

August 22, 2013

EDI Job Number: 13-Y-0167

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

Attention: Adrienne Turcotte, Mount Nansen Project Officer

Re: Mount Nansen Surface Water Quality Field Memo: August 13-15, 2013

| | |
|------------------|--|
| Trip Dates: | August 13-15, 2013 |
| EDI Field Staff: | Joel MacFabe, 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 August 13 to August 15, 2013. Air temperatures during the trip ranged from 14°C to 25°C. Weather conditions were partly cloudy to overcast with light thundershowers.

EDI visited all water quality sites and hydrometric stations. Water levels across most of the sites/stations were low and typical for this time of year. The Brown-McDade pit lake was sampled. An additional grab sample from the seepage pond surface water was collected. This sample was collected following communication via Dension care and maintenance staff on Site at the request of AAM.

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 (July 15-17, 2013) as well as the ALS laboratory and Yukon Government (YG) Environmental Health Services analysis reports. Section 3 contains relevant photos of field conditions. Section 4 details additional monitoring program comments, noteworthy observations, and any changes to budget or scope moving forward.



1. Hydrology

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 low with only some stations on 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 and assumed to be less than program measurement uncertainty (0.001 m³/s).

Erosion of the bank upstream of the H-VC-REF station continues to progress, with one of the braces on the stilling becoming compromised. Stilling well anchors will 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 redeployed following hydrometric monitoring. Site conditions at most stations are consistent with the seasonal drop in stage levels in early summer.

Table 1. Hydrometric program details.

| | |
|---------------------------------------|--|
| Hydrology program dates: | August 13-14, 2013 |
| Weather at time of monitoring: | Weather conditions were partly cloudy to overcast, with temperatures between 14°C to 25°C. Thunderstorms and rain showers occurred periodically over the course of the monitoring event. |

| Station | Hydrometric Measurement Type | Notes & Comments |
|-------------|------------------------------|--|
| ATM-DC2/DC4 | None | Both atmospheric barologgers downloaded. |
| H-DC-DX | Not Possible | Water level very low (Photo 3, Photo 9). No hydrometric measurement possible at station or at downstream culvert. |
| H-DC-DX+105 | Salt Slug | Water levels low to moderate. Salt tracer method used to measure stream discharge. |
| H-DC-D1b | Salt Slug | Flow levels were low. Salt tracer discharge measurement taken. |
| H-DC-U1 | Salt Slug | Water levels were 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 | Stilling well silt accumulation, cleared and logger redeployed in water. Salt tracer method used to estimate stream discharge. |
| H-DC-M | Salt Slug | Sedimentation discovered in stilling well. Salt tracer used to estimate stream discharge. Logger downloaded and redeployed. |



| Station | Hydrometric Measurement Type | Notes & Comments |
|----------|------------------------------|---|
| H-DC-R | Salt Slug | Water level low to moderate. Logger continues to be submerged in sediment. Salt tracer used to estimate stream discharge. |
| H-VC-REF | ADV | Flow levels low and water clear. Upstream bank is eroding and the stilling well may need to be repositioned. Area-velocity method used to estimate discharge. Logger downloaded and redeployed. |
| H-VC-U | ADV | Water levels are low. Discharge measurement completed using the mid-section method. Logger downloaded and redeployed. |
| H-BC | Salt Slug | Water levels low and water very clear. Salt tracer used to measure discharge. |
| H-VC-DBC | ADV | Water level low. 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 low with low turbidity levels. 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 | Very little flow at station (Photo 6), with no water flowing over the 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 which was dry. Water levels were low at all other sites, particularly those along Pony Creek where there was no surface water flow upstream of the sampling locations at WQ-PC-D (Photo 7) and WQ-PC-U. The Brown-McDade pit lake was sampled at three depths during this trip (Photo 8) and a surface water grab sample was collected from the seepage pond following the request of AAM staff communicated via Denison Environmental on Site. The seepage pond grab sample was requested following observations of algae accumulation on the surface of the water by Care and Maintenance Staff (Denison). EDI staff noted that that algae growth is not uncommon.



All water quality samples were delivered to ALS on Friday, August 16, 2013. Bacteriological samples collected from the pump house well could not be submitted to YG Environmental Health Services since they do not accept samples on Fridays.

This report includes analytical results from samples collected during the July 16-17, 2013 trip (Appendix A) as well as copies of the ALS Certificate of Analysis (Appendix B) and copies of the YG Environmental Health Services results for that sampling event (Appendix C).

Table 2. Water quality sampling program details.

| | |
|-------------------------------------|--|
| WQ Sampling dates: | August 14-15, 2013 |
| Weather at time of sampling: | Weather conditions were partly cloudy to overcast, with temperatures between 20°C to 25°C during sampling. |

| Site | Sampled? (Yes/No) | Notes / Explanations |
|--------------|------------------------------|---|
| WQ-PIT1 | Yes | Samples taken from surface. Dissolved oxygen (DO) 80.0 %. |
| WQ-PIT2 | Yes | Samples taken from 2.5 m depth. DO 69.8%. |
| WQ-PIT3 | Yes | Samples taken from 5 m depth. DO 78.1%. |
| WQ-SEEP | Yes | Conditions normal, collected samples. |
| WQ-TP | Yes | Conditions normal for this time of year. |
| WQ-DC-DX | Yes | Water levels were low with low turbidity (Photo 3). |
| WQ-DC-DX+105 | Yes | Water levels low with low turbidity. |
| WQ-DC-D1b | Yes | Water levels were moderate. |
| WQ-DC-U1 | Yes | Water levels were low and turbidity low. |
| WQ-DC-U2 | Yes | Water levels low with no turbidity. |
| WQ-DC-U | Yes | Water levels low with moderate turbidity. |
| WQ-DC-R | Yes | Water levels were low with low turbidity. |
| WQ-VC-REF | Yes | Site conditions normal for time of year, water levels were low with clear water. |
| WQ-VC-U | Yes | Site conditions normal for time of year, water levels were low 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 low with no turbidity. |
| WQ-VC-UMN | Yes | Site conditions normal for time of year, water levels were low with no turbidity. |
| WQ-MN | Yes | Site conditions normal for time of year with low water levels and low turbidity. |
| WQ-VC-R | Yes | Site conditions normal for time of year with low flow levels and no turbidity. |



| Site | Sampled? (Yes/No) | Notes / Explanations |
|--|----------------------|---|
| WQ-PW | Yes | Bacteriological sample and drinking water samples collected from discharge pipe. |
| WQ-PC-U | Yes | No surface flow observed entering pond at sampling location. Water samples collected from pond. |
| WQ-PC-D | Yes | Very low flows. Creek went underground and reappeared 6 m downstream from regular sampling location (Photo 7). Sample collected at this location. |
| WQ-ADIT-SEEP | No | Seep was dry. No samples collected. |
| WQ-MS-S-08 | Yes | Seep was producing water. Sample collected. |
| WQ-MS-S-03 | Yes | Very low flows with high amount of orange filamentous algae. |
| WQ-DRY | No | Not required at this time. |
| Quality Assurance/Quality Control Samples | | |
| Field Replicate A | Yes | Collected from WQ-SEEP. |
| Field Replicate B | Yes | Collected from WQ-MS-S-03. |
| 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-REF station, showing eroding bank and re-positioned well brace.



Photo 3. The H/WQ-DC-DX location showing very low flow levels.



Photo 4. H-DC-M station showing moderate water levels.



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

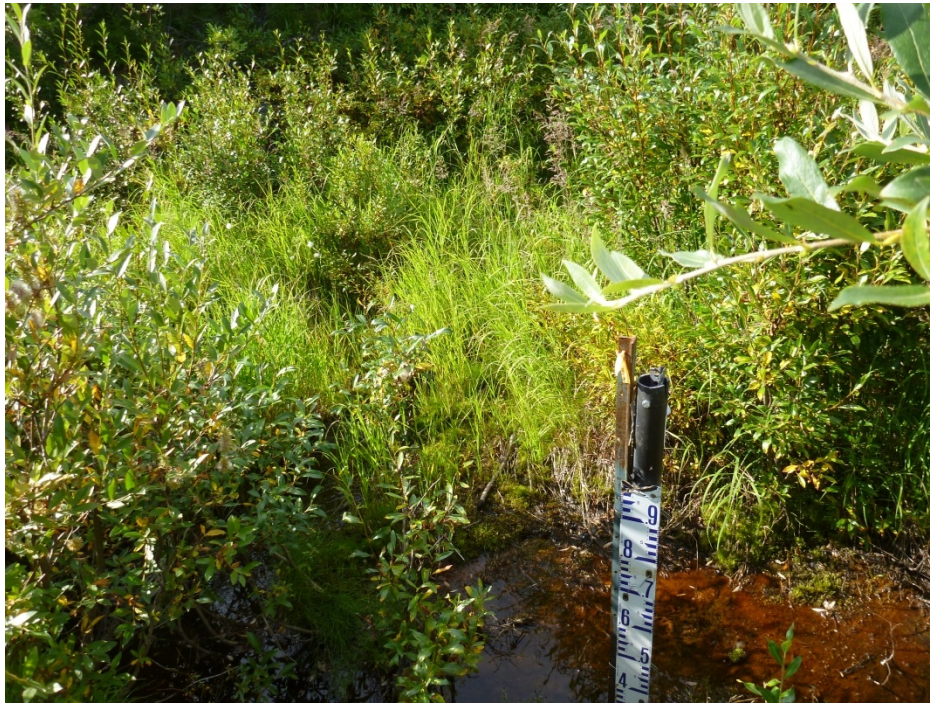


Photo 6. H-PC-U station showing very low water levels around stilling well.



Photo 7. WQ-Adit Seep site showing no surface flow.



Photo 8. The Brown-McDade pit lake, conditions on August 14, 2013.



Photo 9. H-DC-DX/DX+105 volumetric sampling location at levels too low to gauge (+/- 0.001 m³/s).



4. Additional Trip Information/Comments

| | |
|--|---|
| Any changes to project scope (i.e. additional sites sampled): | One additional grab sample collected from the seepage pond, submitted for general water chemistry suite and nutrients analysis. |
| Any alterations to sample scheduling: | No alterations to the sampling schedule |
| Any events resulting in changes to budget: | The added cost of the grab sample from the seepage pond is expected to be negligible and should not affect the budget. |
| Additional Comments: | None |
| Wildlife Sightings: | Arctic grayling juveniles observed in Victoria Creek. |
| Site concerns including safety concerns: | None |



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



Table A-1. Water Quality Parameter Guideline Exceedances; July 15-17, 2013 trip.

| Analyte | Units | CCME-WATER-FAL | Mount Nansen Effluent Discharge Standards | Sample ID | 0167-130717-025 | 0167-130717-024 | 0167-130717-023 | 0167-130717-030 | 0167-130716-015 | 0167-130716-017 | 0167-130716-011 | 0167-130716-009 | 0167-130716-014 | 0167-130716-020 | 0167-130716-018 | 0167-130716-016 | 0167-130716-005 |
|--------------------------------------|-------|----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | | WQ Site ID | WQ-PIT-2 | WQ-PIT-1 | WQ-PIT-3 | WQ-PW | WQ-DC-U2 | WQ-DC-U1 | WQ-DC-DX+105 | WQ-MS-S-03 | WQ-PC-U | WQ-DC-U | WQ-DC-U-r | WQ-SEEP | WQ-DC-R |
| | | | | Date Sampled | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 |
| | | | | Detection Limit | | | | | | | | | | | | | |
| Temperature (in-situ) | °C | - | - | - | 12.8 | 13.0 | 11.0 | 2.6 | 6.4 | 6.9 | 0.8 | 5.6 | 7.1 | 14.2 | - | 9.4 | 9.1 |
| Specific Conductivity (in-situ) | µS/cm | - | - | - | 1552.0 | 1547.0 | 2462.0 | 426.1 | 1256.0 | 1227.0 | 1239.0 | 1256.0 | 468.5 | 1386.0 | - | 1672.0 | 1242.0 |
| pH (in-situ) | - | 6.5 - 9.0 | 6.0 - 8.5 | - | 8.0 | 8.0 | 7.0 | 7.4 | 7.7 | 7.5 | 7.0 | 7.3 | 6.5 | 8.0 | - | 6.9 | 7.7 |
| Turbidity (in-situ) | NTU | - | - | - | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Dissolved Oxygen (in-situ) | mg/L | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Colour, True | CU | 15 | - | 5 | - | - | - | <5.0 | - | - | - | - | - | - | - | - | - |
| Conductivity | µS/cm | - | - | 2 | 1500 | 1460 | 2090 | 395 | 1120 | 1240 | 1180 | 1170 | 423 | 1310 | 1270 | 1580 | 1160 |
| Hardness (as CaCO3) | mg/L | - | - | 0.5 | 950 | 950 | 1450 | 196 | 759 | 814 | 726 | 752 | 224 | 847 | 795 | 929 | 699 |
| pH (lab) | pH | 6.5 - 9.0 | 6.0 - 8.5 | 0.1 | 8.08 | 8.07 | 7.4 | 7.75 | 7.83 | 7.77 | 7.7 | 7.65 | 7.16 | 8.09 | 8.06 | 7.38 | 7.9 |
| Total Suspended Solids | mg/L | - | 50 | 3 | <3.0 | <3.0 | 4 | - | 288 | 9.3 | 4 | 55.3 | 4.7 | 25.3 | 21.3 | 22 | 15.3 |
| Total Dissolved Solids | mg/L | - | - | 10 | 1230 | 1230 | 1990 | 212 | 933 | 1000 | 879 | 903 | 281 | 1060 | 1030 | 1300 | 904 |
| Turbidity | NTU | - | - | 0.1 | 0.36 | 0.28 | 1.19 | <0.10 | 51.2 | 6.96 | 2.42 | 26.2 | 1.68 | 30.7 | 27.6 | 87.8 | 43.9 |
| Alkalinity, Bicarbonate (as CaCO3) | mg/L | - | - | 1 | 128 | 128 | 191 | - | 224 | 198 | 263 | 259 | 73.6 | 225 | 219 | 248 | 196 |
| 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 | 128 | 128 | 191 | - | 224 | 198 | 263 | 259 | 73.6 | 225 | 219 | 248 | 196 |
| Ammonia, Total (as N) | mg/L | - | - | 0.005 | <0.0050 | <0.0050 | <0.0050 | - | 0.0969 | 0.0306 | 0.0102 | 0.0066 | 0.0088 | 0.926 | 0.955 | 3.9 | 0.715 |
| Chloride (Cl) | mg/L | - | - | 0.5 | <5.0 | <5.0 | <10 | <0.50 | <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 | 0.27 | 0.27 | <0.40 | 0.096 | <0.20 | <0.20 | <0.20 | <0.20 | 0.039 | <0.20 | <0.20 | <0.20 | <0.20 |
| Nitrate (as N) | mg/L | 3 | - | 0.005 | <0.050 | <0.050 | <0.10 | 0.143 | 0.068 | <0.050 | <0.050 | <0.050 | 0.0075 | 0.33 | 0.341 | 1.38 | 0.467 |
| Nitrite (as N) | mg/L | 0.06 | - | 0.001 | <0.010 | <0.010 | <0.020 | <0.0010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.0010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Sulfate (SO4) | mg/L | - | - | 0.5 | 806 | 804 | 1350 | 36.1 | 532 | 599 | 459 | 476 | 151 | 604 | 605 | 742 | 519 |
| Cyanide, Weak Acid Diss | mg/L | - | 0.1 | 0.005 | - | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0114 | <0.0050 |
| Cyanide, Total | mg/L | - | 0.3 | 0.005 | - | - | - | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0134 | 0.0128 | 0.0772 | 0.0052 |
| Cyanate | mg/L | - | - | 0.2 | - | - | - | - | 0.56 | 0.35 | <0.20 | <0.20 | <0.20 | 0.36 | 1.05 | 1.32 | 1.02 |
| Thiocyanate (SCN) | mg/L | - | - | 0.5 | - | - | - | - | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 2.79 | <0.50 |
| Aluminum (Al)-Total | mg/L | 0.005 | - | 0.003 | 0.0068 | 0.0088 | 0.0156 | <0.010 | 5.38 | 0.0678 | 0.0132 | 0.561 | 0.0269 | 0.257 | 0.253 | 0.0168 | 0.16 |
| Antimony (Sb)-Total | mg/L | - | 0.15 | 0.0001 | 0.0042 | 0.00413 | 0.00152 | <0.00050 | 0.00426 | 0.00229 | 0.0154 | 0.0158 | 0.00038 | 0.00157 | 0.00163 | 0.00063 | 0.00183 |
| Arsenic (As)-Total | mg/L | 0.005 | - | 0.0001 | 0.0069 | 0.00705 | 0.0267 | 0.00053 | 0.0422 | 0.0146 | 0.0291 | 0.102 | 0.0058 | 0.0252 | 0.0253 | 0.039 | 0.0359 |
| Barium (Ba)-Total | mg/L | - | - | 0.00005 | 0.0158 | 0.0158 | 0.0144 | 0.083 | 0.142 | 0.0438 | 0.0111 | 0.0409 | 0.0831 | 0.0761 | 0.0783 | 0.065 | 0.0709 |
| Beryllium (Be)-Total | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | 0.00019 | <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 | <0.0010 | - | <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 | <0.020 | <0.10 | 0.039 | 0.041 | <0.010 | <0.010 | <0.010 | 0.035 | 0.038 | 0.081 | 0.033 |
| Cadmium (Cd)-Total | mg/L | 0.00001 | 0.02 | 0.00001 | 0.00353 | 0.00358 | 0.00608 | <0.00020 | 0.000499 | 0.000019 | 0.00687 | 0.00283 | 0.000075 | 0.000153 | 0.000149 | 0.000546 | 0.000147 |
| Calcium (Ca)-Total | mg/L | - | - | 0.05 | 253 | 255 | 393 | 45.4 | 176 | 190 | 182 | 187 | 65.1 | 202 | 201 | 273 | 176 |
| Chromium (Cr)-Total | mg/L | 0.001 | 0.04 | 0.0001 | 0.00011 | <0.00010 | <0.00020 | <0.00020 | 0.00959 | 0.00032 | 0.00013 | 0.00084 | 0.00019 | 0.00072 | 0.00061 | 0.00047 | 0.00051 |
| Cobalt (Co)-Total | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | 0.00365 | 0.00041 | 0.00052 | 0.00147 | 0.00147 | 0.00234 | 0.00245 | 0.00803 | 0.00219 |
| Copper (Cu)-Total | mg/L | 0.002 | 0.2 | 0.0005 | 0.00212 | 0.0023 | 0.0045 | <0.0010 | 0.014 | 0.00109 | <0.00050 | 0.007 | 0.00079 | 0.00224 | 0.00222 | 0.00558 | 0.00147 |
| Iron (Fe)-Total | mg/L | 0.3 | 1 | 0.01 | 0.025 | 0.02 | 0.071 | <0.030 | 10.2 | 1.32 | 0.214 | 3.95 | 1.39 | 4.12 | 3.77 | 8.56 | 4.28 |
| Lead (Pb)-Total | mg/L | 0.001 | 0.1 | 0.00005 | 0.000523 | 0.000507 | 0.00153 | 0.00057 | 0.0072 | 0.000054 | 0.000092 | 0.0342 | 0.000057 | 0.000402 | 0.000371 | 0.000187 | 0.00306 |
| Lithium (Li)-Total | mg/L | - | - | 0.0005 | 0.00784 | 0.00748 | 0.0105 | - | 0.00903 | 0.00456 | 0.00816 | 0.00862 | <0.00050 | 0.00189 | 0.00198 | <0.00050 | 0.00107 |
| Magnesium (Mg)-Total | mg/L | - | - | 0.1 | 69 | 68.5 | 113 | 20.1 | 75.2 | 84.8 | 58.1 | 60.2 | 14.7 | 67.1 | 68 | 50.1 | 58.1 |
| Manganese (Mn)-Total | mg/L | - | 0.5 | 0.00005 | 0.0294 | 0.0296 | 0.397 | <0.0020 | 0.741 | 0.359 | 1.11 | 1.29 | 0.973 | 1.72 | 1.85 | 5.16 | 1.77 |
| Mercury (Hg)-Total | mg/L | 0.000026 | 0.005 | 0.00001 | <0.000010 | <0.000010 | <0.000010 | <0.00020 | 0.000017 | <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 | 0.000187 | 0.000173 | <0.00010 | - | 0.00063 | 0.000306 | 0.000351 | 0.000326 | 0.000109 | 0.000564 | 0.0006 | 0.000951 | 0.0005 |
| Nickel (Ni)-Total | mg/L | 0.025 | 0.3 | 0.0005 | 0.00055 | 0.00051 | 0.0015 | - | 0.00711 | 0.00103 | 0.00217 | 0.00239 | 0.00087 | 0.00152 | 0.00149 | 0.00256 | 0.00138 |
| Phosphorus (P)-Total | mg/L | - | - | 0.05 | <0.050 | <0.050 | <0.050 | - | 0.439 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Potassium (K)-Total | mg/L | - | - | 0.1 | 3.06 | 3.04 | 4.43 | 0.91 | 4.29 | 3.96 | 3.53 | 4.05 | 0.28 | 3.87 | 4.22 | 6.5 | 3.59 |
| Selenium (Se)-Total | mg/L | 0.001 | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | <0.0010 | 0.00032 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.00012 | 0.0001 | 0.00018 | 0.00011 |
| Silicon (Si)-Total | mg/L | - | - | 0.05 | 2.53 | 2.53 | 2.64 | - | 13.7 | 5.69 | 6.12 | 7.28 | 6.05 | 5.46 | 5.99 | 6.28 | 5.94 |
| Silver (Ag)-Total | mg/L | 0.0001 | 0.1 | 0.00001 | 0.000018 | 0.000013 | <0.000020 | - | 0.0000124 | <0.000010 | <0.000010 | 0.000549 | <0.000010 | 0.000019 | 0.000016 | 0.00003 | 0.000039 |
| Sodium (Na)-Total | mg/L | - | - | 0.05 | 9.1 | 9.33 | 18.8 | 4.8 | 7.46 | 7.64 | 4.9 | 4.83 | 4.58 | 16.3 | 17.2 | 40.3 | 15.7 |
| Strontium (Sr)-Total | mg/L | - | - | 0.0002 | 0.809 | 0.799 | 1.24 | - | 0.544 | 0.514 | 0.385 | 0.419 | 0.418 | 0.634 | 0.676 | 0.787 | 0.579 |
| Sulfur (S)-Total | mg/L | - | - | 0.5 | 267 | 266 | 429 | - | 173 | 209 | 147 | 155 | 53.4 | 185 | 203 | 235 | 172 |
| Thallium (Tl)-Total | mg/L | 0.0008 | - | 0.00001 | 0.000082 | 0.000082 | 0.000098 | - | 0.000099 | <0.000010 | 0.000111 | 0.000092 | <0.000010 | <0.000010 | 0.00001 | 0.000013 | <0.000010 |
| Tin (Sn)-Total | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | 0.000017 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Titanium (Ti)-Total | mg/L | - | - | 0.01 | <0.010 | <0.010 | <0.020 | - | 0.234 | <0.010 | <0.010 | 0.03 | <0.010 | 0.012 | 0.011 | <0.010 | <0.010 |
| Uranium (U)-Total | mg/L | - | - | 0.00001 | 0.00306 | 0.00292 | 0.00451 | 0.00202 | 0.00347 | 0.00223 | 0.0044 | 0.00369 | 0.000124 | 0.00274 | 0.00285 | 0.0028 | 0.00232 |
| Vanadium (V)-Total | mg/L | - | - | 0.001 | <0.0010 | <0.0010 | <0.0020 | - | 0.0217 | <0.0010 | <0.0010 | 0.0027 | <0.0010 | 0.0021 | 0.0021 | 0.0015 | 0.0013 |
| Zinc (Zn)-Total | mg/L | 0.03 | 0.3 | 0.003 | 0.36 | 0.364 | 0.733 | <0.050 | 0.0919 | 0.0116 | 0.971 | 0.805 | 0.0103 | 0.0109 | 0.0114 | 0.009 | 0.0083 |
| Dissolved Metals Filtration Location | - | - | - | n/a | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD |
| Aluminum (Al)-Dissolved | mg/L | 0.005 | - | 0.001 | <0.0010 | <0.0010 | <0.0020 | - | 0.0185 | 0.0114 | <0.0010 | 0.0011 | 0.0131 | 0.0183 | 0.0167 | 0.0063 | 0.0086 |



