
				Detection Limit													
Barium (Ba)-Dissolved	mg/L	-	-	0.0005	-	0.063	0.0139	0.0134	0.0121	-	0.062	0.0697	0.0635	0.0647	0.0581	0.0712	0.0235
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	0.075	<0.010	<0.010	<0.010	0.026	0.048
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	-	0.000022	0.00301	0.00303	0.00433	-	0.000015	0.000401	0.000015	0.000113	0.000021	0.000021	0.000282
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	-	24.7	263	276	360	-	23.6	275	24.1	48.4	67.4	160	202
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	-	0.0001	<0.00010	<0.00010	<0.00010	-	0.0001	0.00034	<0.00010	0.0001	0.00011	0.00011	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	-	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	0.00789	<0.00010	0.00024	0.00058	0.00053	0.00029
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	-	0.00128	0.00164	0.00137	0.00202	-	0.00139	0.003	0.00127	0.00136	0.00097	0.00304	0.00075
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	-	0.066	<0.010	<0.010	<0.010	-	0.068	4.6	0.066	0.082	0.892	0.521	0.096
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	-	<0.000050	0.000084	0.000062	0.000126	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	-	0.00088	0.00697	0.00639	0.00709	-	0.00095	0.00088	0.00107	0.00132	<0.00050	0.00425	0.0072
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	-	8.08	75	73.3	97.4	-	7.85	53.8	7.92	11.6	17.7	70.9	91.9
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	-	0.0575	0.0225	0.0241	0.117	-	0.0278	5.54	0.032	0.524	0.886	0.785	0.856
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	-	0.000427	0.00019	0.000158	0.000095	-	0.000389	0.00096	0.000379	0.000804	0.000078	0.000414	0.000269
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	-	<0.00050	<0.00050	<0.00050	0.00058	-	<0.00050	0.00248	<0.00050	0.00056	0.00052	0.00084	0.00075
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	-	0.59	3.28	3.1	3.94	-	0.55	6.98	0.56	0.85	3.82	3.29	4.25
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	-	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	-	5.82	2.66	2.61	2.75	-	5.78	6.31	5.8	6.65	4.83	5.93	5.89
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	-	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	-	2.43	9.76	9.4	13	-	2.31	9.4	2.3	3.62	3.95	6.83	6.88
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	-	0.274	0.868	0.73	1.19	-	0.269	0.805	0.27	0.309	0.22	0.506	0.554
Sulfur (S)-Dissolved	mg/L	-	-	0.5	-	6.02	276	269	354	-	4.84	238	5.06	22.5	54.9	157	204
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	-	<0.000010	0.000091	0.000075	0.00009	-	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	0.000038
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	-	0.000547	0.00335	0.00272	0.00405	-	0.000509	0.00318	0.000494	0.00115	0.000134	0.00227	0.00285
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	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	-	<0.0010	0.288	0.292	0.454	-	0.0019	0.007	<0.0010	0.0012	0.0014	0.0101	0.19



Table A-1. Water Quality Parameter Guideline Exceedances; August 13-15, 2013 trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130814-017	0167-130814-FIELD-BLANK	0167-130814-TRAVEL-BLANK
					WQ-MS-S-03 8/14/2013	FIELD BLANK 8/14/2013	TRAVEL BLANK 8/16/2013
Temperature (in-situ)	°C	-	-	-	2.9	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	1264.0	-	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.04	-	-
Turbidity (in-situ)	NTU	-	-	-	5.62	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-
Conductivity	µS/cm	-	-	2	1160	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	716	<0.50	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.48	6.16	5.71
Total Suspended Solids	mg/L	-	50	3	<3.0	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	1020	<10	<10
Turbidity	NTU	-	-	0.1	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	278	1	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	278	1	<1.0
Ammonia, Total (as N)	mg/L	-	-	0.005	0.0337	<0.0050	0.0218
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.28	<0.020	<0.020
Nitrate (as N)	mg/L	3	-	0.005	<0.050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	480	<0.50	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	0.0042	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0188	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.064	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0148	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.00001	0.02	0.00001	0.00422	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	181	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.001	0.04	0.0001	0.00012	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00115	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	1.37	<0.010	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000577	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00897	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	63.2	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	1.3	<0.000050	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.073	-	0.00005	0.000382	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.025	0.3	0.0005	0.00228	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.49	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	6.12	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	4.78	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.453	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	156	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.00011	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	-	-	0.00001	0.00422	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	1.09	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	<0.0010	<0.0010	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.0176	<0.00010	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0398	<0.00010	-

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; August 13-15, 2013 trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130814-017	0167-130814-FIELD-BLANK	0167-130814-TRAVEL-BLANK
				WQ Site ID	WQ-MS-S-03	FIELD BLANK	TRAVEL BLANK
				Date Sampled	8/14/2013	8/14/2013	8/16/2013
				Detection Limit			
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0159	<0.000050	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.00001	-	0.00001	0.00226	<0.000010	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	183	<0.050	-
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00109	<0.00010	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	<0.00020	<0.00020	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	1.14	<0.010	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000179	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00893	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	63.1	<0.10	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	1.26	<0.000050	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000355	<0.000050	-
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.0005	0.00207	<0.00050	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	3.56	<0.10	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.14	<0.050	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	4.7	<0.050	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.448	<0.00020	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	152	<0.50	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000096	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.00415	<0.000010	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	1.03	<0.0010	-



Appendix B:
ALS Analytical Reports
August 13-15, 2013



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

Date Received: 16-AUG-13
Report Date: 28-AUG-13 16:45 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1348866
Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 13-Y-0167
C of C Numbers: 1, 2, 3
Legal Site Desc:

Comments: Please note we found that the Total and Dissolved metal results did not match for ALS identified sample L1348866-17 and -18. The unprepared Total metal result confirmed that the correct Total metal bottles were used.