Table A-1. Water Quality Parameter Guideline Exceedances; July 15-17, 2013 trip.

| Analyte | Units | CCME-WATER-FAL | Mount Nansen Effluent Discharge Standards | Sample ID | 0167-130717-025 | 0167-130717-024 | 0167-130717-023 | 0167-130717-030 | 0167-130716-015 | 0167-130716-017 | 0167-130716-011 | 0167-130716-009 | 0167-130716-014 | 0167-130716-020 | 0167-130716-018 | 0167-130716-016 | 0167-130716-005 | |
|---------------------------|-------|----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------|
| | | | | WQ Site ID | WQ-PIT-2 | WQ-PIT-1 | WQ-PIT-3 | WQ-PW | WQ-DC-U2 | WQ-DC-U1 | WQ-DC-DX+105 | WQ-MS-S-03 | WQ-PC-U | WQ-DC-U | WQ-DC-U-r | WQ-SEEP | WQ-DC-R | |
| | | | | Date Sampled | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 |
| | | | | Detection Limit | | | | | | | | | | | | | | |
| Antimony (Sb)-Dissolved | mg/L | - | - | 0.0001 | 0.0041 | 0.00398 | 0.00151 | - | 0.00321 | 0.0022 | 0.0153 | 0.0095 | 0.00032 | 0.00157 | 0.00144 | 0.00055 | 0.00118 | |
| Arsenic (As)-Dissolved | mg/L | 0.005 | 0.15 | 0.0001 | 0.00648 | 0.00639 | 0.0154 | - | 0.00525 | 0.0103 | 0.0102 | 0.0153 | 0.00305 | 0.0115 | 0.0113 | 0.0225 | 0.0131 | |
| Barium (Ba)-Dissolved | mg/L | - | - | 0.00005 | 0.0161 | 0.0159 | 0.0114 | - | 0.0603 | 0.0408 | 0.0115 | 0.0285 | 0.0729 | 0.0651 | 0.066 | 0.0639 | 0.0643 | |
| Beryllium (Be)-Dissolved | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | <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 | <0.0010 | - | <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 | <0.020 | - | 0.027 | 0.031 | <0.010 | <0.010 | <0.010 | 0.035 | 0.033 | 0.077 | 0.029 | |
| Cadmium (Cd)-Dissolved | mg/L | 0.00001 | - | 0.00001 | 0.00352 | 0.00349 | 0.00481 | - | 0.000019 | 0.000015 | 0.00569 | 0.00216 | 0.000071 | 0.000058 | 0.000058 | 0.000396 | 0.000027 | |
| Calcium (Ca)-Dissolved | mg/L | - | - | 0.05 | 265 | 265 | 395 | - | 179 | 188 | 190 | 198 | 65.7 | 220 | 204 | 284 | 182 | |
| Chromium (Cr)-Dissolved | mg/L | 0.001 | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.00011 | 0.00013 | <0.00010 | 0.00031 | 0.00017 | |
| Cobalt (Co)-Dissolved | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | 0.00043 | 0.00034 | 0.00051 | 0.00106 | 0.00077 | 0.00212 | 0.00209 | 0.00798 | 0.00204 | |
| Copper (Cu)-Dissolved | mg/L | 0.002 | - | 0.0002 | 0.00172 | 0.0017 | 0.00246 | - | 0.00051 | 0.00061 | <0.00020 | 0.0009 | 0.0005 | 0.00111 | 0.00113 | 0.00308 | 0.00076 | |
| Iron (Fe)-Dissolved | mg/L | 0.3 | - | 0.01 | <0.010 | <0.010 | <0.010 | - | 0.428 | 0.691 | 0.069 | 0.563 | 0.482 | 0.297 | 0.269 | 4.71 | 0.854 | |
| Lead (Pb)-Dissolved | mg/L | 0.001 | - | 0.00005 | 0.000195 | 0.000183 | 0.00021 | - | <0.000050 | <0.000050 | <0.000050 | 0.000068 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | |
| Lithium (Li)-Dissolved | mg/L | - | - | 0.0005 | 0.00748 | 0.00733 | 0.0092 | - | 0.00445 | 0.00362 | 0.00806 | 0.00798 | <0.00050 | 0.00272 | 0.00214 | <0.00050 | 0.00083 | |
| Magnesium (Mg)-Dissolved | mg/L | - | - | 0.1 | 70.1 | 69.8 | 112 | - | 76.2 | 83.4 | 60.9 | 62.7 | 14.7 | 72.4 | 69.5 | 53.3 | 59.6 | |
| Manganese (Mn)-Dissolved | mg/L | - | - | 0.00005 | 0.0287 | 0.028 | 0.311 | - | 0.577 | 0.317 | 1.1 | 1.23 | 0.4 | 1.75 | 1.67 | 5.15 | 1.76 | |
| Mercury (Hg)-Dissolved | mg/L | 0.000026 | - | 0.00001 | <0.000010 | <0.000010 | <0.000010 | - | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | |
| Molybdenum (Mo)-Dissolved | mg/L | 0.073 | - | 0.00005 | 0.000164 | 0.000164 | <0.00010 | - | 0.000356 | 0.000266 | 0.000347 | 0.000284 | 0.000081 | 0.000587 | 0.0006 | 0.000908 | 0.00048 | |
| Nickel (Ni)-Dissolved | mg/L | 0.025 | - | 0.0005 | <0.00050 | <0.00050 | <0.0010 | - | 0.00062 | 0.00082 | 0.0021 | 0.00173 | 0.00066 | 0.00103 | 0.00103 | 0.00243 | 0.00118 | |
| Phosphorus (P)-Dissolved | mg/L | - | - | 0.05 | <0.050 | <0.050 | <0.050 | - | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | |
| Potassium (K)-Dissolved | mg/L | - | - | 0.1 | 3.05 | 3.03 | 4.33 | - | 3.72 | 3.77 | 3.75 | 3.97 | 0.27 | 4.2 | 4.24 | 6.93 | 3.63 | |
| Selenium (Se)-Dissolved | mg/L | 0.001 | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.0001 | 0.0002 | <0.00010 | |
| Silicon (Si)-Dissolved | mg/L | - | - | 0.05 | 2.54 | 2.56 | 2.58 | - | 5.73 | 5.39 | 6.38 | 6.25 | 6.02 | 5.18 | 5.24 | 6.34 | 5.52 | |
| Silver (Ag)-Dissolved | mg/L | 0.0001 | - | 0.00001 | <0.000010 | <0.000010 | <0.000020 | - | <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 | 9.19 | 9.28 | 14.3 | - | 7.08 | 7 | 4.81 | 4.66 | 4.4 | 16.1 | 16.4 | 40.5 | 16 | |
| Strontium (Sr)-Dissolved | mg/L | - | - | 0.0002 | 0.8 | 0.814 | 1.2 | - | 0.495 | 0.454 | 0.408 | 0.421 | 0.4 | 0.678 | 0.688 | 0.773 | 0.575 | |
| Sulfur (S)-Dissolved | mg/L | - | - | 0.5 | 264 | 265 | 411 | - | 172 | 197 | 148 | 156 | 52.5 | 193 | 198 | 239 | 172 | |
| Thallium (Tl)-Dissolved | mg/L | 0.0008 | - | 0.00001 | 0.00008 | 0.000079 | 0.000096 | - | <0.000010 | <0.000010 | 0.0001 | 0.000054 | <0.000010 | <0.000010 | <0.000010 | 0.000019 | <0.000010 | |
| Tin (Sn)-Dissolved | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 | <0.00020 | - | <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 | <0.020 | - | <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 | 0.00292 | 0.0029 | 0.00429 | - | 0.00265 | 0.002 | 0.00419 | 0.00349 | 0.000096 | 0.00282 | 0.00278 | 0.00276 | 0.0023 | |
| Vanadium (V)-Dissolved | mg/L | - | - | 0.001 | <0.0010 | <0.0010 | <0.0020 | - | <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 | 0.36 | 0.354 | 0.572 | - | 0.0119 | 0.0072 | 1.05 | 0.733 | 0.0068 | 0.0015 | 0.0014 | 0.0059 | 0.0016 | |



Table A-1. Water Quality Parameter Guideline Exceedances; July 15-17, 2013 trip.

| Analyte | Units | CCME-WATER-FAL | Mount Nansen Effluent Discharge Standards | Sample ID | 0167-130716-012 | 0167-130716-006 | 0167-130716-021 | 0167-130716-019 | 0167-130716-010 | 0167-130716-004 | 0167-130716-013 | 0167-130716-003 | 0167-130716-001 | 0167-130716-002 | 0167-130716-007 | 0167-130717-022 | 0167-130717-026 |
|--------------------------------------|-------|----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | | WQ Site ID | WQ-BC | WQ-VC-U | WQ-TP | WQ-PC-D | WQ-DC-D1b | WQ-MN | WQ-VC-REF | WQ-VC-UMN | WQ-VC-R | WQ-MN-r | WQ-VC-DBC | WQ-DC-DX | WQ-DRY |
| | | | | Date Sampled | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 17-JUL-13 | 17-JUL-13 |
| | | | | Detection Limit | | | | | | | | | | | | | |
| Temperature (in-situ) | °C | - | - | - | 14.8 | 7.5 | 17.5 | 6.9 | 7.0 | 5.3 | 10.6 | 8.0 | 7.5 | - | 7.6 | 3.8 | 2.2 |
| Specific Conductivity (in-situ) | µS/cm | - | - | - | 342.6 | 206.1 | 1254.0 | 592.8 | 1462.0 | 110.6 | 208.3 | 288.8 | 270.3 | - | 213.3 | 873.0 | 377.4 |
| pH (in-situ) | - | 6.5 - 9.0 | 6.0 - 8.5 | - | 8.3 | 7.5 | 8.4 | 6.8 | 7.9 | 7.3 | 7.7 | 7.7 | 7.4 | - | 7.7 | 7.1 | 7.4 |
| Turbidity (in-situ) | NTU | - | - | - | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Dissolved Oxygen (in-situ) | mg/L | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Colour, True | CU | 15 | - | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Conductivity | µS/cm | - | - | 2 | 330 | 206 | 1160 | 547 | 1370 | 109 | 202 | 277 | 261 | 106 | 208 | 816 | 354 |
| Hardness (as CaCO3) | mg/L | - | - | 0.5 | 174 | 102 | 695 | 304 | 948 | 54.2 | 114 | 141 | 131 | 54.2 | 101 | 498 | 192 |
| pH (lab) | pH | 6.5 - 9.0 | 6.0 - 8.5 | 0.1 | 8.21 | 7.84 | 8.22 | 7.04 | 8.1 | 7.58 | 7.99 | 7.92 | 8.01 | 7.65 | 7.88 | 7.25 | 7.91 |
| Total Suspended Solids | mg/L | - | 50 | 3 | <3.0 | <3.0 | 6 | 6 | 62 | 3.3 | <3.0 | 3.3 | 3.3 | <3.0 | 7.3 | 314 | 4 |
| Total Dissolved Solids | mg/L | - | - | 10 | 197 | 109 | 957 | 366 | 1130 | 60.5 | 116 | 164 | 153 | 59.7 | 113 | 614 | 204 |
| Turbidity | NTU | - | - | 0.1 | 0.65 | 0.75 | 4.44 | 2.82 | 17.2 | 9.53 | 1.07 | 1.88 | 2.41 | 9.21 | 1.62 | 109 | 0.54 |
| Alkalinity, Bicarbonate (as CaCO3) | mg/L | - | - | 1 | 111 | 89.8 | 80.7 | 156 | 263 | 53.1 | 94.7 | 100 | 94.7 | 51.8 | 95.8 | 145 | 177 |
| 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 | 111 | 89.8 | 80.7 | 156 | 263 | 53.1 | 94.7 | 100 | 94.7 | 51.8 | 95.8 | 145 | 177 |
| Ammonia, Total (as N) | mg/L | - | - | 0.005 | <0.0050 | <0.0050 | 0.0131 | <0.0050 | 0.105 | 0.0358 | <0.0050 | 0.0173 | 0.0082 | 0.0371 | <0.0050 | 0.0153 | <0.0050 |
| Chloride (Cl) | mg/L | - | - | 0.5 | <0.50 | <0.50 | <5.0 | <0.50 | <5.0 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <5.0 | <0.50 |
| Fluoride (F) | mg/L | 0.12 | - | 0.02 | 0.075 | 0.058 | <0.20 | 0.046 | <0.20 | 0.074 | 0.047 | 0.054 | 0.047 | 0.074 | 0.051 | <0.20 | 0.067 |
| Nitrate (as N) | mg/L | 3 | - | 0.005 | <0.0050 | 0.045 | 0.099 | 0.0768 | 0.085 | 0.0322 | 0.049 | 0.0681 | 0.0583 | 0.0319 | 0.044 | <0.050 | <0.0050 |
| Nitrite (as N) | mg/L | 0.06 | - | 0.001 | <0.0010 | <0.0010 | <0.010 | <0.0010 | <0.010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.010 | <0.0010 |
| Sulfate (SO4) | mg/L | - | - | 0.5 | 63.3 | 16.8 | 632 | 156 | 641 | 3.44 | 16.2 | 50.6 | 45.5 | 3.46 | 17.5 | 333 | 24.9 |
| Cyanide, Weak Acid Diss | mg/L | - | 0.1 | 0.005 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Cyanide, Total | mg/L | - | 0.3 | 0.005 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Cyanate | mg/L | - | - | 0.2 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Thiocyanate (SCN) | mg/L | - | - | 0.5 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Aluminum (Al)-Total | mg/L | 0.005 | - | 0.003 | 0.026 | 0.0533 | 0.0625 | 0.236 | 0.937 | 0.0886 | 0.0726 | 0.0345 | 0.039 | 0.0936 | 0.0788 | 1.87 | 0.0314 |
| Antimony (Sb)-Total | mg/L | - | 0.15 | 0.0001 | 0.0002 | 0.00011 | 0.0451 | 0.0147 | 0.0194 | 0.00015 | 0.00011 | 0.00032 | 0.0003 | 0.00013 | 0.00011 | 0.00149 | 0.00039 |
| Arsenic (As)-Total | mg/L | 0.005 | - | 0.0001 | 0.00194 | 0.00037 | 0.0906 | 0.0142 | 0.116 | 0.0026 | 0.00045 | 0.00227 | 0.00219 | 0.00264 | 0.00045 | 0.0462 | 0.00165 |
| Barium (Ba)-Total | mg/L | - | 1 | 0.00005 | 0.0664 | 0.0717 | 0.00992 | 0.0349 | 0.0391 | 0.0899 | 0.0705 | 0.0689 | 0.0707 | 0.0861 | 0.0716 | 0.0871 | 0.0843 |
| 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 | <0.010 | 0.085 | <0.010 | 0.051 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Cadmium (Cd)-Total | mg/L | 0.00001 | 0.02 | 0.00001 | 0.00011 | 0.000025 | 0.00116 | 0.00435 | 0.00271 | 0.000038 | 0.000024 | 0.000024 | 0.000028 | 0.000036 | 0.000028 | 0.000114 | 0.000017 |
| Calcium (Ca)-Total | mg/L | - | - | 0.05 | 49.2 | 26 | 193 | 88.6 | 207 | 14.1 | 26.6 | 37 | 34.6 | 14.2 | 26.3 | 130 | 52.4 |
| Chromium (Cr)-Total | mg/L | 0.001 | 0.04 | 0.0001 | 0.00018 | 0.00048 | 0.00016 | 0.00034 | 0.00178 | 0.00052 | 0.00034 | 0.00017 | 0.00019 | 0.00061 | 0.0002 | 0.0028 | 0.00014 |
| Cobalt (Co)-Total | mg/L | - | - | 0.0001 | 0.00025 | <0.00010 | 0.00084 | 0.00015 | 0.00074 | 0.00124 | <0.00010 | 0.00015 | 0.00022 | 0.00128 | <0.00010 | 0.00232 | <0.00010 |
| Copper (Cu)-Total | mg/L | 0.002 | 0.2 | 0.0005 | 0.0015 | 0.00133 | 0.024 | 0.0257 | 0.00685 | 0.0027 | 0.00131 | 0.00145 | 0.00163 | 0.00222 | 0.00124 | 0.00429 | 0.0008 |
| Iron (Fe)-Total | mg/L | 0.3 | 1 | 0.01 | 0.095 | 0.089 | 0.3 | 0.384 | 3.47 | 2.99 | 0.109 | 0.179 | 0.386 | 3.08 | 0.101 | 9.03 | 0.439 |
| Lead (Pb)-Total | mg/L | 0.001 | 0.1 | 0.00005 | 0.000077 | 0.000066 | 0.00812 | 0.0114 | 0.0473 | 0.000072 | 0.000093 | 0.000075 | 0.000069 | 0.000064 | 0.000103 | 0.00332 | 0.000057 |
| Lithium (Li)-Total | mg/L | - | - | 0.0005 | 0.00093 | <0.00050 | 0.00612 | 0.00067 | 0.00815 | 0.00052 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Magnesium (Mg)-Total | mg/L | - | - | 0.1 | 11.7 | 8.84 | 44.3 | 19.9 | 88.6 | 4.44 | 9.24 | 11.9 | 11 | 4.53 | 8.84 | 33.9 | 13.9 |
| Manganese (Mn)-Total | mg/L | - | 0.5 | 0.00005 | 0.607 | 0.0411 | 0.479 | 0.248 | 0.767 | 0.384 | 0.0312 | 0.101 | 0.0978 | 0.395 | 0.0507 | 3.44 | 0.00654 |
| Mercury (Hg)-Total | mg/L | 0.000026 | 0.005 | 0.00001 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | 0.000021 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | 0.000035 | <0.000010 |
| Molybdenum (Mo)-Total | mg/L | 0.073 | - | 0.00005 | 0.000819 | 0.000481 | 0.00183 | 0.000089 | 0.000302 | 0.00038 | 0.000444 | 0.000432 | 0.000392 | 0.000379 | 0.000424 | 0.000182 | 0.000084 |
| Nickel (Ni)-Total | mg/L | 0.025 | 0.3 | 0.0005 | 0.00073 | <0.00050 | 0.00138 | 0.0009 | 0.00175 | 0.00241 | <0.00050 | 0.00054 | 0.00061 | 0.00247 | <0.00050 | 0.00207 | <0.00050 |
| Phosphorus (P)-Total | mg/L | - | - | 0.05 | <0.050 | <0.050 | <0.050 | <0.050 | 0.06 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.079 | <0.050 |
| Potassium (K)-Total | mg/L | - | - | 0.1 | 0.91 | 0.7 | 11.2 | 1.17 | 4.03 | 0.88 | 0.67 | 0.95 | 0.92 | 0.9 | 0.7 | 4.61 | 2.08 |
| Selenium (Se)-Total | mg/L | 0.001 | - | 0.0001 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.00012 | <0.00010 | <0.00010 | <0.00010 | 0.00011 | <0.00010 | <0.00010 | <0.00010 |
| Silicon (Si)-Total | mg/L | - | - | 0.05 | 6.75 | 5.89 | 1.77 | 7.13 | 6.57 | 7.65 | 5.66 | 5.68 | 5.75 | 7.8 | 5.83 | 7.61 | 4.8 |
| Silver (Ag)-Total | mg/L | 0.0001 | 0.1 | 0.00001 | <0.000010 | <0.000010 | 0.000194 | 0.000205 | 0.000585 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | 0.000014 | 0.000088 | <0.000010 |
| Sodium (Na)-Total | mg/L | - | - | 0.05 | 3.65 | 2.48 | 15.2 | 4.7 | 6.34 | 2.14 | 2.49 | 3.7 | 3.59 | 2.23 | 2.55 | 5.26 | 2.33 |
| Strontium (Sr)-Total | mg/L | - | - | 0.0002 | 0.314 | 0.281 | 0.486 | 0.579 | 0.517 | 0.0886 | 0.296 | 0.3 | 0.272 | 0.0886 | 0.286 | 0.327 | 0.147 |
| Sulfur (S)-Total | mg/L | - | - | 0.5 | 21.9 | 6.04 | 207 | 54.4 | 198 | 1.45 | 5.61 | 17.4 | 15.6 | 1.45 | 6.15 | 104 | 8.71 |
| Thallium (Tl)-Total | mg/L | 0.0008 | - | 0.00001 | <0.000010 | <0.000010 | 0.000261 | 0.00003 | 0.000083 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | 0.000066 | <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 | - | - | 0.01 | <0.010 | <0.010 | <0.010 | <0.010 | 0.046 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.076 | <0.010 |
| Uranium (U)-Total | mg/L | - | - | 0.00001 | 0.00154 | 0.00061 | 0.000938 | 0.00093 | 0.00327 | 0.000331 | 0.000694 | 0.000696 | 0.00065 | 0.000335 | 0.000644 | 0.000541 | 0.000358 |
| Vanadium (V)-Total | mg/L | - | - | 0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 0.0036 | 0.0015 | <0.0010 | <0.0010 | <0.0010 | 0.0016 | <0.0010 | 0.007 | <0.0010 |
| Zinc (Zn)-Total | mg/L | 0.03 | 0.3 | 0.003 | <0.0030 | <0.0030 | 0.0664 | 0.23 | 0.414 | 0.0037 | <0.0030 | 0.004 | <0.0030 | 0.0037 | <0.0030 | 0.0152 | <0.0030 |
| Dissolved Metals Filtration Location | - | - | - | n/a | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD |
| Aluminum (Al)-Dissolved | mg/L | 0.005 | - | 0.001 | 0.0068 | 0.0088 | 0.0093 | 0.0098 | 0.0033 | 0.0762 | 0.0108 | 0.0083 | 0.0133 | 0.0813 | 0.0089 | 0.0048 | 0.0022 |



Table A-1. Water Quality Parameter Guideline Exceedances; July 15-17, 2013 trip.

| Analyte | Units | CCME-WATER-FAL | Mount Nansen Effluent Discharge Standards | Sample ID | 0167-130716-012 | 0167-130716-006 | 0167-130716-021 | 0167-130716-019 | 0167-130716-010 | 0167-130716-004 | 0167-130716-013 | 0167-130716-003 | 0167-130716-001 | 0167-130716-002 | 0167-130716-007 | 0167-130717-022 | 0167-130717-026 |
|---------------------------|-------|----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | | WQ Site ID | WQ-BC | WQ-VC-U | WQ-TP | WQ-PC-D | WQ-DC-D1b | WQ-MN | WQ-VC-REF | WQ-VC-UMN | WQ-VC-R | WQ-MN-r | WQ-VC-DBC | WQ-DC-DX | WQ-DRY |
| | | | | Date Sampled | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 17-JUL-13 | 17-JUL-13 |
| | | | | Detection Limit | | | | | | | | | | | | | |
| Antimony (Sb)-Dissolved | mg/L | - | - | 0.0001 | 0.00018 | <0.00010 | 0.0449 | 0.0102 | 0.00971 | 0.00013 | <0.00010 | 0.00032 | 0.00028 | 0.00012 | <0.00010 | 0.00054 | 0.00035 |
| Arsenic (As)-Dissolved | mg/L | 0.005 | 0.15 | 0.0001 | 0.0017 | 0.00035 | 0.0612 | 0.00628 | 0.0137 | 0.00231 | 0.00033 | 0.0014 | 0.00157 | 0.00238 | 0.00034 | 0.0166 | 0.00048 |
| Barium (Ba)-Dissolved | mg/L | - | - | 0.00005 | 0.0617 | 0.0689 | 0.00938 | 0.0325 | 0.0233 | 0.0881 | 0.0691 | 0.0723 | 0.0723 | 0.0819 | 0.0693 | 0.0641 | 0.0828 |
| 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 | <0.010 | 0.081 | <0.010 | 0.047 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Cadmium (Cd)-Dissolved | mg/L | 0.00001 | - | 0.00001 | 0.000095 | 0.000016 | 0.000802 | 0.00459 | 0.000464 | 0.000032 | 0.000014 | 0.000019 | 0.000018 | 0.000033 | 0.000018 | 0.000013 | <0.000010 |
| Calcium (Ca)-Dissolved | mg/L | - | - | 0.05 | 50.2 | 26.2 | 202 | 88.9 | 222 | 14.3 | 29.8 | 37 | 34.5 | 14.3 | 26.2 | 140 | 53.6 |
| Chromium (Cr)-Dissolved | mg/L | 0.001 | - | 0.0001 | <0.00010 | <0.00010 | <0.00010 | 0.0001 | <0.00010 | 0.00053 | <0.00010 | 0.00019 | 0.00013 | 0.00047 | <0.00010 | <0.00010 | <0.00010 |
| Cobalt (Co)-Dissolved | mg/L | - | - | 0.0001 | 0.00022 | <0.00010 | 0.00078 | <0.00010 | 0.00025 | 0.00121 | <0.00010 | 0.00013 | 0.00019 | 0.00122 | <0.00010 | 0.00145 | <0.00010 |
| Copper (Cu)-Dissolved | mg/L | 0.002 | - | 0.0002 | 0.00124 | 0.00109 | 0.017 | 0.0196 | 0.00081 | 0.00203 | 0.00105 | 0.00118 | 0.00125 | 0.00199 | 0.00108 | 0.00043 | 0.00058 |
| Iron (Fe)-Dissolved | mg/L | 0.3 | - | 0.01 | 0.052 | 0.026 | 0.019 | 0.01 | 0.125 | 2.44 | 0.026 | 0.03 | 0.213 | 2.57 | 0.024 | 4.17 | <0.010 |
| Lead (Pb)-Dissolved | mg/L | 0.001 | - | 0.00005 | <0.000050 | <0.000050 | 0.000307 | 0.000407 | 0.000108 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | 0.000057 | <0.000050 | 0.000107 | <0.000050 |
| Lithium (Li)-Dissolved | mg/L | - | - | 0.0005 | <0.00050 | <0.00050 | 0.0061 | 0.00085 | 0.00739 | <0.00050 | <0.00050 | 0.00059 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Magnesium (Mg)-Dissolved | mg/L | - | - | 0.1 | 11.9 | 8.84 | 46.2 | 20.1 | 95.3 | 4.5 | 9.48 | 11.8 | 10.9 | 4.52 | 8.65 | 36.1 | 14.1 |
| Manganese (Mn)-Dissolved | mg/L | - | - | 0.00005 | 0.588 | 0.0379 | 0.431 | 0.279 | 0.659 | 0.381 | 0.0263 | 0.0936 | 0.0922 | 0.382 | 0.0477 | 3.12 | 0.00191 |
| 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 | 0.000752 | 0.000403 | 0.00186 | 0.00009 | 0.000253 | 0.000374 | 0.000426 | 0.000443 | 0.000394 | 0.000372 | 0.000415 | 0.000133 | 0.000074 |
| Nickel (Ni)-Dissolved | mg/L | 0.025 | - | 0.0005 | 0.00061 | <0.00050 | 0.00127 | 0.00108 | 0.00077 | 0.0025 | <0.00050 | <0.00050 | 0.00055 | 0.00242 | <0.00050 | 0.00064 | <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 | 0.9 | 0.69 | 11.5 | 1.13 | 4.41 | 0.87 | 0.66 | 0.89 | 0.9 | 0.89 | 0.66 | 4.82 | 2.13 |
| Selenium (Se)-Dissolved | mg/L | 0.001 | - | 0.0001 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.0001 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Silicon (Si)-Dissolved | mg/L | - | - | 0.05 | 6.84 | 5.81 | 1.71 | 6.75 | 5.51 | 7.75 | 5.69 | 5.57 | 5.64 | 7.79 | 5.66 | 5.21 | 4.75 |
| Silver (Ag)-Dissolved | mg/L | 0.0001 | - | 0.00001 | <0.000010 | <0.000010 | 0.000038 | <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 | 3.48 | 2.48 | 15.4 | 5.46 | 6.51 | 2.34 | 2.45 | 3.68 | 3.57 | 2.23 | 2.51 | 5.54 | 2.33 |
| Strontium (Sr)-Dissolved | mg/L | - | - | 0.0002 | 0.296 | 0.291 | 0.496 | 0.602 | 0.521 | 0.0921 | 0.295 | 0.335 | 0.278 | 0.0894 | 0.285 | 0.338 | 0.154 |
| Sulfur (S)-Dissolved | mg/L | - | - | 0.5 | 21.7 | 5.96 | 210 | 52.6 | 206 | 1.45 | 5.61 | 17.3 | 15.5 | 1.43 | 6.1 | 110 | 8.71 |
| Thallium (Tl)-Dissolved | mg/L | 0.0008 | - | 0.00001 | <0.000010 | <0.000010 | 0.000249 | 0.000016 | 0.000037 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| Tin (Sn)-Dissolved | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <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 | 0.00147 | 0.000573 | 0.000911 | 0.00126 | 0.00334 | 0.000326 | 0.000655 | 0.000737 | 0.000622 | 0.000333 | 0.000638 | 0.000441 | 0.00039 |
| Vanadium (V)-Dissolved | mg/L | - | - | 0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 0.0014 | <0.0010 | <0.0010 | <0.0010 | 0.0013 | <0.0010 | <0.0010 | <0.0010 |
| Zinc (Zn)-Dissolved | mg/L | 0.03 | - | 0.001 | <0.0010 | 0.0011 | 0.0333 | 0.32 | 0.234 | 0.0036 | 0.0014 | 0.0016 | <0.0010 | 0.0036 | <0.0010 | 0.0012 | <0.0010 |