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	L1348866-1 Water 14-AUG-13 14:05 0167-130814-009	L1348866-2 Water 14-AUG-13 13:30 0167-130814-012	L1348866-3 Water 14-AUG-13 15:51 0167-130814-016	L1348866-4 Water 14-AUG-13 15:40 0167-130814-003	L1348866-5 Water 14-AUG-13 14:24 0167-130814-008
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	454	1250	1150	1470	368
	Hardness (as CaCO3) (mg/L)	245	709	727	951	188
	pH (pH)	7.11	8.15	8.06	7.59	7.89
	Total Suspended Solids (mg/L)	<3.0	3.9	4.8	13.3	4.6
	Total Dissolved Solids (mg/L)	358	1070	1020	1350	276
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	134	84.4	264	321	84.2
	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)	134	84.4	264	321	84.2
	Ammonia, Total (as N) (mg/L)	0.0056	0.0135 ^{DLA}	0.0236 ^{DLA}	0.151 ^{DLA}	0.0072
	Chloride (Cl) (mg/L)	<0.50	<5.0	<5.0	<5.0 ^{DLA}	<0.50
	Fluoride (F) (mg/L)	0.062	0.26 ^{DLA}	0.32 ^{DLA}	<0.20 ^{DLA}	0.056
	Nitrate (as N) (mg/L)	0.210	<0.050 ^{DLA}	<0.050 ^{DLA}	0.127 ^{DLA}	<0.0050
	Nitrite (as N) (mg/L)	0.0020	<0.010 ^{DLA}	<0.010 ^{DLA}	<0.010 ^{DLA}	<0.0010
	Sulfate (SO4) (mg/L)	125	671	477	673	107
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
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)	0.0230	0.0179	0.0042	0.0674	0.0244
	Antimony (Sb)-Total (mg/L)	0.00754	0.0471	0.0189	0.00401	0.00041
	Arsenic (As)-Total (mg/L)	0.00511	0.110	0.0679	0.465	0.00240
	Barium (Ba)-Total (mg/L)	0.0310	0.00905	0.0150	0.0143	0.0580
	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	0.094	<0.010	0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.00274	0.000731	0.00439	0.00104	0.000031
	Calcium (Ca)-Total (mg/L)	71.8	208	185	219	55.3
	Chromium (Cr)-Total (mg/L)	0.00020	0.00016	0.00016	0.00022	0.00022
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00072	0.00119	0.00300	0.00013
	Copper (Cu)-Total (mg/L)	0.0161	0.0195	0.00055	0.00124	0.00092
	Iron (Fe)-Total (mg/L)	0.029	0.204	1.39	5.32	0.172

* 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	L1348866-6 Water 14-AUG-13 13:40 0167-130814-013	L1348866-7 Water 14-AUG-13 08:15 0167-130814-005	L1348866-8 Water 14-AUG-13 13:20 0167-130814-011	L1348866-9 Water 16-AUG-13 09:20 TRAVEL BLANK	L1348866-10 Water 14-AUG-13 12:26 0167-130814-021
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	1200	84.9	1520	<2.0	1310
	Hardness (as CaCO3) (mg/L)	745	43.1	874		758
	pH (pH)	7.82	7.45	7.68	5.71	7.96
	Total Suspended Solids (mg/L)	<3.0	<3.0	20.5	<3.0	11.0
	Total Dissolved Solids (mg/L)	1070	110	1410	<10	1130
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	221	42.2	249	<1.0	222
	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)	221	42.2	249	<1.0	222
	Ammonia, Total (as N) (mg/L)	0.0213	0.0289	4.07	0.0218	1.26
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<0.50	<5.0 ^{DLA}	<0.50	<5.0 ^{DLA}
	Fluoride (F) (mg/L)	<0.20 ^{DLA}	0.067	<0.20 ^{DLA}	<0.020	<0.20 ^{DLA}
	Nitrate (as N) (mg/L)	<0.050 ^{DLA}	0.0301	1.19	<0.0050	0.424
	Nitrite (as N) (mg/L)	<0.010 ^{DLA}	0.0010	0.035	<0.0010	0.024
	Sulfate (SO4) (mg/L)	558	2.27	753	<0.50	596
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	0.0138	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	0.0650	<0.0050	0.0139
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	1.11
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	3.14	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0319	0.123	0.0185	<0.0030	0.162
	Antimony (Sb)-Total (mg/L)	0.00244	0.00014	0.00059	<0.00010	0.00125
	Arsenic (As)-Total (mg/L)	0.0109	0.00321	0.0446	<0.00010	0.0240
	Barium (Ba)-Total (mg/L)	0.0388	0.0793	0.0739	<0.000050	0.0721
	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)	0.037	<0.010	0.080	<0.010	0.042
	Cadmium (Cd)-Total (mg/L)	0.000013	0.000038	0.000530	<0.000010	0.000119
	Calcium (Ca)-Total (mg/L)	171	12.1	261	<0.050	190
	Chromium (Cr)-Total (mg/L)	0.00021	0.00074	0.00052	<0.00010	0.00049
	Cobalt (Co)-Total (mg/L)	0.00032	0.00125	0.00797	<0.00010	0.00275
	Copper (Cu)-Total (mg/L)	0.00090	0.00242	0.00532	<0.00050	0.00215
	Iron (Fe)-Total (mg/L)	0.793	3.45	8.68	<0.010	2.67

* 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	L1348866-11 Water 14-AUG-13 16:01 0167-130814-015	L1348866-12 Water 14-AUG-13 09:23 0167-130814-006	L1348866-13 Water 14-AUG-13 07:32 0167-130814-007	L1348866-14 Water 14-AUG-13 08:45 0167-130814-002	L1348866-15 Water 14-AUG-13 10:04 0167-130814-023
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	1130	1130	192	238	199
	Hardness (as CaCO3) (mg/L)	678	620	107	116	95.0
	pH (pH)	7.99	7.84	7.94	7.93	7.81
	Total Suspended Solids (mg/L)	<3.0	8.5	<3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	981	965	162	160	125
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	283	202	84.7	87.5	87.9
	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)	283	202	84.7	87.5	87.9
	Ammonia, Total (as N) (mg/L)	0.0207 ^{DLA}	0.788	0.0067	0.0169	0.0075
	Chloride (Cl) (mg/L)	<5.0	<5.0	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.34	0.20	0.057	0.056	0.055
	Nitrate (as N) (mg/L)	<0.050 ^{DLA}	0.602	0.0585	0.0687	0.0510
	Nitrite (as N) (mg/L)	<0.010 ^{DLA}	0.035	0.0016	0.0017	<0.0010
	Sulfate (SO4) (mg/L)	454	487	30.6	34.5	17.7
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
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	0.29	<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)	0.0039	0.101	0.0468	0.0415	0.0453
	Antimony (Sb)-Total (mg/L)	0.0137	0.00109	0.00019	0.00020	0.00011
	Arsenic (As)-Total (mg/L)	0.0296	0.0411	0.00228	0.00216	0.00059
	Barium (Ba)-Total (mg/L)	0.0118	0.0706	0.0684	0.0662	0.0643
	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	0.032	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.00539	0.000084	0.000026	0.000026	0.000025
	Calcium (Ca)-Total (mg/L)	174	159	27.8	30.2	24.8
	Chromium (Cr)-Total (mg/L)	0.00015	0.00052	0.00027	0.00027	0.00024
	Cobalt (Co)-Total (mg/L)	0.00052	0.00239	0.00024	0.00015	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	0.00189	0.00179	0.00174	0.00190
	Iron (Fe)-Total (mg/L)	0.269	5.14	0.539	0.227	0.120

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1348866-16	L1348866-17	L1348866-18	L1348866-19	L1348866-20
	Description	Water	Water	Water	Water	Water
	Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	15-AUG-13	14-AUG-13
	Sampled Time	17:00	17:29	17:45	07:30	11:29
	Client ID	0167-130814-027	0167-130814-028	0167-130814-029	0167-130814-030	0167-130814-026
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)				<5.0	
	Conductivity (uS/cm)	1490	1770	1550	366	192
	Hardness (as CaCO3) (mg/L)	966	990	1300	189	91.3
	pH (pH)	8.05	7.65	8.05	7.74	7.92
	Total Suspended Solids (mg/L)	<3.0	3.7	<3.0		<3.0
	Total Dissolved Solids (mg/L)	1430	1700	1420	204	132
	Turbidity (NTU)				<0.10	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	149	187	148		80.7
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	149	187	148	167	80.7
	Ammonia, Total (as N) (mg/L)	0.0084	<0.0050	0.0050		<0.0050
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<5.0 ^{DLA}	<5.0 ^{DLA}	<0.50	<0.50
	Fluoride (F) (mg/L)	0.28	0.28	0.28	0.106	0.053
	Nitrate (as N) (mg/L)	<0.050 ^{DLA}	<0.050 ^{DLA}	<0.050 ^{DLA}	0.145	0.0532
	Nitrite (as N) (mg/L)	<0.010 ^{DLA}	<0.010 ^{DLA}	<0.010 ^{DLA}	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	868	1030	855	34.8	14.4
	Anion Sum (meq/L)				4.08	
	Cation Sum (meq/L)				4.02	
	Cation - Anion Balance (%)				-0.7	
Cyanides	Cyanide, Weak Acid Diss (mg/L)					<0.0050
	Cyanide, Total (mg/L)					<0.0050
	Cyanate (mg/L)					<0.20
	Thiocyanate (SCN) (mg/L)					<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0095	0.0306	0.0097	<0.010	0.0478
	Antimony (Sb)-Total (mg/L)	0.00449	0.00368	0.00458	<0.00050	<0.00010
	Arsenic (As)-Total (mg/L)	0.00873	0.0130	0.00871	0.00038	0.00051
	Barium (Ba)-Total (mg/L)	0.0147	0.0116	0.0141	0.084	0.0632
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050		<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.10	<0.010
	Cadmium (Cd)-Total (mg/L)	0.00305	0.00434	0.00307	<0.00020	0.000019
	Calcium (Ca)-Total (mg/L)	258	314	273	43.3	24.0
	Chromium (Cr)-Total (mg/L)	0.00012	0.00020	0.00020	<0.0020	0.00021
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Copper (Cu)-Total (mg/L)	0.00230	0.00353	0.00217	<0.0010	0.00198
	Iron (Fe)-Total (mg/L)	0.023	0.106	0.025	<0.030	0.132

* 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	L1348866-21 Water 14-AUG-13 16:07 0167-130814-010	L1348866-22 Water 14-AUG-13 10:23 0167-130814-024	L1348866-23 Water 14-AUG-13 10:45 0167-130814-025	L1348866-24 Water 14-AUG-13 16:07 0167-130814-019	L1348866-25 Water 14-AUG-13 13:53 0167-130814-014
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	1570	187	330	460	1130
	Hardness (as CaCO3) (mg/L)	909	92.7	169	241	692
	pH (pH)	7.58	7.78	8.12	7.41	7.74
	Total Suspended Solids (mg/L)	20.7	<3.0	<3.0	25.3	235
	Total Dissolved Solids (mg/L)	1410	133	221	348	959
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	247	84.7	113	80.3	211
	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)	247	84.7	113	80.3	211
	Ammonia, Total (as N) (mg/L)	3.96	<0.0050	0.0074	0.0082	0.184
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<0.50	<0.50	<0.50	<5.0 ^{DLA}
	Fluoride (F) (mg/L)	<0.20 ^{DLA}	0.053	0.082	0.061	<0.20 ^{DLA}
	Nitrate (as N) (mg/L)	1.14	0.0530	<0.0050	0.0393	0.107
	Nitrite (as N) (mg/L)	0.028	<0.0010	<0.0010	<0.0010	0.012
	Sulfate (SO4) (mg/L)	753	15.2	68.6	163	491
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)	0.0095	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	0.0444	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanate (mg/L)	2.22	<0.20	<0.20	<0.20	<0.20
	Thiocyanate (SCN) (mg/L)	3.14	<0.50	<0.50	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0209	0.0471	0.0193	0.285	3.59
	Antimony (Sb)-Total (mg/L)	0.00061	0.00011	0.00022	0.00156	0.00354
	Arsenic (As)-Total (mg/L)	0.0463	0.00049	0.00236	0.0116	0.0314
	Barium (Ba)-Total (mg/L)	0.0739	0.0652	0.0660	0.0626	0.125
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	0.083	<0.010	<0.010	<0.010	0.028
	Cadmium (Cd)-Total (mg/L)	0.000551	0.000023	0.000126	0.000043	0.000391
	Calcium (Ca)-Total (mg/L)	272	24.4	49.0	67.3	153
	Chromium (Cr)-Total (mg/L)	0.00054	0.00022	0.00024	0.00058	0.00687
	Cobalt (Co)-Total (mg/L)	0.00830	<0.00010	0.00026	0.00069	0.00220
	Copper (Cu)-Total (mg/L)	0.00564	0.00184	0.00180	0.00186	0.0109
	Iron (Fe)-Total (mg/L)	8.55	0.122	0.146	1.55	6.76