Table A-1. Water Quality Parameter Guideline Exceedances; July 15-17, 2013 trip.

| Analyte | Units | CCME-WATER-FAL | Mount Nansen Effluent Discharge Standards | Sample ID | 0167-130717-TRAVEL | 0167-130717-FIELD-BLANK |
|--------------------------------------|-------|----------------|---|-----------------|--------------------|-------------------------|
| | | | | WQ Site ID | TRAVEL BLANK | FIELD BLANK |
| | | | | Date Sampled | 17-JUL-13 | 17-JUL-13 |
| | | | | Detection Limit | | |
| Temperature (in-situ) | °C | - | - | - | - | - |
| Specific Conductivity (in-situ) | µS/cm | - | - | - | - | - |
| pH (in-situ) | - | 6.5 - 9.0 | 6.0 - 8.5 | - | - | - |
| Turbidity (in-situ) | NTU | - | - | - | - | - |
| Dissolved Oxygen (in-situ) | mg/L | - | - | - | - | - |
| Colour, True | CU | 15 | - | 5 | - | - |
| Conductivity | µS/cm | - | - | 2 | <2.0 | <2.0 |
| Hardness (as CaCO3) | mg/L | - | - | 0.5 | <0.50 | <0.50 |
| pH (lab) | pH | 6.5 - 9.0 | 6.0 - 8.5 | 0.1 | 5.64 | 5.63 |
| Total Suspended Solids | mg/L | - | 50 | 3 | <3.0 | <3.0 |
| Total Dissolved Solids | mg/L | - | - | 10 | <1.0 | <1.0 |
| Turbidity | NTU | - | - | 0.1 | <0.10 | <0.10 |
| Alkalinity, Bicarbonate (as CaCO3) | mg/L | - | - | 1 | <1.0 | 1.1 |
| Alkalinity, Carbonate (as CaCO3) | mg/L | - | - | 1 | <1.0 | <1.0 |
| Alkalinity, Hydroxide (as CaCO3) | mg/L | - | - | 1 | <1.0 | <1.0 |
| Alkalinity, Total (as CaCO3) | mg/L | - | - | 1 | <1.0 | 1.1 |
| Ammonia, Total (as N) | mg/L | - | - | 0.005 | 0.0386 | <0.0050 |
| Chloride (Cl) | mg/L | - | - | 0.5 | <0.50 | <0.50 |
| Fluoride (F) | mg/L | 0.12 | - | 0.02 | <0.020 | <0.020 |
| Nitrate (as N) | mg/L | 3 | - | 0.005 | <0.0050 | <0.0050 |
| Nitrite (as N) | mg/L | 0.06 | - | 0.001 | <0.0010 | <0.0010 |
| Sulfate (SO4) | mg/L | - | - | 0.5 | <0.50 | <0.50 |
| Cyanide, Weak Acid Diss | mg/L | - | 0.1 | 0.005 | <0.0050 | <0.0050 |
| Cyanide, Total | mg/L | - | 0.3 | 0.005 | <0.0050 | <0.0050 |
| Cyanate | mg/L | - | - | 0.2 | <0.20 | <0.20 |
| Thiocyanate (SCN) | mg/L | - | - | 0.5 | - | - |
| Aluminum (Al)-Total | mg/L | 0.005 | - | 0.003 | <0.0030 | <0.0030 |
| Antimony (Sb)-Total | mg/L | - | 0.15 | 0.0001 | <0.00010 | <0.00010 |
| Arsenic (As)-Total | mg/L | 0.005 | - | 0.0001 | <0.00010 | <0.00010 |
| Barium (Ba)-Total | mg/L | - | 1 | 0.00005 | <0.000050 | <0.000050 |
| Beryllium (Be)-Total | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 |
| Bismuth (Bi)-Total | mg/L | - | - | 0.0005 | <0.00050 | <0.00050 |
| Boron (B)-Total | mg/L | - | - | 0.01 | <0.010 | <0.010 |
| Cadmium (Cd)-Total | mg/L | 0.00001 | 0.02 | 0.00001 | <0.000010 | <0.000010 |
| Calcium (Ca)-Total | mg/L | - | - | 0.05 | <0.050 | <0.050 |
| Chromium (Cr)-Total | mg/L | 0.001 | 0.04 | 0.0001 | <0.00010 | <0.00010 |
| Cobalt (Co)-Total | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 |
| Copper (Cu)-Total | mg/L | 0.002 | 0.2 | 0.0005 | <0.00050 | <0.00050 |
| Iron (Fe)-Total | mg/L | 0.3 | 1 | 0.01 | <0.010 | <0.010 |
| Lead (Pb)-Total | mg/L | 0.001 | 0.1 | 0.00005 | <0.000050 | <0.000050 |
| Lithium (Li)-Total | mg/L | - | - | 0.0005 | <0.00050 | <0.00050 |
| Magnesium (Mg)-Total | mg/L | - | - | 0.1 | <0.10 | <0.10 |
| Manganese (Mn)-Total | mg/L | - | 0.5 | 0.00005 | <0.000050 | <0.000050 |
| Mercury (Hg)-Total | mg/L | 0.000026 | 0.005 | 0.00001 | <0.000010 | <0.000010 |
| Molybdenum (Mo)-Total | mg/L | 0.073 | - | 0.00005 | <0.000050 | <0.000050 |
| Nickel (Ni)-Total | mg/L | 0.025 | 0.3 | 0.0005 | <0.00050 | <0.00050 |
| Phosphorus (P)-Total | mg/L | - | - | 0.05 | <0.050 | <0.050 |
| Potassium (K)-Total | mg/L | - | - | 0.1 | <0.10 | <0.10 |
| Selenium (Se)-Total | mg/L | 0.001 | - | 0.0001 | <0.00010 | <0.00010 |
| Silicon (Si)-Total | mg/L | - | - | 0.05 | <0.050 | <0.050 |
| Silver (Ag)-Total | mg/L | 0.0001 | 0.1 | 0.00001 | <0.000010 | <0.000010 |
| Sodium (Na)-Total | mg/L | - | - | 0.05 | <0.050 | <0.050 |
| Strontium (Sr)-Total | mg/L | - | - | 0.0002 | <0.00020 | <0.00020 |
| Sulfur (S)-Total | mg/L | - | - | 0.5 | <0.50 | <0.50 |
| Thallium (Tl)-Total | mg/L | 0.0008 | - | 0.00001 | <0.000010 | <0.000010 |
| Tin (Sn)-Total | mg/L | - | - | 0.0001 | <0.00010 | <0.00010 |
| Titanium (Ti)-Total | mg/L | - | - | 0.01 | <0.010 | <0.010 |
| Uranium (U)-Total | mg/L | - | - | 0.00001 | <0.000010 | <0.000010 |
| Vanadium (V)-Total | mg/L | - | - | 0.001 | <0.0010 | <0.0010 |
| Zinc (Zn)-Total | mg/L | 0.03 | 0.3 | 0.003 | <0.0030 | <0.0030 |
| Dissolved Metals Filtration Location | | - | - | n/a | - | FIELD |
| Aluminum (Al)-Dissolved | mg/L | 0.005 | - | 0.001 | - | <0.0010 |

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; July 15-17, 2013 trip.

| Analyte | Units | CCME-WATER-FAL | Mount Nansen Effluent Discharge Standards | Sample ID | 0167-130717-TRAVEL | 0167-130717-FIELD-BLANK |
|---------------------------|-------|----------------|---|-----------------|--------------------|-------------------------|
| | | | | WQ Site ID | TRAVEL BLANK | FIELD BLANK |
| | | | | Date Sampled | 17-JUL-13 | 17-JUL-13 |
| | | | | Detection Limit | | |
| Antimony (Sb)-Dissolved | mg/L | - | - | 0.0001 | - | <0.00010 |
| Arsenic (As)-Dissolved | mg/L | 0.005 | 0.15 | 0.0001 | - | <0.00010 |
| Barium (Ba)-Dissolved | mg/L | - | - | 0.00005 | - | <0.000050 |
| Beryllium (Be)-Dissolved | mg/L | - | - | 0.0001 | - | <0.00010 |
| Bismuth (Bi)-Dissolved | mg/L | - | - | 0.0005 | - | <0.00050 |
| Boron (B)-Dissolved | mg/L | - | - | 0.01 | - | <0.010 |
| Cadmium (Cd)-Dissolved | mg/L | 0.00001 | - | 0.00001 | - | <0.000010 |
| Calcium (Ca)-Dissolved | mg/L | - | - | 0.05 | - | <0.050 |
| Chromium (Cr)-Dissolved | mg/L | 0.001 | - | 0.0001 | - | <0.00010 |
| Cobalt (Co)-Dissolved | mg/L | - | - | 0.0001 | - | <0.00010 |
| Copper (Cu)-Dissolved | mg/L | 0.002 | - | 0.0002 | - | <0.00020 |
| Iron (Fe)-Dissolved | mg/L | 0.3 | - | 0.01 | - | <0.010 |
| Lead (Pb)-Dissolved | mg/L | 0.001 | - | 0.00005 | - | <0.000050 |
| Lithium (Li)-Dissolved | mg/L | - | - | 0.0005 | - | <0.00050 |
| Magnesium (Mg)-Dissolved | mg/L | - | - | 0.1 | - | <0.10 |
| Manganese (Mn)-Dissolved | mg/L | - | - | 0.00005 | - | <0.000050 |
| Mercury (Hg)-Dissolved | mg/L | 0.000026 | - | 0.00001 | - | <0.000010 |
| Molybdenum (Mo)-Dissolved | mg/L | 0.073 | - | 0.00005 | - | <0.000050 |
| Nickel (Ni)-Dissolved | mg/L | 0.025 | - | 0.0005 | - | <0.00050 |
| Phosphorus (P)-Dissolved | mg/L | - | - | 0.05 | - | <0.050 |
| Potassium (K)-Dissolved | mg/L | - | - | 0.1 | - | <0.10 |
| Selenium (Se)-Dissolved | mg/L | 0.001 | - | 0.0001 | - | <0.00010 |
| Silicon (Si)-Dissolved | mg/L | - | - | 0.05 | - | <0.050 |
| Silver (Ag)-Dissolved | mg/L | 0.0001 | - | 0.00001 | - | <0.000010 |
| Sodium (Na)-Dissolved | mg/L | - | - | 0.05 | - | <0.050 |
| Strontium (Sr)-Dissolved | mg/L | - | - | 0.0002 | - | <0.00020 |
| Sulfur (S)-Dissolved | mg/L | - | - | 0.5 | - | <0.50 |
| Thallium (Tl)-Dissolved | mg/L | 0.0008 | - | 0.00001 | - | <0.000010 |
| Tin (Sn)-Dissolved | mg/L | - | - | 0.0001 | - | <0.00010 |
| Titanium (Ti)-Dissolved | mg/L | - | - | 0.01 | - | <0.010 |
| Uranium (U)-Dissolved | mg/L | - | - | 0.00001 | - | <0.000010 |
| Vanadium (V)-Dissolved | mg/L | - | - | 0.001 | - | <0.0010 |
| Zinc (Zn)-Dissolved | mg/L | 0.03 | - | 0.001 | - | <0.0010 |



Appendix B:
ALS Analytical Reports



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

Date Received: 17-JUL-13
Report Date: 31-JUL-13 17:31 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1334013
Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 13-Y-0167
C of C Numbers: 1, 2, 3, 4, 5
Legal Site Desc:

Can Dang
Senior Account Manager

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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| Sample ID Description Sampled Date Sampled Time Client ID | L1334013-1 Water 16-JUL-13 12:00 0167-130716-015 | L1334013-2 Water 16-JUL-13 12:00 0167-130716-017 | L1334013-3 Water 16-JUL-13 12:00 0167-130716-011 | L1334013-4 Water 16-JUL-13 12:00 0167-130716-009 | L1334013-5 Water 16-JUL-13 12:00 0167-130716-014 | |
|---|--|--|--|--|--|----------|
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| Physical Tests | Conductivity (uS/cm) | 1120 | 1240 | 1180 | 1170 | 423 |
| | Hardness (as CaCO3) (mg/L) | 759 | 814 | 726 | 752 | 224 |
| | pH (pH) | 7.83 | 7.77 | 7.70 | 7.65 | 7.16 |
| | Total Suspended Solids (mg/L) | 288 | 9.3 | 4.0 | 55.3 | 4.7 |
| | Total Dissolved Solids (mg/L) | 933 | 1000 | 879 | 903 | 281 |
| | Turbidity (NTU) | 51.2 | 6.96 | 2.42 | 26.2 | 1.68 |
| Anions and Nutrients | Alkalinity, Bicarbonate (as CaCO3) (mg/L) | 224 | 198 | 263 | 259 | 73.6 |
| | 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) | 224 | 198 | 263 | 259 | 73.6 |
| | Ammonia, Total (as N) (mg/L) | 0.0969 | 0.0306 | 0.0102 | 0.0066 | 0.0088 |
| | Chloride (Cl) (mg/L) | <5.0 ^{DLA} | <5.0 ^{DLA} | <5.0 ^{DLA} | <5.0 ^{DLA} | <0.50 |
| | Fluoride (F) (mg/L) | <0.20 ^{DLA} | <0.20 ^{DLA} | <0.20 ^{DLA} | <0.20 ^{DLA} | 0.039 |
| | Nitrate (as N) (mg/L) | 0.068 | <0.050 ^{DLA} | <0.050 ^{DLA} | <0.050 ^{DLA} | 0.0075 |
| | Nitrite (as N) (mg/L) | <0.010 ^{DLA} | <0.010 ^{DLA} | <0.010 ^{DLA} | <0.010 ^{DLA} | <0.0010 |
| | Sulfate (SO4) (mg/L) | 532 | 599 | 459 | 476 | 151 |
| | Anion Sum (meq/L) | 15.6 | 16.4 | 14.8 | 15.1 | 4.61 |
| | Cation Sum (meq/L) | 15.6 | 16.7 | 14.9 | 15.4 | 4.73 |
| | Cation - Anion Balance (%) | 0.2 | 0.8 | 0.2 | 1.1 | 1.2 |
| Cyanides | Cyanide, Weak Acid Diss (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| | Cyanide, Total (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| | Cyanate (mg/L) | 0.56 | 0.35 | <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) | 5.38 | 0.0678 | 0.0132 | 0.561 | 0.0269 |
| | Antimony (Sb)-Total (mg/L) | 0.00426 | 0.00229 | 0.0154 | 0.0158 | 0.00038 |
| | Arsenic (As)-Total (mg/L) | 0.0422 | 0.0146 | 0.0291 | 0.102 | 0.00580 |
| | Barium (Ba)-Total (mg/L) | 0.142 | 0.0438 | 0.0111 | 0.0409 | 0.0831 |
| | Beryllium (Be)-Total (mg/L) | 0.00019 | <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) | 0.039 | 0.041 | <0.010 | <0.010 | <0.010 |
| | Cadmium (Cd)-Total (mg/L) | 0.000499 | 0.000019 | 0.00687 | 0.00283 | 0.000075 |
| | Calcium (Ca)-Total (mg/L) | 176 | 190 | 182 | 187 | 65.1 |
| | Chromium (Cr)-Total (mg/L) | 0.00959 | 0.00032 | 0.00013 | 0.00084 | 0.00019 |
| | Cobalt (Co)-Total (mg/L) | 0.00365 | 0.00041 | 0.00052 | 0.00147 | 0.00147 |
| | Copper (Cu)-Total (mg/L) | 0.0140 | 0.00109 | <0.00050 | 0.00700 | 0.00079 |
| | Iron (Fe)-Total (mg/L) | 10.2 | 1.32 | 0.214 | 3.95 | 1.39 |
| | Lead (Pb)-Total (mg/L) | 0.00720 | 0.000054 | 0.000092 | 0.0342 | 0.000057 |