* 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	L1348866-26 Water 14-AUG-13 15:13 0167-130814-022	L1348866-27 Water 14-AUG-13 15:51 0167-130814-017	L1348866-28 Water 14-AUG-13 18:00 FIELD BLANK	L1348866-29 Water 15-AUG-13 08:01 0167-130815-032
Grouping	Analyte				
WATER					
Physical Tests	Colour, True (CU)				
	Conductivity (uS/cm)	1380	1160	<2.0	1190
	Hardness (as CaCO3) (mg/L)	883	716	<0.50	
	pH (pH)	8.04	7.48	6.16	7.90
	Total Suspended Solids (mg/L)	12.3	<3.0	<3.0	
	Total Dissolved Solids (mg/L)	1260	1020	<10	
	Turbidity (NTU)				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	275	278	1.0	230
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	275	278	1.0	230
	Ammonia, Total (as N) (mg/L)	0.133	0.0337	<0.0050	0.912
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<5.0 ^{DLA}	<0.50	<5.0 ^{DLA}
	Fluoride (F) (mg/L)	0.21	0.28	<0.020	<0.20 ^{DLA}
	Nitrate (as N) (mg/L)	0.100	<0.050	<0.0050	0.916
	Nitrite (as N) (mg/L)	<0.010 ^{DLA}	<0.010	<0.0010	0.020
	Sulfate (SO4) (mg/L)	647	480	<0.50	495
	Anion Sum (meq/L)				
	Cation Sum (meq/L)				
	Cation - Anion Balance (%)				
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	
	Cyanate (mg/L)	<0.20	<0.20	<0.20	
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.119	0.0042	<0.0030	
	Antimony (Sb)-Total (mg/L)	0.00784	0.0188	<0.00010	
	Arsenic (As)-Total (mg/L)	0.0307	0.0640	<0.00010	
	Barium (Ba)-Total (mg/L)	0.0260	0.0148	<0.000050	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	
	Boron (B)-Total (mg/L)	0.055	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000868	0.00422	<0.000010	
	Calcium (Ca)-Total (mg/L)	204	181	<0.050	
	Chromium (Cr)-Total (mg/L)	0.00032	0.00012	<0.00010	
	Cobalt (Co)-Total (mg/L)	0.00034	0.00115	<0.00010	
	Copper (Cu)-Total (mg/L)	0.00162	<0.00050	<0.00050	
	Iron (Fe)-Total (mg/L)	1.07	1.37	<0.010	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1348866-1	L1348866-2	L1348866-3	L1348866-4	L1348866-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13
		Sampled Time	14:05	13:30	15:51	15:40	14:24
		Client ID	0167-130814-009	0167-130814-012	0167-130814-016	0167-130814-003	0167-130814-008
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.00110	0.00424	0.000731	0.00633	0.000050
	Lithium (Li)-Total (mg/L)		0.00137	0.00674	0.00880	0.00753	0.00052
	Magnesium (Mg)-Total (mg/L)		16.8	47.4	63.1	97.0	12.4
	Manganese (Mn)-Total (mg/L)		0.0631	0.149	1.34	2.94	0.0310
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)		0.000080	0.00198	0.000405	0.000258	0.000067
	Nickel (Ni)-Total (mg/L)		0.00083	0.00092	0.00238	0.00143	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)		0.96	12.8	3.57	4.86	0.35
	Selenium (Se)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00011	<0.00010
	Silicon (Si)-Total (mg/L)		6.42	1.70	6.18	6.15	6.63
	Silver (Ag)-Total (mg/L)		0.000036	0.000127	<0.000010	0.000130	<0.000010
	Sodium (Na)-Total (mg/L)		4.21	17.2	4.87	7.54	4.21
	Strontium (Sr)-Total (mg/L)		0.483	0.568	0.455	0.541	0.410
	Sulfur (S)-Total (mg/L)		41.8	220	156	217	36.4
	Thallium (Tl)-Total (mg/L)		0.000012	0.000289	0.000118	0.000090	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000898	0.00103	0.00458	0.00419	0.000300
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		0.224	0.0377	1.08	0.0974	0.0036
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0124	0.0056	0.0014	<0.0010	0.0117
	Antimony (Sb)-Dissolved (mg/L)		0.00769	0.0462	0.0156	0.00294	0.00040
	Arsenic (As)-Dissolved (mg/L)		0.00487	0.0860	0.0351	0.372	0.00207
	Barium (Ba)-Dissolved (mg/L)		0.0306	0.00840	0.0176	0.0127	0.0557
	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	0.086	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.00269	0.000451	0.00218	0.000148	0.000028
	Calcium (Ca)-Dissolved (mg/L)		71.2	205	186	220	55.0
	Chromium (Cr)-Dissolved (mg/L)		0.00010	<0.00010	<0.00010	<0.00010	0.00012
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	0.00066	0.00104	0.00280	0.00013
	Copper (Cu)-Dissolved (mg/L)		0.0157	0.0142	0.00033	<0.00020	0.00078
	Iron (Fe)-Dissolved (mg/L)		0.010	0.018	0.937	4.31	0.096
	Lead (Pb)-Dissolved (mg/L)		0.000726	0.000295	0.000280	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.00136	0.00675	0.00881	0.00805	<0.00050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1348866-6	L1348866-7	L1348866-8	L1348866-9	L1348866-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	16-AUG-13	14-AUG-13
		Sampled Time	13:40	08:15	13:20	09:20	12:26
		Client ID	0167-130814-013	0167-130814-005	0167-130814-011	TRAVEL BLANK	0167-130814-021
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		<0.000050	0.000069	0.000092	<0.000050	0.000174
	Lithium (Li)-Total (mg/L)		0.00423	0.00071	0.00052	<0.00050	0.00239
	Magnesium (Mg)-Total (mg/L)		77.1	3.18	52.7	<0.10	64.7
	Manganese (Mn)-Total (mg/L)		0.215	0.331	5.44	<0.000050	2.24
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)		0.000324	0.000303	0.00104	<0.000050	0.000624
	Nickel (Ni)-Total (mg/L)		0.00086	0.00267	0.00281	<0.00050	0.00151
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)		3.43	0.75	6.76	<0.10	4.19
	Selenium (Se)-Total (mg/L)		<0.00010	0.00014	0.00021	<0.00010	0.00012
	Silicon (Si)-Total (mg/L)		5.62	7.86	6.15	<0.050	5.93
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	0.000034	<0.000010	0.000013
	Sodium (Na)-Total (mg/L)		6.71	1.99	39.9	<0.050	18.7
	Strontium (Sr)-Total (mg/L)		0.476	0.0697	0.822	<0.00020	0.663
	Sulfur (S)-Total (mg/L)		179	1.09	248	<0.50	194
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	0.000014	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.00203	0.000174	0.00321	<0.000010	0.00244
	Vanadium (V)-Total (mg/L)		<0.0010	0.0018	0.0015	<0.0010	0.0014
	Zinc (Zn)-Total (mg/L)		0.0070	0.0037	0.0072	<0.0030	0.0062
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0163	0.0914	0.0080		0.0179
	Antimony (Sb)-Dissolved (mg/L)		0.00243	0.00013	0.00055		0.00121
	Arsenic (As)-Dissolved (mg/L)		0.00956	0.00252	0.0241		0.0150
	Barium (Ba)-Dissolved (mg/L)		0.0380	0.0750	0.0700		0.0673
	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)		0.032	<0.010	0.074		0.037
	Cadmium (Cd)-Dissolved (mg/L)		0.000011	0.000029	0.000387		0.000069
	Calcium (Ca)-Dissolved (mg/L)		169	12.0	262		194
	Chromium (Cr)-Dissolved (mg/L)		0.00012	0.00058	0.00035		0.00015
	Cobalt (Co)-Dissolved (mg/L)		0.00029	0.00115	0.00800		0.00261
	Copper (Cu)-Dissolved (mg/L)		0.00071	0.00211	0.00293		0.00113
	Iron (Fe)-Dissolved (mg/L)		0.556	2.24	4.65		0.497
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050		<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.00412	0.00091	0.00051		0.00226

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1348866-11	L1348866-12	L1348866-13	L1348866-14	L1348866-15
		Description	Water	Water	Water	Water	Water
		Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13
		Sampled Time	16:01	09:23	07:32	08:45	10:04
		Client ID	0167-130814-015	0167-130814-006	0167-130814-007	0167-130814-002	0167-130814-023
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.000053	0.000610	0.000095	0.000089	0.000081
	Lithium (Li)-Total (mg/L)		0.00822	0.00142	0.00066	0.00073	0.00087
	Magnesium (Mg)-Total (mg/L)		61.2	54.7	9.10	9.87	8.17
	Manganese (Mn)-Total (mg/L)		1.15	2.04	0.115	0.105	0.0612
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)		0.000401	0.000578	0.000419	0.000431	0.000457
	Nickel (Ni)-Total (mg/L)		0.00194	0.00143	0.00068	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)		3.63	3.45	0.74	0.73	0.62
	Selenium (Se)-Total (mg/L)		<0.00010	0.00011	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)		6.17	6.16	6.06	5.79	5.81
	Silver (Ag)-Total (mg/L)		<0.000010	0.000014	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		5.11	16.8	3.05	3.12	2.42
	Strontium (Sr)-Total (mg/L)		0.450	0.570	0.275	0.292	0.280
	Sulfur (S)-Total (mg/L)		150	160	10.6	11.8	6.11
	Thallium (Tl)-Total (mg/L)		0.000112	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.00479	0.00199	0.000541	0.000585	0.000554
	Vanadium (V)-Total (mg/L)		<0.0010	0.0016	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		0.856	0.0069	<0.0030	<0.0030	<0.0030
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		<0.0010	0.0118	0.0207	0.0134	0.0152
	Antimony (Sb)-Dissolved (mg/L)		0.0136	0.00092	0.00018	0.00018	0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00858	0.0145	0.00136	0.00122	0.00049
	Barium (Ba)-Dissolved (mg/L)		0.0114	0.0614	0.0660	0.0648	0.0630
	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	0.029	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.00373	0.000032	0.000021	0.000021	0.000022
	Calcium (Ca)-Dissolved (mg/L)		170	158	27.9	30.1	24.7
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	0.00021	0.00015	<0.00010	0.00010
	Cobalt (Co)-Dissolved (mg/L)		0.00050	0.00219	0.00022	0.00012	<0.00010
	Copper (Cu)-Dissolved (mg/L)		<0.00020	0.00084	0.00136	0.00123	0.00128
	Iron (Fe)-Dissolved (mg/L)		0.101	0.949	0.291	0.064	0.066
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.00825	0.00145	0.00069	0.00081	0.00088