* 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 | L1334013-6 Water 16-JUL-13 12:00 0167-130716-020 | L1334013-7 Water 16-JUL-13 12:00 0167-130716-018 | L1334013-8 Water 16-JUL-13 12:00 0167-130716-016 | L1334013-9 Water 16-JUL-13 12:00 0167-130716-005 | L1334013-10 Water 16-JUL-13 12:00 0167-130716-012 |
|-----------------------------|---|--|--|--|--|---|
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| Physical Tests | Conductivity (uS/cm) | 1310 | 1270 | 1580 | 1160 | 330 |
| | Hardness (as CaCO3) (mg/L) | 847 | 795 | 929 | 699 | 174 |
| | pH (pH) | 8.09 | 8.06 | 7.38 | 7.90 | 8.21 |
| | Total Suspended Solids (mg/L) | 25.3 | 21.3 | 22.0 | 15.3 | <3.0 |
| | Total Dissolved Solids (mg/L) | 1060 | 1030 | 1300 | 904 | 197 |
| | Turbidity (NTU) | 30.7 | 27.6 | 87.8 | 43.9 | 0.65 |
| Anions and Nutrients | Alkalinity, Bicarbonate (as CaCO3) (mg/L) | 225 | 219 | 248 | 196 | 111 |
| | 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) | 225 | 219 | 248 | 196 | 111 |
| | Ammonia, Total (as N) (mg/L) | 0.926 | 0.955 | 3.90 | 0.715 | <0.0050 |
| | Chloride (Cl) (mg/L) | <5.0 ^{DLA} | <5.0 ^{DLA} | <5.0 ^{DLA} | <5.0 ^{DLA} | <0.50 |
| | Fluoride (F) (mg/L) | <0.20 ^{DLA} | <0.20 ^{DLA} | <0.20 ^{DLA} | <0.20 ^{DLA} | 0.075 |
| | Nitrate (as N) (mg/L) | 0.330 | 0.341 | 1.38 | 0.467 | <0.0050 |
| | Nitrite (as N) (mg/L) | <0.010 ^{DLA} | <0.010 ^{DLA} | <0.010 ^{DLA} | <0.010 ^{DLA} | <0.0010 |
| | Sulfate (SO4) (mg/L) | 604 | 605 | 742 | 519 | 63.3 |
| | Anion Sum (meq/L) | 17.1 | 17.0 | 20.5 | 14.8 | 3.54 |
| | Cation Sum (meq/L) | 17.9 | 16.9 | 21.2 | 14.9 | 3.68 |
| | Cation - Anion Balance (%) | 2.2 | -0.4 | 1.7 | 0.5 | 2.0 |
| Cyanides | Cyanide, Weak Acid Diss (mg/L) | <0.0050 | <0.0050 | 0.0114 | <0.0050 | <0.0050 |
| | Cyanide, Total (mg/L) | 0.0134 | 0.0128 | 0.0772 | 0.0052 | <0.0050 |
| | Cyanate (mg/L) | 0.36 | 1.05 | 1.32 | 1.02 | <0.20 |
| | Thiocyanate (SCN) (mg/L) | <0.50 | <0.50 | 2.79 | <0.50 | <0.50 |
| Total Metals | Aluminum (Al)-Total (mg/L) | 0.257 | 0.253 | 0.0168 | 0.160 | 0.0260 |
| | Antimony (Sb)-Total (mg/L) | 0.00157 | 0.00163 | 0.00063 | 0.00183 | 0.00020 |
| | Arsenic (As)-Total (mg/L) | 0.0252 | 0.0253 | 0.0390 | 0.0359 | 0.00194 |
| | Barium (Ba)-Total (mg/L) | 0.0761 | 0.0783 | 0.0650 | 0.0709 | 0.0664 |
| | 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) | 0.035 | 0.038 | 0.081 | 0.033 | <0.010 |
| | Cadmium (Cd)-Total (mg/L) | 0.000153 | 0.000149 | 0.000546 | 0.000147 | 0.000110 |
| | Calcium (Ca)-Total (mg/L) | 202 | 201 | 273 | 176 | 49.2 |
| | Chromium (Cr)-Total (mg/L) | 0.00072 | 0.00061 | 0.00047 | 0.00051 | 0.00018 |
| | Cobalt (Co)-Total (mg/L) | 0.00234 | 0.00245 | 0.00803 | 0.00219 | 0.00025 |
| | Copper (Cu)-Total (mg/L) | 0.00224 | 0.00222 | 0.00558 | 0.00147 | 0.00150 |
| | Iron (Fe)-Total (mg/L) | 4.12 | 3.77 | 8.56 | 4.28 | 0.095 |
| | Lead (Pb)-Total (mg/L) | 0.000402 | 0.000371 | 0.000187 | 0.00306 | 0.000077 |

* 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 | L1334013-11 Water 16-JUL-13 12:00 0167-130716-006 | L1334013-12 Water 16-JUL-13 12:00 0167-130716-021 | L1334013-13 Water 16-JUL-13 12:00 0167-130716-019 | L1334013-14 Water 16-JUL-13 12:00 0167-130716-010 | L1334013-15 Water 16-JUL-13 12:00 0167-130716-004 | |
|---|---|---|---|---|---|----------|
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| Physical Tests | Conductivity (uS/cm) | 206 | 1160 | 547 | 1370 | 109 |
| | Hardness (as CaCO3) (mg/L) | 102 | 695 | 304 | 948 | 54.2 |
| | pH (pH) | 7.84 | 8.22 | 7.04 | 8.10 | 7.58 |
| | Total Suspended Solids (mg/L) | <3.0 | 6.0 | 6.0 | 62.0 | 3.3 |
| | Total Dissolved Solids (mg/L) | 109 | 957 | 366 | 1130 | 60.5 |
| | Turbidity (NTU) | 0.75 | 4.44 | 2.82 | 17.2 | 9.53 |
| Anions and Nutrients | Alkalinity, Bicarbonate (as CaCO3) (mg/L) | 89.8 | 80.7 | 156 | 263 | 53.1 |
| | Alkalinity, Carbonate (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Alkalinity, Hydroxide (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Alkalinity, Total (as CaCO3) (mg/L) | 89.8 | 80.7 | 156 | 263 | 53.1 |
| | Ammonia, Total (as N) (mg/L) | <0.0050 | 0.0131 | <0.0050 | 0.105 | 0.0358 |
| | Chloride (Cl) (mg/L) | <0.50 | <5.0 ^{DLA} | <0.50 | <5.0 ^{DLA} | <0.50 |
| | Fluoride (F) (mg/L) | 0.058 | <0.20 ^{DLA} | 0.046 | <0.20 ^{DLA} | 0.074 |
| | Nitrate (as N) (mg/L) | 0.0450 | 0.099 | 0.0768 | 0.085 | 0.0322 |
| | Nitrite (as N) (mg/L) | <0.0010 | <0.010 ^{DLA} | <0.0010 | <0.010 ^{DLA} | <0.0010 |
| | Sulfate (SO4) (mg/L) | 16.8 | 632 | 156 | 641 | 3.44 |
| | Anion Sum (meq/L) | 2.15 | 14.8 | 6.37 | 18.6 | 1.14 |
| | Cation Sum (meq/L) | 2.16 | 14.9 | 6.37 | 19.4 | 1.36 |
| | Cation - Anion Balance (%) | 0.2 | 0.3 | 0.0 | 2.0 | 9.0 |
| Cyanides | Cyanide, Weak Acid Diss (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| | Cyanide, Total (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| | Cyanate (mg/L) | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| | Thiocyanate (SCN) (mg/L) | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Total Metals | Aluminum (Al)-Total (mg/L) | 0.0533 | 0.0625 | 0.236 | 0.937 | 0.0886 |
| | Antimony (Sb)-Total (mg/L) | 0.00011 | 0.0451 | 0.0147 | 0.0194 | 0.00015 |
| | Arsenic (As)-Total (mg/L) | 0.00037 | 0.0906 | 0.0142 | 0.116 | 0.00260 |
| | Barium (Ba)-Total (mg/L) | 0.0717 | 0.00992 | 0.0349 | 0.0391 | 0.0899 |
| | 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 | 0.085 | <0.010 | 0.051 | <0.010 |
| | Cadmium (Cd)-Total (mg/L) | 0.000025 | 0.00116 | 0.00435 | 0.00271 | 0.000038 |
| Total Metals | Calcium (Ca)-Total (mg/L) | 26.0 | 193 | 88.6 | 207 | 14.1 |
| Total Metals | Chromium (Cr)-Total (mg/L) | 0.00048 | 0.00016 | 0.00034 | 0.00178 | 0.00052 |
| Total Metals | Cobalt (Co)-Total (mg/L) | <0.00010 | 0.00084 | 0.00015 | 0.00074 | 0.00124 |
| Total Metals | Copper (Cu)-Total (mg/L) | 0.00133 | 0.0240 | 0.0257 | 0.00685 | 0.00270 |
| | Iron (Fe)-Total (mg/L) | 0.089 | 0.300 | 0.384 | 3.47 | 2.99 |
| Total Metals | Lead (Pb)-Total (mg/L) | 0.000066 | 0.00812 | 0.0114 | 0.0473 | 0.000072 |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

31-JUL-13 17:31 (MT)

Version: FINAL

| Sample ID | Description | L1334013-16 | L1334013-17 | L1334013-18 | L1334013-19 | L1334013-20 |
|-----------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|
| Sampled Date | Sampled Time | 16-JUL-13 12:00 | 16-JUL-13 12:00 | 16-JUL-13 12:00 | 16-JUL-13 12:00 | 16-JUL-13 12:00 |
| Client ID | 0167-130716-013 | 0167-130716-003 | 0167-130716-001 | 0167-130716-002 | 0167-130716-007 | |
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| | Conductivity (uS/cm) | 202 | 277 | 261 | 106 | 208 |
| | Hardness (as CaCO3) (mg/L) | 114 | 141 | 131 | 54.2 | 101 |
| | pH (pH) | 7.99 | 7.92 | 8.01 | 7.65 | 7.88 |
| Physical Tests | Total Suspended Solids (mg/L) | <3.0 | 3.3 | 3.3 | <3.0 | 7.3 |
| Physical Tests | Total Dissolved Solids (mg/L) | 116 | 164 | 153 | 59.7 | 113 |
| | Turbidity (NTU) | 1.07 | 1.88 | 2.41 | 9.21 | 1.62 |
| | Alkalinity, Bicarbonate (as CaCO3) (mg/L) | 94.7 | 100 | 94.7 | 51.8 | 95.8 |
| | Alkalinity, Carbonate (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Alkalinity, Hydroxide (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Alkalinity, Total (as CaCO3) (mg/L) | 94.7 | 100 | 94.7 | 51.8 | 95.8 |
| | Ammonia, Total (as N) (mg/L) | <0.0050 | 0.0173 | 0.0082 | 0.0371 | <0.0050 |
| | Chloride (Cl) (mg/L) | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | Fluoride (F) (mg/L) | 0.047 | 0.054 | 0.047 | 0.074 | 0.051 |
| | Nitrate (as N) (mg/L) | 0.0490 | 0.0681 | 0.0583 | 0.0319 | 0.0440 |
| | Nitrite (as N) (mg/L) | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| | Sulfate (SO4) (mg/L) | 16.2 | 50.6 | 45.5 | 3.46 | 17.5 |
| | Anion Sum (meq/L) | 2.24 | 3.06 | 2.85 | 1.11 | 2.28 |
| | Cation Sum (meq/L) | 2.40 | 3.01 | 2.81 | 1.37 | 2.15 |
| | Cation - Anion Balance (%) | 3.5 | -0.9 | -0.6 | 10.2 | -3.1 |
| Cyanides | Cyanide, Weak Acid Diss (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Cyanides | Cyanide, Total (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Cyanides | Cyanate (mg/L) | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Cyanides | Thiocyanate (SCN) (mg/L) | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Total Metals | Aluminum (Al)-Total (mg/L) | 0.0726 | 0.0345 | 0.0390 | 0.0936 | 0.0788 |
| Total Metals | Antimony (Sb)-Total (mg/L) | 0.00011 | 0.00032 | 0.00030 | 0.00013 | 0.00011 |
| Total Metals | Arsenic (As)-Total (mg/L) | 0.00045 | 0.00227 | 0.00219 | 0.00264 | 0.00045 |
| Total Metals | Barium (Ba)-Total (mg/L) | 0.0705 | 0.0689 | 0.0707 | 0.0861 | 0.0716 |
| Total Metals | Beryllium (Be)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Total Metals | Bismuth (Bi)-Total (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| | Boron (B)-Total (mg/L) | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Total Metals | Cadmium (Cd)-Total (mg/L) | 0.000024 | 0.000024 | 0.000028 | 0.000036 | 0.000028 |
| | Calcium (Ca)-Total (mg/L) | 26.6 | 37.0 | 34.6 | 14.2 | 26.3 |
| | Chromium (Cr)-Total (mg/L) | 0.00020 | 0.00017 | 0.00019 | 0.00061 | 0.00020 |
| | Cobalt (Co)-Total (mg/L) | <0.00010 | 0.00015 | 0.00022 | 0.00128 | <0.00010 |
| | Copper (Cu)-Total (mg/L) | 0.00131 | 0.00145 | 0.00163 | 0.00222 | 0.00124 |
| | Iron (Fe)-Total (mg/L) | 0.109 | 0.179 | 0.386 | 3.08 | 0.101 |
| | Lead (Pb)-Total (mg/L) | 0.000093 | 0.000075 | 0.000069 | 0.000064 | 0.000103 |

* 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 | L1334013-26 Water 17-JUL-13 12:00 0167-130717-022 | L1334013-27 Water 17-JUL-13 12:00 0167-130717-026 | L1334013-28 Water 17-JUL-13 15:00 TRAVEL BLANK | L1334013-29 Water 17-JUL-13 12:00 FIELD BLANK | |
|---|---|---|--|---|-----------|
| Grouping | Analyte | | | | |
| WATER | | | | | |
| Physical Tests | Conductivity (uS/cm) | 816 | 354 | <2.0 | <2.0 |
| Physical Tests | Hardness (as CaCO3) (mg/L) | 498 | 192 | <0.50 | <0.50 |
| Physical Tests | pH (pH) | 7.25 | 7.91 | 5.64 | 5.63 |
| Physical Tests | Total Suspended Solids (mg/L) | 314 | 4.0 | <3.0 | <3.0 |
| Physical Tests | Total Dissolved Solids (mg/L) | 614 | 204 | <1.0 | <1.0 |
| Physical Tests | Turbidity (NTU) | 109 | 0.54 | <0.10 | <0.10 |
| Anions and Nutrients | Alkalinity, Bicarbonate (as CaCO3) (mg/L) | 145 | 177 | <1.0 | 1.1 |
| Anions and | Alkalinity, Carbonate (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | <1.0 |
| Anions and | Alkalinity, Hydroxide (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | <1.0 |
| Anions and | Alkalinity, Total (as CaCO3) (mg/L) | 145 | 177 | <1.0 | 1.1 |
| Anions and | Ammonia, Total (as N) (mg/L) | 0.0153 | <0.0050 | 0.0386 ^{RRV} | <0.0050 |
| | Chloride (Cl) (mg/L) | <5.0 ^{DLA} | <0.50 | <0.50 | <0.50 |
| Anions and | Fluoride (F) (mg/L) | <0.20 ^{DLA} | 0.067 | <0.020 | <0.020 |
| Anions and | Nitrate (as N) (mg/L) | <0.050 ^{DLA} | <0.0050 | <0.0050 | <0.0050 |
| Anions and | Nitrite (as N) (mg/L) | <0.010 ^{DLA} | <0.0010 | <0.0010 | <0.0010 |
| Anions and | Sulfate (SO4) (mg/L) | 333 | 24.9 | <0.50 | <0.50 |
| Anions and | Anion Sum (meq/L) | 9.84 | 4.06 | <0.10 | <0.10 |
| Anions and | Cation Sum (meq/L) | 10.6 | 3.99 | <0.10 | <0.10 |
| Anions and | Cation - Anion Balance (%) | 3.9 | -0.9 | 0.0 | -80.8 |
| Cyanides | Cyanide, Weak Acid Diss (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Cyanides | Cyanide, Total (mg/L) | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Cyanides | Cyanate (mg/L) | <0.20 | <0.20 | <0.20 | <0.20 |
| Cyanides | Thiocyanate (SCN) (mg/L) | <0.50 | <0.50 | | |
| Total Metals | Aluminum (Al)-Total (mg/L) | 1.87 | 0.0314 | <0.0030 | <0.0030 |
| Total Metals | Antimony (Sb)-Total (mg/L) | 0.00149 | 0.00039 | <0.00010 | <0.00010 |
| Total Metals | Arsenic (As)-Total (mg/L) | 0.0462 | 0.00165 | <0.00010 | <0.00010 |
| Total Metals | Barium (Ba)-Total (mg/L) | 0.0871 | 0.0843 | <0.000050 | <0.000050 |
| Total Metals | Beryllium (Be)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Total Metals | Bismuth (Bi)-Total (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Total Metals | Boron (B)-Total (mg/L) | <0.010 | <0.010 | <0.010 | <0.010 |
| Total Metals | Cadmium (Cd)-Total (mg/L) | 0.000114 | 0.000017 | <0.000010 | <0.000010 |
| Total Metals | Calcium (Ca)-Total (mg/L) | 130 | 52.4 | <0.050 | <0.050 |
| Total Metals | Chromium (Cr)-Total (mg/L) | 0.00280 | 0.00014 | <0.00010 | <0.00010 |
| Total Metals | Cobalt (Co)-Total (mg/L) | 0.00232 | <0.00010 | <0.00010 | <0.00010 |
| Total Metals | Copper (Cu)-Total (mg/L) | 0.00429 | 0.00080 | <0.00050 | <0.00050 |
| | Iron (Fe)-Total (mg/L) | 9.03 | 0.439 | <0.010 | <0.010 |
| | Lead (Pb)-Total (mg/L) | 0.00332 | 0.000057 | <0.000050 | <0.000050 |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| Sample ID Description Sampled Date Sampled Time Client ID | L1334013-1 Water 16-JUL-13 12:00 0167-130716-015 | L1334013-2 Water 16-JUL-13 12:00 0167-130716-017 | L1334013-3 Water 16-JUL-13 12:00 0167-130716-011 | L1334013-4 Water 16-JUL-13 12:00 0167-130716-009 | L1334013-5 Water 16-JUL-13 12:00 0167-130716-014 | |
|---|--|--|--|--|--|-----------|
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| | Lithium (Li)-Total (mg/L) | 0.00903 | 0.00456 | 0.00816 | 0.00862 | <0.00050 |
| | Magnesium (Mg)-Total (mg/L) | 75.2 | 84.8 | 58.1 | 60.2 | 14.7 |
| | Manganese (Mn)-Total (mg/L) | 0.741 | 0.359 | 1.11 | 1.29 | 0.973 |
| Total Metals | Mercury (Hg)-Total (mg/L) | 0.000017 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| Total Metals | Molybdenum (Mo)-Total (mg/L) | 0.000630 | 0.000306 | 0.000351 | 0.000326 | 0.000109 |
| Total Metals | Nickel (Ni)-Total (mg/L) | 0.00711 | 0.00103 | 0.00217 | 0.00239 | 0.00087 |
| Total Metals | Phosphorus (P)-Total (mg/L) | 0.439 | <0.050 | <0.050 | <0.050 | <0.050 |
| Total Metals | Potassium (K)-Total (mg/L) | 4.29 | 3.96 | 3.53 | 4.05 | 0.28 |
| Total Metals | Selenium (Se)-Total (mg/L) | 0.00032 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Total Metals | Silicon (Si)-Total (mg/L) | 13.7 | 5.69 | 6.12 | 7.28 | 6.05 |
| Total Metals | Silver (Ag)-Total (mg/L) | 0.000124 | <0.000010 | <0.000010 | 0.000549 | <0.000010 |
| | Sodium (Na)-Total (mg/L) | 7.46 | 7.64 | 4.90 | 4.83 | 4.58 |
| | Strontium (Sr)-Total (mg/L) | 0.544 | 0.514 | 0.385 | 0.419 | 0.418 |
| | Sulfur (S)-Total (mg/L) | 173 | 209 | 147 | 155 | 53.4 |
| | Thallium (Tl)-Total (mg/L) | 0.000099 | <0.000010 | 0.000111 | 0.000092 | <0.000010 |
| Total Metals | Tin (Sn)-Total (mg/L) | 0.00017 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Total Metals | Titanium (Ti)-Total (mg/L) | 0.234 | <0.010 | <0.010 | 0.030 | <0.010 |
| Total Metals | Uranium (U)-Total (mg/L) | 0.00347 | 0.00223 | 0.00440 | 0.00369 | 0.000124 |
| Total Metals | Vanadium (V)-Total (mg/L) | 0.0217 | <0.0010 | <0.0010 | 0.0027 | <0.0010 |
| Total Metals | Zinc (Zn)-Total (mg/L) | 0.0919 | 0.0116 | 0.971 | 0.805 | 0.0103 |
| Dissolved Metals | Dissolved Metals Filtration Location | FIELD | FIELD | FIELD | FIELD | FIELD |
| Dissolved Metals | Aluminum (Al)-Dissolved (mg/L) | 0.0185 | 0.0114 | <0.0010 | 0.0011 | 0.0131 |
| Dissolved Metals | Antimony (Sb)-Dissolved (mg/L) | 0.00321 | 0.00220 | 0.0153 | 0.00950 | 0.00032 |
| Dissolved Metals | Arsenic (As)-Dissolved (mg/L) | 0.00525 | 0.0103 | 0.0102 | 0.0153 | 0.00305 |
| Dissolved Metals | Barium (Ba)-Dissolved (mg/L) | 0.0603 | 0.0408 | 0.0115 | 0.0285 | 0.0729 |
| Dissolved Metals | Beryllium (Be)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Dissolved Metals | Bismuth (Bi)-Dissolved (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Dissolved Metals | Boron (B)-Dissolved (mg/L) | 0.027 | 0.031 | <0.010 | <0.010 | <0.010 |
| Dissolved Metals | Cadmium (Cd)-Dissolved (mg/L) | 0.000019 | 0.000015 | 0.00569 | 0.00216 | 0.000071 |
| Dissolved Metals | Calcium (Ca)-Dissolved (mg/L) | 179 | 188 | 190 | 198 | 65.7 |
| Dissolved Metals | Chromium (Cr)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.00011 |
| Dissolved Metals | Cobalt (Co)-Dissolved (mg/L) | 0.00043 | 0.00034 | 0.00051 | 0.00106 | 0.00077 |
| Dissolved Metals | Copper (Cu)-Dissolved (mg/L) | 0.00051 | 0.00061 | <0.00020 | 0.00090 | 0.00050 |
| Dissolved Metals | Iron (Fe)-Dissolved (mg/L) | 0.428 | 0.691 | 0.069 | 0.563 | 0.482 |
| Dissolved Metals | Lead (Pb)-Dissolved (mg/L) | <0.000050 | <0.000050 | <0.000050 | 0.000068 | <0.000050 |
| Dissolved Metals | Lithium (Li)-Dissolved (mg/L) | 0.00445 | 0.00362 | 0.00806 | 0.00798 | <0.00050 |
| Dissolved Metals | Magnesium (Mg)-Dissolved (mg/L) | 76.2 | 83.4 | 60.9 | 62.7 | 14.7 |