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1348866-16	L1348866-17	L1348866-18	L1348866-19	L1348866-20
		Description	Water	Water	Water	Water	Water
		Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	15-AUG-13	14-AUG-13
		Sampled Time	17:00	17:29	17:45	07:30	11:29
		Client ID	0167-130814-027	0167-130814-028	0167-130814-029	0167-130814-030	0167-130814-026
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.000414	0.000800	0.000415	0.00050	0.000074
	Lithium (Li)-Total (mg/L)		0.00740	0.00668	0.00566		0.00093
	Magnesium (Mg)-Total (mg/L)		74.0	84.4	71.8	19.8	7.97
	Manganese (Mn)-Total (mg/L)		0.0253	0.0835	0.0258	<0.0020	0.0310
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.00020	<0.000010
	Molybdenum (Mo)-Total (mg/L)		0.000200	0.000129	0.000196		0.000409
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050		<0.00050
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050		<0.050
	Potassium (K)-Total (mg/L)		3.24	3.62	3.15	0.91	0.56
	Selenium (Se)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.0010	<0.00010
	Silicon (Si)-Total (mg/L)		2.60	2.85	2.56		5.80
	Silver (Ag)-Total (mg/L)		<0.000010	0.000016	<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)		10.1	11.1	9.73	4.7	2.37
	Strontium (Sr)-Total (mg/L)		0.894	1.09	0.957		0.278
	Sulfur (S)-Total (mg/L)		278	315	273		5.01
	Thallium (Tl)-Total (mg/L)		0.000089	0.000101	0.000090		<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010		<0.010
	Uranium (U)-Total (mg/L)		0.00336	0.00396	0.00334	0.00199	0.000536
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010		<0.0010
	Zinc (Zn)-Total (mg/L)		0.292	0.419	0.297	<0.050	<0.0030
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0016	0.0026	0.0126		0.0175
	Antimony (Sb)-Dissolved (mg/L)		0.00448	0.00375	0.00234		<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00803	0.00794	0.0118 ^{DTC}		0.00043
	Barium (Ba)-Dissolved (mg/L)		0.0139	0.0134	0.0121		0.0620
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010		<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050		<0.00050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010		<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.00301	0.00303	0.00433 ^{DTC}		0.000015
	Calcium (Ca)-Dissolved (mg/L)		263	276	360 ^{DTC}		23.6
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010		0.00010
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010		<0.00010
	Copper (Cu)-Dissolved (mg/L)		0.00164	0.00137	0.00202		0.00139
	Iron (Fe)-Dissolved (mg/L)		<0.010	<0.010	<0.010		0.068
	Lead (Pb)-Dissolved (mg/L)		0.000084	0.000062	0.000126		<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.00697	0.00639	0.00709 ^{DTC}		0.00095

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1348866-21	L1348866-22	L1348866-23	L1348866-24	L1348866-25
		Description	Water	Water	Water	Water	Water
		Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13
		Sampled Time	16:07	10:23	10:45	16:07	13:53
		Client ID	0167-130814-010	0167-130814-024	0167-130814-025	0167-130814-019	0167-130814-014
Grouping	Analyte						
WATER							
Total Metals	Lead (Pb)-Total (mg/L)		0.000095	0.000075	0.000096	0.000720	0.00404
	Lithium (Li)-Total (mg/L)		0.00087	0.00109	0.00146	0.00062	0.00599
	Magnesium (Mg)-Total (mg/L)		53.5	8.10	11.7	17.6	67.4
	Manganese (Mn)-Total (mg/L)		5.83	0.0351	0.546	0.938	0.847
	Mercury (Hg)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)		0.00107	0.000405	0.000840	0.000101	0.000707
	Nickel (Ni)-Total (mg/L)		0.00289	<0.00050	0.00067	0.00068	0.00503
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	0.193
	Potassium (K)-Total (mg/L)		6.78	0.61	0.85	3.87	3.51
	Selenium (Se)-Total (mg/L)		0.00021	<0.00010	<0.00010	<0.00010	0.00030
	Silicon (Si)-Total (mg/L)		6.42	5.90	6.65	5.23	10.4
	Silver (Ag)-Total (mg/L)		0.000037	<0.000010	<0.000010	0.000015	0.000105
	Sodium (Na)-Total (mg/L)		40.8	2.37	3.71	4.14	6.90
	Strontium (Sr)-Total (mg/L)		0.831	0.277	0.321	0.211	0.500
	Sulfur (S)-Total (mg/L)		247	5.24	22.7	55.1	152
	Thallium (Tl)-Total (mg/L)		0.000015	<0.000010	<0.000010	0.000015	0.000058
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	0.00011
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	0.010	0.163
	Uranium (U)-Total (mg/L)		0.00332	0.000507	0.00121	0.000145	0.00280
	Vanadium (V)-Total (mg/L)		0.0016	<0.0010	<0.0010	0.0013	0.0169
	Zinc (Zn)-Total (mg/L)		0.0077	<0.0030	<0.0030	0.0049	0.0599
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0085	0.0164	0.0068	0.0087	0.0276
	Antimony (Sb)-Dissolved (mg/L)		0.00055	<0.00010	0.00023	0.00146	0.00247
	Arsenic (As)-Dissolved (mg/L)		0.0244	0.00041	0.00210	0.00757	0.00620
	Barium (Ba)-Dissolved (mg/L)		0.0697	0.0635	0.0647	0.0581	0.0712
	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)		0.075	<0.010	<0.010	<0.010	0.026
	Cadmium (Cd)-Dissolved (mg/L)		0.000401	0.000015	0.000113	0.000021	0.000021
	Calcium (Ca)-Dissolved (mg/L)		275	24.1	48.4	67.4	160
	Chromium (Cr)-Dissolved (mg/L)		0.00034	<0.00010	0.00010	0.00011	0.00011
	Cobalt (Co)-Dissolved (mg/L)		0.00789	<0.00010	0.00024	0.00058	0.00053
	Copper (Cu)-Dissolved (mg/L)		0.00300	0.00127	0.00136	0.00097	0.00304
	Iron (Fe)-Dissolved (mg/L)		4.60	0.066	0.082	0.892	0.521
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.00088	0.00107	0.00132	<0.00050	0.00425

* 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	L1348866-26 Water 14-AUG-13 15:13 0167-130814-022	L1348866-27 Water 14-AUG-13 15:51 0167-130814-017	L1348866-28 Water 14-AUG-13 18:00 FIELD BLANK	L1348866-29 Water 15-AUG-13 08:01 0167-130815-032
Grouping	Analyte				
WATER					
Total Metals	Lead (Pb)-Total (mg/L)	0.00401	0.000577	<0.000050	
	Lithium (Li)-Total (mg/L)	0.00741	0.00897	<0.00050	
	Magnesium (Mg)-Total (mg/L)	91.1	63.2	<0.10	
	Manganese (Mn)-Total (mg/L)	0.902	1.30	<0.000050	
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Total (mg/L)	0.000276	0.000382	<0.000050	
	Nickel (Ni)-Total (mg/L)	0.00085	0.00228	<0.00050	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	4.32	3.49	<0.10	
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.00010	
	Silicon (Si)-Total (mg/L)	6.16	6.12	<0.050	
	Silver (Ag)-Total (mg/L)	0.000038	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	7.11	4.78	<0.050	
	Strontium (Sr)-Total (mg/L)	0.573	0.453	<0.00020	
	Sulfur (S)-Total (mg/L)	212	156	<0.50	
	Thallium (Tl)-Total (mg/L)	0.000046	0.000110	<0.000010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	0.00293	0.00422	<0.000010	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	0.238	1.09	<0.0030	
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0049	<0.0010	<0.0010	
	Antimony (Sb)-Dissolved (mg/L)	0.00734	0.0176	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.0149	0.0398	<0.00010	
	Barium (Ba)-Dissolved (mg/L)	0.0235	0.0159	<0.000050	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	
	Boron (B)-Dissolved (mg/L)	0.048	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.000282	0.00226	<0.000010	
	Calcium (Ca)-Dissolved (mg/L)	202	183	<0.050	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	0.00029	0.00109	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.00075	<0.00020	<0.00020	
	Iron (Fe)-Dissolved (mg/L)	0.096	1.14	<0.010	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000179	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.00720	0.00893	<0.00050	

* 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	L1348866-1	L1348866-2	L1348866-3	L1348866-4	L1348866-5
	Water	14-AUG-13	14:05	0167-130814-009					
	Water	14-AUG-13	13:30	0167-130814-012					
	Water	14-AUG-13	15:51	0167-130814-016					
	Water	14-AUG-13	15:40	0167-130814-003					
	Water	14-AUG-13	14:24	0167-130814-008					
Grouping	Analyte								
WATER									
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	16.3	47.5	63.4	97.6	12.2			
	Manganese (Mn)-Dissolved (mg/L)	0.0628	0.0843	1.22	2.87	0.0308			
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000073	0.00193	0.000353	0.000241	0.000072			
	Nickel (Ni)-Dissolved (mg/L)	0.00078	0.00079	0.00201	0.00138	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	0.95	12.3	3.65	4.73	0.34			
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00013	<0.00010			
	Silicon (Si)-Dissolved (mg/L)	6.39	1.64	6.19	5.91	6.48			
	Silver (Ag)-Dissolved (mg/L)	0.000014	0.000033	<0.000010	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	4.20	16.6	4.81	7.19	4.14			
	Strontium (Sr)-Dissolved (mg/L)	0.466	0.550	0.451	0.515	0.388			
	Sulfur (S)-Dissolved (mg/L)	40.8	214	150	210	35.0			
	Thallium (Tl)-Dissolved (mg/L)	0.000011	0.000284	0.000094	0.000065	<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)	0.000855	0.000995	0.00432	0.00398	0.000295			
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			
	Zinc (Zn)-Dissolved (mg/L)	0.230	0.0161	0.929	0.0909	0.0024			

* 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	L1348866-6 Water 14-AUG-13 13:40 0167-130814-013	L1348866-7 Water 14-AUG-13 08:15 0167-130814-005	L1348866-8 Water 14-AUG-13 13:20 0167-130814-011	L1348866-9 Water 16-AUG-13 09:20 TRAVEL BLANK	L1348866-10 Water 14-AUG-13 12:26 0167-130814-021
Grouping	Analyte				
WATER					
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	78.2	3.18	53.6	66.3
	Manganese (Mn)-Dissolved (mg/L)	0.205	0.315	5.50	2.10
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000319	0.000292	0.000991	0.000619
	Nickel (Ni)-Dissolved (mg/L)	0.00077	0.00252	0.00271	0.00123
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	3.41	0.74	6.86	4.20
	Selenium (Se)-Dissolved (mg/L)	<0.00010	0.00011	0.00022	0.00012
	Silicon (Si)-Dissolved (mg/L)	5.61	7.85	6.11	5.67
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	6.54	2.00	39.7	18.6
	Strontium (Sr)-Dissolved (mg/L)	0.467	0.0670	0.819	0.659
	Sulfur (S)-Dissolved (mg/L)	176	1.07	243	193
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000013	<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)	0.00199	0.000162	0.00316	0.00243
	Vanadium (V)-Dissolved (mg/L)	<0.0010	0.0012	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0062	0.0027	0.0063	0.0025