* 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 | L1334013-6 Water 16-JUL-13 12:00 0167-130716-020 | L1334013-7 Water 16-JUL-13 12:00 0167-130716-018 | L1334013-8 Water 16-JUL-13 12:00 0167-130716-016 | L1334013-9 Water 16-JUL-13 12:00 0167-130716-005 | L1334013-10 Water 16-JUL-13 12:00 0167-130716-012 |
|-------------------------|---|--|--|--|--|---|
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| | Lithium (Li)-Total (mg/L) | 0.00189 | 0.00198 | <0.00050 | 0.00107 | 0.00093 |
| | Magnesium (Mg)-Total (mg/L) | 67.1 | 68.0 | 50.1 | 58.1 | 11.7 |
| | Manganese (Mn)-Total (mg/L) | 1.72 | 1.85 | 5.16 | 1.77 | 0.607 |
| Total Metals | Mercury (Hg)-Total (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Molybdenum (Mo)-Total (mg/L) | 0.000564 | 0.000600 | 0.000951 | 0.000500 | 0.000819 |
| | Nickel (Ni)-Total (mg/L) | 0.00152 | 0.00149 | 0.00256 | 0.00138 | 0.00073 |
| | Phosphorus (P)-Total (mg/L) | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Potassium (K)-Total (mg/L) | 3.87 | 4.22 | 6.50 | 3.59 | 0.91 |
| | Selenium (Se)-Total (mg/L) | 0.00012 | 0.00010 | 0.00018 | 0.00011 | <0.00010 |
| | Silicon (Si)-Total (mg/L) | 5.46 | 5.99 | 6.28 | 5.94 | 6.75 |
| | Silver (Ag)-Total (mg/L) | 0.000019 | 0.000016 | 0.000030 | 0.000039 | <0.000010 |
| | Sodium (Na)-Total (mg/L) | 16.3 | 17.2 | 40.3 | 15.7 | 3.65 |
| | Strontium (Sr)-Total (mg/L) | 0.634 | 0.676 | 0.787 | 0.579 | 0.314 |
| | Sulfur (S)-Total (mg/L) | 185 | 203 | 235 | 172 | 21.9 |
| | Thallium (Tl)-Total (mg/L) | <0.000010 | 0.000010 | 0.000013 | <0.000010 | <0.000010 |
| | Tin (Sn)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Titanium (Ti)-Total (mg/L) | 0.012 | 0.011 | <0.010 | <0.010 | <0.010 |
| | Uranium (U)-Total (mg/L) | 0.00274 | 0.00285 | 0.00280 | 0.00232 | 0.00154 |
| | Vanadium (V)-Total (mg/L) | 0.0021 | 0.0021 | 0.0015 | 0.0013 | <0.0010 |
| | Zinc (Zn)-Total (mg/L) | 0.0109 | 0.0114 | 0.0090 | 0.0083 | <0.0030 |
| Dissolved Metals | Dissolved Metals Filtration Location | FIELD | FIELD | FIELD | FIELD | FIELD |
| Dissolved Metals | Aluminum (Al)-Dissolved (mg/L) | 0.0183 | 0.0167 | 0.0063 | 0.0086 | 0.0068 |
| Dissolved Metals | Antimony (Sb)-Dissolved (mg/L) | 0.00157 | 0.00144 | 0.00055 | 0.00118 | 0.00018 |
| Dissolved Metals | Arsenic (As)-Dissolved (mg/L) | 0.0115 | 0.0113 | 0.0225 | 0.0131 | 0.00170 |
| Dissolved Metals | Barium (Ba)-Dissolved (mg/L) | 0.0651 | 0.0660 | 0.0639 | 0.0643 | 0.0617 |
| Dissolved Metals | Beryllium (Be)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Dissolved Metals | Bismuth (Bi)-Dissolved (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Dissolved Metals | Boron (B)-Dissolved (mg/L) | 0.035 | 0.033 | 0.077 | 0.029 | <0.010 |
| Dissolved Metals | Cadmium (Cd)-Dissolved (mg/L) | 0.000058 | 0.000058 | 0.000396 | 0.000027 | 0.000095 |
| Dissolved Metals | Calcium (Ca)-Dissolved (mg/L) | 220 | 204 | 284 | 182 | 50.2 |
| | Chromium (Cr)-Dissolved (mg/L) | 0.00013 | <0.00010 | 0.00031 | 0.00017 | <0.00010 |
| Dissolved Metals | Cobalt (Co)-Dissolved (mg/L) | 0.00212 | 0.00209 | 0.00798 | 0.00204 | 0.00022 |
| | Copper (Cu)-Dissolved (mg/L) | 0.00111 | 0.00113 | 0.00308 | 0.00076 | 0.00124 |
| Dissolved Metals | Iron (Fe)-Dissolved (mg/L) | 0.297 | 0.269 | 4.71 | 0.854 | 0.052 |
| | Lead (Pb)-Dissolved (mg/L) | <0.000050 | <0.000050 | <0.000050 | <0.000050 | <0.000050 |
| | Lithium (Li)-Dissolved (mg/L) | 0.00272 | 0.00214 | <0.00050 | 0.00083 | <0.00050 |
| | Magnesium (Mg)-Dissolved (mg/L) | 72.4 | 69.5 | 53.3 | 59.6 | 11.9 |

* 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 | L1334013-11 Water 16-JUL-13 12:00 0167-130716-006 | L1334013-12 Water 16-JUL-13 12:00 0167-130716-021 | L1334013-13 Water 16-JUL-13 12:00 0167-130716-019 | L1334013-14 Water 16-JUL-13 12:00 0167-130716-010 | L1334013-15 Water 16-JUL-13 12:00 0167-130716-004 |
|------------------|---|---|---|---|---|---|
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| Total Metals | Lithium (Li)-Total (mg/L) | <0.00050 | 0.00612 | 0.00067 | 0.00815 | 0.00052 |
| Total Metals | Magnesium (Mg)-Total (mg/L) | 8.84 | 44.3 | 19.9 | 88.6 | 4.44 |
| Total Metals | Manganese (Mn)-Total (mg/L) | 0.0411 | 0.479 | 0.248 | 0.767 | 0.384 |
| Total Metals | Mercury (Hg)-Total (mg/L) | <0.000010 | <0.000010 | <0.000010 | 0.000021 | <0.000010 |
| Total Metals | Molybdenum (Mo)-Total (mg/L) | 0.000481 | 0.00183 | 0.000089 | 0.000302 | 0.000380 |
| Total Metals | Nickel (Ni)-Total (mg/L) | <0.00050 | 0.00138 | 0.00090 | 0.00175 | 0.00241 |
| Total Metals | Phosphorus (P)-Total (mg/L) | <0.050 | <0.050 | <0.050 | 0.060 | <0.050 |
| Total Metals | Potassium (K)-Total (mg/L) | 0.70 | 11.2 | 1.17 | 4.03 | 0.88 |
| Total Metals | Selenium (Se)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.00012 |
| Total Metals | Silicon (Si)-Total (mg/L) | 5.89 | 1.77 | 7.13 | 6.57 | 7.65 |
| Total Metals | Silver (Ag)-Total (mg/L) | <0.000010 | 0.000194 | 0.000205 | 0.000585 | <0.000010 |
| Total Metals | Sodium (Na)-Total (mg/L) | 2.48 | 15.2 | 4.70 | 6.34 | 2.14 |
| Total Metals | Strontium (Sr)-Total (mg/L) | 0.281 | 0.486 | 0.579 | 0.517 | 0.0886 |
| Total Metals | Sulfur (S)-Total (mg/L) | 6.04 | 207 | 54.4 | 198 | 1.45 |
| Total Metals | Thallium (Tl)-Total (mg/L) | <0.000010 | 0.000261 | 0.000030 | 0.000083 | <0.000010 |
| Total Metals | Tin (Sn)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Total Metals | Titanium (Ti)-Total (mg/L) | <0.010 | <0.010 | <0.010 | 0.046 | <0.010 |
| Total Metals | Uranium (U)-Total (mg/L) | 0.000610 | 0.000938 | 0.000930 | 0.00327 | 0.000331 |
| Total Metals | Vanadium (V)-Total (mg/L) | <0.0010 | <0.0010 | <0.0010 | 0.0036 | 0.0015 |
| Total Metals | Zinc (Zn)-Total (mg/L) | <0.0030 | 0.0664 | 0.230 | 0.414 | 0.0037 |
| Dissolved Metals | Dissolved Metals Filtration Location | FIELD | FIELD | FIELD | FIELD | FIELD |
| Dissolved Metals | Aluminum (Al)-Dissolved (mg/L) | 0.0088 | 0.0093 | 0.0098 | 0.0033 | 0.0762 |
| Dissolved Metals | Antimony (Sb)-Dissolved (mg/L) | <0.00010 | 0.0449 | 0.0102 | 0.00971 | 0.00013 |
| Dissolved Metals | Arsenic (As)-Dissolved (mg/L) | 0.00035 | 0.0612 | 0.00628 | 0.0137 | 0.00231 |
| Dissolved Metals | Barium (Ba)-Dissolved (mg/L) | 0.0689 | 0.00938 | 0.0325 | 0.0233 | 0.0881 |
| Dissolved Metals | Beryllium (Be)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Dissolved Metals | Bismuth (Bi)-Dissolved (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Dissolved Metals | Boron (B)-Dissolved (mg/L) | <0.010 | 0.081 | <0.010 | 0.047 | <0.010 |
| Dissolved Metals | Cadmium (Cd)-Dissolved (mg/L) | 0.000016 | 0.000802 | 0.00459 | 0.000464 | 0.000032 |
| Dissolved Metals | Calcium (Ca)-Dissolved (mg/L) | 26.2 | 202 | 88.9 | 222 | 14.3 |
| Dissolved Metals | Chromium (Cr)-Dissolved (mg/L) | <0.00010 | <0.00010 | 0.00010 | <0.00010 | 0.00053 |
| Dissolved Metals | Cobalt (Co)-Dissolved (mg/L) | <0.00010 | 0.00078 | <0.00010 | 0.00025 | 0.00121 |
| Dissolved Metals | Copper (Cu)-Dissolved (mg/L) | 0.00109 | 0.0170 | 0.0196 | 0.00081 | 0.00203 |
| Dissolved Metals | Iron (Fe)-Dissolved (mg/L) | 0.026 | 0.019 | 0.010 | 0.125 | 2.44 |
| Dissolved Metals | Lead (Pb)-Dissolved (mg/L) | <0.000050 | 0.000307 | 0.000407 | 0.000108 | <0.000050 |
| Dissolved Metals | Lithium (Li)-Dissolved (mg/L) | <0.00050 | 0.00610 | 0.00085 | 0.00739 | <0.00050 |
| Dissolved Metals | Magnesium (Mg)-Dissolved (mg/L) | 8.84 | 46.2 | 20.1 | 95.3 | 4.50 |