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1348866-11	L1348866-12	L1348866-13	L1348866-14	L1348866-15	
Description	Water	Water	Water	Water	Water	
Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13	
Sampled Time	16:01	09:23	07:32	08:45	10:04	
Client ID	0167-130814-015	0167-130814-006	0167-130814-007	0167-130814-002	0167-130814-023	
Grouping	Analyte					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	61.4	55.0	9.06	9.86	8.08
	Manganese (Mn)-Dissolved (mg/L)	1.13	1.91	0.105	0.0986	0.0575
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000371	0.000515	0.000391	0.000414	0.000427
	Nickel (Ni)-Dissolved (mg/L)	0.00194	0.00117	0.00061	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	3.47	3.35	0.72	0.75	0.59
	Selenium (Se)-Dissolved (mg/L)	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	6.06	5.69	6.04	5.85	5.82
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	4.95	16.2	2.91	3.07	2.43
	Strontium (Sr)-Dissolved (mg/L)	0.440	0.548	0.264	0.288	0.274
	Sulfur (S)-Dissolved (mg/L)	145	157	10.5	11.6	6.02
	Thallium (Tl)-Dissolved (mg/L)	0.000104	<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)	0.00468	0.00193	0.000501	0.000570	0.000547
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.843	0.0018	<0.0010	0.0011	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1348866-16	L1348866-17	L1348866-18	L1348866-19	L1348866-20
Description	Water	Water	Water	Water	Water
Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	15-AUG-13	14-AUG-13
Sampled Time	17:00	17:29	17:45	07:30	11:29
Client ID	0167-130814-027	0167-130814-028	0167-130814-029	0167-130814-030	0167-130814-026
Grouping	Analyte				
WATER					
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	75.0	73.3	97.4 ^{DTC}	7.85
	Manganese (Mn)-Dissolved (mg/L)	0.0225	0.0241	0.117 ^{DTC}	0.0278
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000190	0.000158	0.000095	0.000389
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00058	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	3.28	3.10	3.94 ^{DTC}	0.55
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	2.66	2.61	2.75	5.78
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010 ^{DTC}	<0.000010
	Sodium (Na)-Dissolved (mg/L)	9.76	9.40	13.0 ^{DTC}	2.31
	Strontium (Sr)-Dissolved (mg/L)	0.868	0.730	1.19 ^{DTC}	0.269
	Sulfur (S)-Dissolved (mg/L)	276	269	354 ^{DTC}	4.84
	Thallium (Tl)-Dissolved (mg/L)	0.000091	0.000075	0.000090	<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)	0.00335	0.00272	0.00405	0.000509
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010 ^{DTC}	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.288	0.292	0.454 ^{DTC}	0.0019

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1348866-21	L1348866-22	L1348866-23	L1348866-24	L1348866-25
		Description	Water	Water	Water	Water	Water
		Sampled Date	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13	14-AUG-13
		Sampled Time	16:07	10:23	10:45	16:07	13:53
		Client ID	0167-130814-010	0167-130814-024	0167-130814-025	0167-130814-019	0167-130814-014
Grouping	Analyte						
WATER							
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	53.8	7.92	11.6	17.7	70.9	
	Manganese (Mn)-Dissolved (mg/L)	5.54	0.0320	0.524	0.886	0.785	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000960	0.000379	0.000804	0.000078	0.000414	
	Nickel (Ni)-Dissolved (mg/L)	0.00248	<0.00050	0.00056	0.00052	0.00084	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	6.98	0.56	0.85	3.82	3.29	
	Selenium (Se)-Dissolved (mg/L)	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	
	Silicon (Si)-Dissolved (mg/L)	6.31	5.80	6.65	4.83	5.93	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	40.0	2.30	3.62	3.95	6.83	
	Strontium (Sr)-Dissolved (mg/L)	0.805	0.270	0.309	0.220	0.506	
	Sulfur (S)-Dissolved (mg/L)	238	5.06	22.5	54.9	157	
	Thallium (Tl)-Dissolved (mg/L)	0.000013	<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)	0.00318	0.000494	0.00115	0.000134	0.00227	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0070	<0.0010	0.0012	0.0014	0.0101	

* 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	L1348866-26 Water 14-AUG-13 15:13 0167-130814-022	L1348866-27 Water 14-AUG-13 15:51 0167-130814-017	L1348866-28 Water 14-AUG-13 18:00 FIELD BLANK	L1348866-29 Water 15-AUG-13 08:01 0167-130815-032	
Grouping	Analyte				
WATER					
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	91.9	63.1	<0.10	
	Manganese (Mn)-Dissolved (mg/L)	0.856	1.26	<0.000050	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000269	0.000355	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	0.00075	0.00207	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	4.25	3.56	<0.10	
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Silicon (Si)-Dissolved (mg/L)	5.89	6.14	<0.050	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	6.88	4.70	<0.050	
	Strontium (Sr)-Dissolved (mg/L)	0.554	0.448	<0.00020	
	Sulfur (S)-Dissolved (mg/L)	204	152	<0.50	
	Thallium (Tl)-Dissolved (mg/L)	0.000038	0.000096	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.00285	0.00415	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.190	1.03	<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	Antimony (Sb)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Bismuth (Bi)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Boron (B)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Lead (Pb)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Selenium (Se)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Silver (Ag)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Thallium (Tl)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Tin (Sn)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Titanium (Ti)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Vanadium (V)-Total	DLA	L1348866-20, -21, -22, -23, -24, -25, -26, -27
Duplicate	Beryllium (Be)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Copper (Cu)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Lead (Pb)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Silver (Ag)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Thallium (Tl)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Titanium (Ti)-Dissolved	DLA	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Duplicate	Cyanate	DLIS	L1348866-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Boron (B)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Total	MS-B	L1348866-19
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8
Matrix Spike	Nitrate (as N)	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1348866-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -3, -4, -5, -6, -7, -8

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.
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-MAN-WR	Water	Alkalinity by Manual Titration	APHA 2320
		This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.	
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
		This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.	
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
		This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.	
ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1
		This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.	
ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1
		This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.	
ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1
		This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.	
ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1
		This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.	
ANIONS-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1
		This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision	

Reference Information

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:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

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
---------------------------	-------	-------------------------------------	-----------------

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 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. Waston et al.

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

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

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

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

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

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

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

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

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

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

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

Reference Information

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
---	---	---

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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