* 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 | L1334013-16 | L1334013-17 | L1334013-18 | L1334013-19 | L1334013-20 |
|-------------------------|--------------------------------------|--------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | | | Water | Water | Water | Water | Water |
| | | 16-JUL-13 | 12:00 | 0167-130716-013 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 |
| | | | | | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| | | | | | 0167-130716-013 | 0167-130716-003 | 0167-130716-001 | 0167-130716-002 | 0167-130716-007 |
| Grouping | Analyte | | | | | | | | |
| WATER | | | | | | | | | |
| | Lithium (Li)-Total (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| | Magnesium (Mg)-Total (mg/L) | 9.24 | 11.9 | 11.0 | 4.53 | 8.84 | | | |
| | Manganese (Mn)-Total (mg/L) | 0.0312 | 0.101 | 0.0978 | 0.395 | 0.0507 | | | |
| | Mercury (Hg)-Total (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | | | |
| | Molybdenum (Mo)-Total (mg/L) | 0.000444 | 0.000432 | 0.000392 | 0.000379 | 0.000424 | | | |
| Total Metals | Nickel (Ni)-Total (mg/L) | <0.00050 | 0.00054 | 0.00061 | 0.00247 | <0.00050 | | | |
| Total Metals | Phosphorus (P)-Total (mg/L) | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | | | |
| Total Metals | Potassium (K)-Total (mg/L) | 0.67 | 0.95 | 0.92 | 0.90 | 0.70 | | | |
| Total Metals | Selenium (Se)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | 0.00011 | <0.00010 | | | |
| Total Metals | Silicon (Si)-Total (mg/L) | 5.66 | 5.68 | 5.75 | 7.80 | 5.83 | | | |
| Total Metals | Silver (Ag)-Total (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.000010 | 0.000014 | | | |
| Total Metals | Sodium (Na)-Total (mg/L) | 2.49 | 3.70 | 3.59 | 2.23 | 2.55 | | | |
| Total Metals | Strontium (Sr)-Total (mg/L) | 0.296 | 0.300 | 0.272 | 0.0886 | 0.286 | | | |
| Total Metals | Sulfur (S)-Total (mg/L) | 5.61 | 17.4 | 15.6 | 1.45 | 6.15 | | | |
| Total Metals | Thallium (Tl)-Total (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | | | |
| Total Metals | Tin (Sn)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | | | |
| Total Metals | Titanium (Ti)-Total (mg/L) | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | | | |
| Total Metals | Uranium (U)-Total (mg/L) | 0.000694 | 0.000696 | 0.000650 | 0.000335 | 0.000644 | | | |
| | Vanadium (V)-Total (mg/L) | <0.0010 | <0.0010 | <0.0010 | 0.0016 | <0.0010 | | | |
| | Zinc (Zn)-Total (mg/L) | <0.0030 | 0.0040 | <0.0030 | 0.0037 | <0.0030 | | | |
| Dissolved Metals | Dissolved Metals Filtration Location | FIELD | FIELD | FIELD | FIELD | FIELD | | | |
| Dissolved Metals | Aluminum (Al)-Dissolved (mg/L) | 0.0108 | 0.0083 | 0.0133 | 0.0813 | 0.0089 | | | |
| Dissolved Metals | Antimony (Sb)-Dissolved (mg/L) | <0.00010 | 0.00032 | 0.00028 | 0.00012 | <0.00010 | | | |
| Dissolved Metals | Arsenic (As)-Dissolved (mg/L) | 0.00033 | 0.00140 | 0.00157 | 0.00238 | 0.00034 | | | |
| Dissolved Metals | Barium (Ba)-Dissolved (mg/L) | 0.0691 | 0.0723 | 0.0723 | 0.0819 | 0.0693 | | | |
| Dissolved Metals | Beryllium (Be)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | | | |
| Dissolved Metals | Bismuth (Bi)-Dissolved (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | | | |
| Dissolved Metals | Boron (B)-Dissolved (mg/L) | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | | | |
| Dissolved Metals | Cadmium (Cd)-Dissolved (mg/L) | 0.000014 | 0.000019 | 0.000018 | 0.000033 | 0.000018 | | | |
| Dissolved Metals | Calcium (Ca)-Dissolved (mg/L) | 29.8 | 37.0 | 34.5 | 14.3 | 26.2 | | | |
| Dissolved Metals | Chromium (Cr)-Dissolved (mg/L) | <0.00010 | 0.00019 | 0.00013 | 0.00047 | <0.00010 | | | |
| Dissolved Metals | Cobalt (Co)-Dissolved (mg/L) | <0.00010 | 0.00013 | 0.00019 | 0.00122 | <0.00010 | | | |
| Dissolved Metals | Copper (Cu)-Dissolved (mg/L) | 0.00105 | 0.00118 | 0.00125 | 0.00199 | 0.00108 | | | |
| | Iron (Fe)-Dissolved (mg/L) | 0.026 | 0.030 | 0.213 | 2.57 | 0.024 | | | |
| | Lead (Pb)-Dissolved (mg/L) | <0.000050 | <0.000050 | <0.000050 | 0.000057 | <0.000050 | | | |
| | Lithium (Li)-Dissolved (mg/L) | <0.00050 | 0.00059 | <0.00050 | <0.00050 | <0.00050 | | | |
| | Magnesium (Mg)-Dissolved (mg/L) | 9.48 | 11.8 | 10.9 | 4.52 | 8.65 | | | |

* 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 | L1334013-26 | L1334013-27 | L1334013-28 | L1334013-29 |
|------------------|--------------------------------------|--------------|--------------|-----------------|-----------------|-----------------|--------------|-------------|
| | | | | | Water | Water | Water | Water |
| | | 17-JUL-13 | 12:00 | 0167-130717-022 | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 |
| | | | | | 12:00 | 12:00 | 15:00 | 12:00 |
| | | | | | 0167-130717-022 | 0167-130717-026 | TRAVEL BLANK | FIELD BLANK |
| Grouping | Analyte | | | | | | | |
| WATER | | | | | | | | |
| Total Metals | Lithium (Li)-Total (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Total Metals | Magnesium (Mg)-Total (mg/L) | 33.9 | 13.9 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Total Metals | Manganese (Mn)-Total (mg/L) | 3.44 | 0.00654 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | <0.000050 |
| Total Metals | Mercury (Hg)-Total (mg/L) | 0.000035 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| Total Metals | Molybdenum (Mo)-Total (mg/L) | 0.000182 | 0.000084 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | <0.000050 |
| Total Metals | Nickel (Ni)-Total (mg/L) | 0.00207 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Total Metals | Phosphorus (P)-Total (mg/L) | 0.079 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Potassium (K)-Total (mg/L) | 4.61 | 2.08 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| | Selenium (Se)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Silicon (Si)-Total (mg/L) | 7.61 | 4.80 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Silver (Ag)-Total (mg/L) | 0.000088 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Sodium (Na)-Total (mg/L) | 5.26 | 2.33 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Strontium (Sr)-Total (mg/L) | 0.327 | 0.147 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 |
| | Sulfur (S)-Total (mg/L) | 104 | 8.71 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | Thallium (Tl)-Total (mg/L) | 0.000066 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Tin (Sn)-Total (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Titanium (Ti)-Total (mg/L) | 0.076 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| | Uranium (U)-Total (mg/L) | 0.000541 | 0.000358 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Vanadium (V)-Total (mg/L) | 0.0070 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Total Metals | Zinc (Zn)-Total (mg/L) | 0.0152 | <0.0030 | <0.0030 | <0.0030 | <0.0030 | <0.0030 | <0.0030 |
| Dissolved Metals | Dissolved Metals Filtration Location | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD | FIELD |
| | Aluminum (Al)-Dissolved (mg/L) | 0.0048 | 0.0022 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| | Antimony (Sb)-Dissolved (mg/L) | 0.00054 | 0.00035 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Arsenic (As)-Dissolved (mg/L) | 0.0166 | 0.00048 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Barium (Ba)-Dissolved (mg/L) | 0.0641 | 0.0828 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | <0.000050 |
| | Beryllium (Be)-Dissolved (mg/L) | <0.00010 | <0.00010 | <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 | <0.00050 | <0.00050 |
| | Boron (B)-Dissolved (mg/L) | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Dissolved Metals | Cadmium (Cd)-Dissolved (mg/L) | 0.000013 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| Dissolved Metals | Calcium (Ca)-Dissolved (mg/L) | 140 | 53.6 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Dissolved Metals | Chromium (Cr)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Dissolved Metals | Cobalt (Co)-Dissolved (mg/L) | 0.00145 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Dissolved Metals | Copper (Cu)-Dissolved (mg/L) | 0.00043 | 0.00058 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 |
| Dissolved Metals | Iron (Fe)-Dissolved (mg/L) | 4.17 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Dissolved Metals | Lead (Pb)-Dissolved (mg/L) | 0.000107 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | <0.000050 | <0.000050 |
| Dissolved Metals | Lithium (Li)-Dissolved (mg/L) | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Dissolved Metals | Magnesium (Mg)-Dissolved (mg/L) | 36.1 | 14.1 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | Sample ID | L1334013-1 | L1334013-2 | L1334013-3 | L1334013-4 | L1334013-5 |
|-------------------------|----------------------------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | Description | Water | Water | Water | Water | Water |
| | | Sampled Date | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 |
| | | Sampled Time | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| | | Client ID | 0167-130716-015 | 0167-130716-017 | 0167-130716-011 | 0167-130716-009 | 0167-130716-014 |
| Grouping | Analyte | | | | | | |
| WATER | | | | | | | |
| Dissolved Metals | Manganese (Mn)-Dissolved (mg/L) | | 0.577 | 0.317 | 1.10 | 1.23 | 0.400 |
| | Mercury (Hg)-Dissolved (mg/L) | | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Molybdenum (Mo)-Dissolved (mg/L) | | 0.000356 | 0.000266 | 0.000347 | 0.000284 | 0.000081 |
| | Nickel (Ni)-Dissolved (mg/L) | | 0.00062 | 0.00082 | 0.00210 | 0.00173 | 0.00066 |
| | Phosphorus (P)-Dissolved (mg/L) | | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Dissolved Metals | Potassium (K)-Dissolved (mg/L) | | 3.72 | 3.77 | 3.75 | 3.97 | 0.27 |
| | Selenium (Se)-Dissolved (mg/L) | | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Silicon (Si)-Dissolved (mg/L) | | 5.73 | 5.39 | 6.38 | 6.25 | 6.02 |
| | Silver (Ag)-Dissolved (mg/L) | | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Sodium (Na)-Dissolved (mg/L) | | 7.08 | 7.00 | 4.81 | 4.66 | 4.40 |
| | Strontium (Sr)-Dissolved (mg/L) | | 0.495 | 0.454 | 0.408 | 0.421 | 0.400 |
| | Sulfur (S)-Dissolved (mg/L) | | 172 | 197 | 148 | 156 | 52.5 |
| | Thallium (Tl)-Dissolved (mg/L) | | <0.000010 | <0.000010 | 0.000100 | 0.000054 | <0.000010 |
| | Tin (Sn)-Dissolved (mg/L) | | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Titanium (Ti)-Dissolved (mg/L) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| | Uranium (U)-Dissolved (mg/L) | | 0.00265 | 0.00200 | 0.00419 | 0.00349 | 0.000096 |
| | Vanadium (V)-Dissolved (mg/L) | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| | Zinc (Zn)-Dissolved (mg/L) | | 0.0119 | 0.0072 | 1.05 | 0.733 | 0.0068 |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | Sample ID | L1334013-6 | L1334013-7 | L1334013-8 | L1334013-9 | L1334013-10 |
|-------------------------|----------------------------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | Description | Water | Water | Water | Water | Water |
| | | Sampled Date | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 |
| | | Sampled Time | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| | | Client ID | 0167-130716-020 | 0167-130716-018 | 0167-130716-016 | 0167-130716-005 | 0167-130716-012 |
| Grouping | Analyte | | | | | | |
| WATER | | | | | | | |
| Dissolved Metals | Manganese (Mn)-Dissolved (mg/L) | | 1.75 | 1.67 | 5.15 | 1.76 | 0.588 |
| | Mercury (Hg)-Dissolved (mg/L) | | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Molybdenum (Mo)-Dissolved (mg/L) | | 0.000587 | 0.000600 | 0.000908 | 0.000480 | 0.000752 |
| | Nickel (Ni)-Dissolved (mg/L) | | 0.00103 | 0.00103 | 0.00243 | 0.00118 | 0.00061 |
| Dissolved Metals | Phosphorus (P)-Dissolved (mg/L) | | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Potassium (K)-Dissolved (mg/L) | | 4.20 | 4.24 | 6.93 | 3.63 | 0.90 |
| | Selenium (Se)-Dissolved (mg/L) | | <0.00010 | 0.00010 | 0.00020 | <0.00010 | <0.00010 |
| | Silicon (Si)-Dissolved (mg/L) | | 5.18 | 5.24 | 6.34 | 5.52 | 6.84 |
| | Silver (Ag)-Dissolved (mg/L) | | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Sodium (Na)-Dissolved (mg/L) | | 16.1 | 16.4 | 40.5 | 16.0 | 3.48 |
| | Strontium (Sr)-Dissolved (mg/L) | | 0.678 | 0.688 | 0.773 | 0.575 | 0.296 |
| | Sulfur (S)-Dissolved (mg/L) | | 193 | 198 | 239 | 172 | 21.7 |
| | Thallium (Tl)-Dissolved (mg/L) | | <0.000010 | <0.000010 | 0.000019 | <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) | | 0.00282 | 0.00278 | 0.00276 | 0.00230 | 0.00147 |
| | Vanadium (V)-Dissolved (mg/L) | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| | Zinc (Zn)-Dissolved (mg/L) | | 0.0015 | 0.0014 | 0.0059 | 0.0016 | <0.0010 |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | Sample ID | L1334013-11 | L1334013-12 | L1334013-13 | L1334013-14 | L1334013-15 |
|-------------------------|----------------------------------|--------------|-----------------|-----------------|------------------------|-----------------|-----------------|
| | | Description | Water | Water | Water | Water | Water |
| | | Sampled Date | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 | 16-JUL-13 |
| | | Sampled Time | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| | | Client ID | 0167-130716-006 | 0167-130716-021 | 0167-130716-019 | 0167-130716-010 | 0167-130716-004 |
| Grouping | Analyte | | | | | | |
| WATER | | | | | | | |
| Dissolved Metals | Manganese (Mn)-Dissolved (mg/L) | | 0.0379 | 0.431 | 0.279 | 0.659 | 0.381 |
| | Mercury (Hg)-Dissolved (mg/L) | | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Molybdenum (Mo)-Dissolved (mg/L) | | 0.000403 | 0.00186 | 0.000090 | 0.000253 | 0.000374 |
| | Nickel (Ni)-Dissolved (mg/L) | | <0.00050 | 0.00127 | 0.00108 | 0.00077 | 0.00250 |
| | Phosphorus (P)-Dissolved (mg/L) | | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Potassium (K)-Dissolved (mg/L) | | 0.69 | 11.5 | 1.13 | 4.41 | 0.87 |
| | Selenium (Se)-Dissolved (mg/L) | | <0.00010 | <0.00010 | <0.00010 | <0.00010 | 0.00010 |
| | Silicon (Si)-Dissolved (mg/L) | | 5.81 | 1.71 | 6.75 | 5.51 | 7.75 |
| | Silver (Ag)-Dissolved (mg/L) | | <0.000010 | 0.000038 | <0.000010 | <0.000010 | <0.000010 |
| | Sodium (Na)-Dissolved (mg/L) | | 2.48 | 15.4 | 5.46 | 6.51 | 2.34 |
| | Strontium (Sr)-Dissolved (mg/L) | | 0.291 | 0.496 | 0.602 | 0.521 | 0.0921 |
| | Sulfur (S)-Dissolved (mg/L) | | 5.96 | 210 | 52.6 | 206 | 1.45 |
| | Thallium (Tl)-Dissolved (mg/L) | | <0.000010 | 0.000249 | 0.000016 | 0.000037 | <0.000010 |
| | Tin (Sn)-Dissolved (mg/L) | | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Dissolved Metals | Titanium (Ti)-Dissolved (mg/L) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| | Uranium (U)-Dissolved (mg/L) | | 0.000573 | 0.000911 | 0.00126 ^{DTC} | 0.00334 | 0.000326 |
| | Vanadium (V)-Dissolved (mg/L) | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 0.0014 |
| | Zinc (Zn)-Dissolved (mg/L) | | 0.0011 | 0.0333 | 0.320 ^{DTC} | 0.234 | 0.0036 |

* 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 | L1334013-16 Water 16-JUL-13 12:00 0167-130716-013 | L1334013-17 Water 16-JUL-13 12:00 0167-130716-003 | L1334013-18 Water 16-JUL-13 12:00 0167-130716-001 | L1334013-19 Water 16-JUL-13 12:00 0167-130716-002 | L1334013-20 Water 16-JUL-13 12:00 0167-130716-007 | |
|---|---|---|---|---|---|-----------|
| Grouping | Analyte | | | | | |
| WATER | | | | | | |
| | Manganese (Mn)-Dissolved (mg/L) | 0.0263 | 0.0936 | 0.0922 | 0.382 | 0.0477 |
| | Mercury (Hg)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Molybdenum (Mo)-Dissolved (mg/L) | 0.000426 | 0.000443 | 0.000394 | 0.000372 | 0.000415 |
| | Nickel (Ni)-Dissolved (mg/L) | <0.00050 | <0.00050 | 0.00055 | 0.00242 | <0.00050 |
| | Phosphorus (P)-Dissolved (mg/L) | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Potassium (K)-Dissolved (mg/L) | 0.66 | 0.89 | 0.90 | 0.89 | 0.66 |
| | Selenium (Se)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Silicon (Si)-Dissolved (mg/L) | 5.69 | 5.57 | 5.64 | 7.79 | 5.66 |
| | Silver (Ag)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Sodium (Na)-Dissolved (mg/L) | 2.45 | 3.68 | 3.57 | 2.23 | 2.51 |
| | Strontium (Sr)-Dissolved (mg/L) | 0.295 | 0.335 | 0.278 | 0.0894 | 0.285 |
| | Sulfur (S)-Dissolved (mg/L) | 5.61 | 17.3 | 15.5 | 1.43 | 6.10 |
| | Thallium (Tl)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| | Tin (Sn)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| | Titanium (Ti)-Dissolved (mg/L) | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| | Uranium (U)-Dissolved (mg/L) | 0.000655 | 0.000737 | 0.000622 | 0.000333 | 0.000638 |
| | Vanadium (V)-Dissolved (mg/L) | <0.0010 | <0.0010 | <0.0010 | 0.0013 | <0.0010 |
| | Zinc (Zn)-Dissolved (mg/L) | 0.0014 | 0.0016 | <0.0010 | 0.0036 | <0.0010 |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| Sample ID | L1334013-26 | L1334013-27 | L1334013-28 | L1334013-29 | |
|-------------------------|----------------------------------|-----------------|--------------|-------------|--|
| Description | Water | Water | Water | Water | |
| Sampled Date | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | |
| Sampled Time | 12:00 | 12:00 | 15:00 | 12:00 | |
| Client ID | 0167-130717-022 | 0167-130717-026 | TRAVEL BLANK | FIELD BLANK | |
| Grouping | Analyte | | | | |
| WATER | | | | | |
| | Manganese (Mn)-Dissolved (mg/L) | 3.12 | 0.00191 | <0.000050 | |
| | Mercury (Hg)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000010 | |
| | Molybdenum (Mo)-Dissolved (mg/L) | 0.000133 | 0.000074 | <0.000050 | |
| | Nickel (Ni)-Dissolved (mg/L) | 0.00064 | <0.00050 | <0.00050 | |
| Dissolved Metals | Phosphorus (P)-Dissolved (mg/L) | <0.050 | <0.050 | <0.050 | |
| | Potassium (K)-Dissolved (mg/L) | 4.82 | 2.13 | <0.10 | |
| | Selenium (Se)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | |
| | Silicon (Si)-Dissolved (mg/L) | 5.21 | 4.75 | <0.050 | |
| | Silver (Ag)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000010 | |
| | Sodium (Na)-Dissolved (mg/L) | 5.54 | 2.33 | <0.050 | |
| | Strontium (Sr)-Dissolved (mg/L) | 0.338 | 0.154 | <0.00020 | |
| | Sulfur (S)-Dissolved (mg/L) | 110 | 8.71 | <0.50 | |
| | Thallium (Tl)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000010 | |
| | Tin (Sn)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00010 | |
| | Titanium (Ti)-Dissolved (mg/L) | <0.010 | <0.010 | <0.010 | |
| | Uranium (U)-Dissolved (mg/L) | 0.000441 | 0.000390 | <0.000010 | |
| | Vanadium (V)-Dissolved (mg/L) | <0.0010 | <0.0010 | <0.0010 | |
| | Zinc (Zn)-Dissolved (mg/L) | 0.0012 | <0.0010 | <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 | Aluminum (Al)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Antimony (Sb)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Arsenic (As)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Beryllium (Be)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Bismuth (Bi)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Chromium (Cr)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Cobalt (Co)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Lead (Pb)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Nickel (Ni)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Selenium (Se)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Silver (Ag)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Thallium (Tl)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Tin (Sn)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Titanium (Ti)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Duplicate | Vanadium (V)-Dissolved | DLA | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Antimony (Sb)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Arsenic (As)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Molybdenum (Mo)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Sulfate (SO4) | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -28, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Sulfate (SO4) | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -28, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Sulfate (SO4) | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -28, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Ammonia, Total (as N) | MS-B | L1334013-1, -11, -12, -13, -14, -15, -17, -18, -19, -2, -20, -26, -29, -3, -4, -5 |
| Matrix Spike | Barium (Ba)-Total | MS-B | L1334013-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -26, -27, -7, -8, -9 |
| Matrix Spike | Strontium (Sr)-Total | MS-B | L1334013-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -26, -27, -7, -8, -9 |
| Matrix Spike | Barium (Ba)-Total | MS-B | L1334013-1, -2, -3, -4, -5, -6 |
| Matrix Spike | Sodium (Na)-Total | MS-B | L1334013-1, -2, -3, -4, -5, -6 |
| Matrix Spike | Strontium (Sr)-Total | MS-B | L1334013-1, -2, -3, -4, -5, -6 |
| Matrix Spike | Barium (Ba)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Boron (B)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Sodium (Na)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Aluminum (Al)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |

Reference Information

| | Parameter | Qualifier | Applies to Sample Number(s) |
|--------------|--------------------------|-----------|--|
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Barium (Ba)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Sodium (Na)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334013-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -26, -27, -29, -3, -4, -5, -6, -7, -8, -9 |

Qualifiers for Individual Parameters Listed:

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

Test Method References:

| ALS Test Code | Matrix | Test Description | Method Reference** |
|-------------------------|--------|---|------------------------|
| ALK-PCT-VA | Water | Alkalinity by Auto. Titration | APHA 2320 "Alkalinity" |
| | | This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values. | |
| ALK-PCT-VA | Water | Alkalinity by Auto. Titration | APHA 2320 Alkalinity |
| | | This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values. | |
| ANIONS-CL-IC-WR | Water | Chloride by Ion Chromatography | EPA 300.1 |
| | | This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. | |
| ANIONS-F-IC-WR | Water | Fluoride by Ion Chromatography | EPA 300.1 |
| | | This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. | |
| ANIONS-NO2-IC-WR | Water | Nitrite Nitrogen by Ion Chromatography | EPA 300.1 |
| | | This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance. | |
| ANIONS-NO3-IC-WR | Water | Nitrate Nitrogen by Ion Chromatography | EPA 300.1 |
| | | This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance. | |
| ANIONS-SO4-IC-WR | Water | Sulphate by Ion Chromatography | EPA 300.1 |
| | | This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. | |
| CN-CNO-WT | Water | Cyanate | APHA 4500-CN-L |
| CN-SCN-VA | Water | Thiocyanate by Colour | APHA 4500-CN CYANIDE |
| | | This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method. | |
| CN-T-CFA-VA | Water | Total Cyanide in water by CFA | ISO 14403:2002 |
| | | This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero. | |
| CN-WAD-CFA-VA | Water | Weak Acid Diss. Cyanide in water by CFA | APHA 4500-CN CYANIDE |
| | | This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis. | |
| EC-MAN-WR | Water | Conductivity by Meter | APHA 2510 (B) |

Reference Information

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-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

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

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

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

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

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

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

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

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

Reference Information

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

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

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

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

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

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

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

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

TURBIDITY-WR Water Turbidity by Nephelometer APHA 2130

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

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

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

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

Chain of Custody Numbers:

| | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

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.

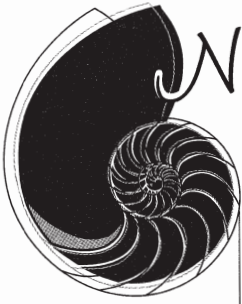
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.



Nautilus Environmental

8664 Commerce Court, Burnaby, BC V5A 4N7

WO#: 13389

Mr. Can Dang
ALS Environmental
Suite 100-8081 Lougheed Hwy.
Burnaby, BC
V5A 1W9

July 30, 2013

Dear Mr. Dang:

Re: Toxicity testing on the sample identified as L1334013-8 [Collected on July 16, 2013]

Nautilus Environmental is pleased to provide you the results of the 96-h LT50 rainbow trout toxicity test on the above sample, received on July 19, 2013. Testing was conducted according to Environment Canada 1/RM/13, (Second Edition, 2000, including May 2007 amendments). The result of this test is provided in the table below and is based on the appended data. All acceptability criteria outlined in the Environment Canada protocol were met.

Table A. Result for the 96-h rainbow trout LT50 test.

| Sample ID | Collection Date and Time | 96-h LT50 (hours) ¹ |
|------------|--------------------------|--------------------------------|
| L1334013-8 | July 16 2013 @ N/A | >96 |

¹ Results relate only to the sample tested.

Please feel free to contact the undersigned at 604-420-8773 should you have any questions or require any additional information.

Yours truly,

Nautilus Environmental

Jacob Frank, B.Sc.
Laboratory Biologist

Verified by

Julianna Kalocai, M.Sc., R.P.Bio.
QA Officer

Rainbow Trout Summary Sheet

Client: ALS

Start Date/Time: July 19/13 @ 1200

Work Order No.: 13389

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: L1334013-8
Sample Date: July 16/13 @ N/A
Date Received: July 19/13 @ 1045
Sample Volume: 1 x 20L
Other: N/A

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 061113
Source: Miracle Springs
No. Fish/Volume (L): 10/15L
Loading Density: 0.44
Mean Length ± SD (mm): 41 ± 1
Mean Weight ± SD (g): 0.66 ± 0.05

Range: 40 - 42
Range: 0.58 - 0.73

NaNO₂ Reference Toxicant Results:

Reference Toxicant ID: RTNE41
Stock Solution ID: 13N601
Date Initiated: June 27/13
96-h LC₅₀ (95% CL): 8.2 (5.8 - 12.0) mg/L NaNO₂

Reference Toxicant Mean and Historical Range: 4.7 (2.4 - 9.4) mg/L NaNO₂
Reference Toxicant CV (%): 42

Test Results: The 96-h LT50 is > 96-hours.

Reviewed by: JOB

Date reviewed: July 26/13

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: ALS
 Sample I.D.: L1334013-8
 W.O. #: SBF+3394 13389
 RBT Batch #: 061113
 Date Collected/Time: July 16/13 NA
 Date Setup/Time: July 19/13 1200h
 Sample Setup By: JO

Number Fish/Volume: 10/15L
 7-d % Mortality: 0/0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Yes

D.O. meter: DO-1/2
 pH meter: pH-1/2
 Cond. Meter: C-1/2

| Undiluted Sample WQ | | |
|---------------------|------------|------------|
| Parameters | Initial WQ | Adjustment |
| Temp °C | 14.5 | 14.5 |
| pH | 7.0 | 7.1 |
| D.O. (mg/L) | 8.7 | 9.7 |
| Cond. (µS/cm) | 1622 | 1621 |

| Concentration | # Survivors | | | | | | Temperature (°C) | | | | | | Dissolved Oxygen (mg/L) | | | | | | pH | | | | | | Conductivity (µS/cm) | | | | |
|---------------|-------------|----|----|----|----|-----|------------------|------|------|------|------|------|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|----------------------|-------|-------|-----|-----|
| | 1 | 2 | 4 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | 0 | 96 |
| (% v/v) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Control | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 16.21 | 16.21 | 16.21 | 16.21 | 16.21 | 0 | 96 |
| 10E | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 16.21 | 16.21 | 16.21 | 16.21 | 16.21 | 0 | 96 |
| Initials | AV | AO | ML | AO | ML | SBF | ML | AV | AO | ML | SBF | ML | AV | AO | ML | SBF | ML | AV | AO | ML | SBF | ML | AV | AO | ML | SBF | ML | SBF | SBF |

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Orange to purple

Fish Description at 96? All Fish appear OK.

Other Observations:

Reviewed by: JOH

Date Reviewed: July 26/13



L1334013

VANCOUVER

Subcontract Request Form

Subcontract To:

NAUTILUS ENVIRONMENTAL

8664 COMMERCE COURT
BURNABY, BC V5A 4N7

NOTES: Please reference on final report and invoice: PO# L1334013
ALS requires QC data to be provided with your final results.

LTSO Rainbow Trout

Please see enclosed 1 sample(s) in 1 Container(s)

| SAMPLE NUMBER | CLIENT ID | DATE SAMPLED | Priority Flag |
|---------------|---|--------------|---------------|
| L1334013-8 | 0167-130716-016 | 7/16/2013 | |
| | Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14) | 9/19/2013 | |

Subcontract Info Contact: Dorota Jamro (604) 253-4188
 Analysis and reporting info contact: Can Dang
 8081 LOUGHEED HWY
 SUITE 100
 BURNABY, BC V5A 1W9
 Phone: (604) 253-4188 Email: can.dang@alsglobal.com

Please email confirmation of receipt to: can.dang@alsglobal.com

Shipped By: [Signature] Date Shipped: July 19/2013
 Received By: YUONNE LAM Date Received: July 19/2013 @ 1045h
 Verified By: _____ Date Verified: _____
 Temperature: 6.3°C
 Sample Integrity Issues: low - 2 OK

WO # 83389



| | | | | | | | | | | | | | | | | | | | | |
|--|--|---|--|------------------------------------|--|--|--|-------------|-------|--|---|---|---|---|---|---|---|---|---|---|
| Report To | | Company: EDI | | Report Format / Distribution | | <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax | | | | | | | | | | | | | | |
| Contact: Meghan Marjanovic | | Address: 2195 - 2nd Ave | | Email 1: mmarjanovic@edynamics.com | | <input type="checkbox"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT | | | | | | | | | | | | | | |
| Phone: 867-393-4882 | | Fax: Y1A 3T8 | | Email 2: | | <input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT | | | | | | | | | | | | | | |
| Invoice To | | Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | | Client / Project Information | | Please indicate below Filtered, Preserved or both (F, P, F/P) | | | | | | | | | | | | | | |
| Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | | Job #: Mount Nansen 13-Y-0167 | | PO / AFE: | | <input type="checkbox"/> F <input type="checkbox"/> P <input type="checkbox"/> F/P | | | | | | | | | | | | | | |
| Company: Environmental Dynamics Inc | | Contact: Shannon Jenner sjenner@edynamics.com | | LSD: | | <input type="checkbox"/> F/P <input type="checkbox"/> P | | | | | | | | | | | | | | |
| Address: 2195 - 2nd Ave, Y1A 3T8 | | Phone: 867-393-4882 | | Quote #: Q38399 | | <input type="checkbox"/> F/P <input type="checkbox"/> P | | | | | | | | | | | | | | |
| Fax: (to use only) | | ALS Contact: | | Sampler: | | <input type="checkbox"/> F/P <input type="checkbox"/> P | | | | | | | | | | | | | | |
| Sample | | Sample Identification (This description will appear on the report) | | Date (dd-mm-yy) | | Time (hh:mm) | | Sample Type | | ALK-PCT-VA ANIONS-ALL-IC-WR CN-CNO-WT CN-SCN-VA CN-T-CFA-VA CN-WAD-CFA-VA EC-MAN-WR,PH-MAN-WR MET-D-BCMDG-A MET-T-BCMDG-VA NH3-F-VA TDS-VA,TSS-VA Turbidity Number of Containers | | | | | | | | | | |
| | | 0167-130716 - 015 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 017 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 011 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 009 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 014 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 020 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 018 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 016 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |
| | | 0167-130716 - 005 | | | | | | | Water | X | X | X | X | X | X | X | X | X | X | 6 |



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

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

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

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

| | | | | | | | | | | |
|--------------------------|---------------------------|-----------------------|--------------------------|----------------|------------|---------------------|--------------|-------|-------|---|
| Released by: Joel Hubber | Date (dd-mm-yy): 13-07-17 | Time (hh-mm): 9:45 AM | Received by: [Signature] | Date: 17-08-13 | Time: 3:00 | Temperature: 4.7 °C | Verified by: | Date: | Time: | Observations: Yes / No ? If Yes add SIF |
|--------------------------|---------------------------|-----------------------|--------------------------|----------------|------------|---------------------|--------------|-------|-------|---|

MEGHA MARJANOVIC

GENF 18.01 Front



| | | | | | |
|--|---|--|--------------|--|---|
| Report To | | Report Format / Distribution | | Service Requested (Rush for routine analysis subject to availability) | |
| Company: EDI | <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other | <input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax | | <input checked="" type="checkbox"/> Regular (Standard Turnaround Times - Business Days) <input type="checkbox"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="checkbox"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT | |
| Contact: Meghan Marjanovic | Address: 2195 - 2nd Ave | Email 1: mmarjanovic@edynamics.com | Email 2: | Analysis Request Please indicate below Filtered, Preserved or both (F, P, F/P) | |
| Address: Y1A 3T8 | Phone: 867-393-4882 | Fax: | Email 3: | | |
| Invoice To | Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Client / Project Information | Job #: | | |
| Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Company: Environmental Dynamics Inc | PO / AFE: | Quote #: | Q38399 | |
| Contact: Shannon Jenner sjenner@edynamics.com | Address: 2195 - 2nd Ave, Y1A 3T8 | LSD: | ALS Contact: | Sampler: | |
| Phone: 867-393-4882 | Fax: | | | | |
| LABWORK ORDER (#60083011) | | | | | |
| Sample Identification (This description will appear on the report) | | Date (dd-mm-yy) | Time (hh:mm) | Sample Type | |
| 0167-130716 - 012 | | | | Water | X |
| 0167-130716 - 006 | | | | Water | X |
| 0167-130716 - 021 | | | | Water | X |
| 0167-130716 - 019 | | | | Water | X |
| 0167-130716 - 010 | | | | Water | X |
| 0167-130716 - 004 | | | | Water | X |
| 0167-130716 - 013 | | | | Water | X |
| 0167-130716 - 003 | | | | Water | X |
| 0167-130716 - 001 | | | | Water | X |
| | | L1334013-COFC | | | |

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

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| | | | | | |
|-----------------------------------|-------------------------|-------------------------------------|-----------------|--|--|
| SHIPMENT RELEASE (4/15/09) | | SHIPMENT RECEPTION (4/15/09) | | SHIPMENT VERIFICATION (4/15/09) | |
| Released by: <i>Sed MacIver</i> | Date (dd-mm-yy): 130712 | Received by: | Date: | Verified by: | Date: |
| <i>Meghan-Marjanovic</i> | Time (hh:mm): 09:00 | | Time: | | Time: |
| | | | Temperature: °C | | |
| | | | | | Observations: Yes / No ? If Yes add SIF |

GENF 18.01 Front

| | | | | | |
|--|---|--|--|--|---|
| Report To | | Report Format / Distribution | | Service Requested (Rush for routine analysis subject to availability) | |
| Company: EDI | <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other | <input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax | <input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days) <input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT | | |
| Contact: Meghan Marjanovic | Email 1: mmarjanovic@edynamics.com | | Analysis Request Please indicate below Filled, Preserved or both (F, P, F/P) | | |
| Address: 2195 - 2nd Ave | Y1A 3T8 | Email 2: | | | |
| Phone: 867-393-4882 | Fax: | Email 3: | | | |
| Invoice To Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Client / Project Information | | | | |
| Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Job #: | Mount Nansen 13-Y-0167 | | | |
| Company: Environmental Dynamics Inc | PO / AFE: | | | | |
| Contact: Shannon Jenner sjenner@edynamics.com | LSD: | | | | |
| Address: 2195 - 2nd Ave, Y1A 3T8 | Quote #: | Q38399 | | | |
| Phone: 867-393-4882 | Fax: | | | | |
| LABWORK ORDER (Lab Use Only) | | ALS Contact: | Sampler: | | |
| Sample Identification (This description will appear on the report) | | Date (dd-mm-yy) | Time (hh:mm) | Sample Type | |
| 0167-1307 B - 022 | | | | Water | X |
| 0167-1307 B - 026 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| 0167-13 | | | | Water | X |
| TRAVEL Blank | | | | | X |
| FIELD Blank | | | | | X |



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

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

| | | | | | | | | | | |
|----------------------------------|----------------------------------|------------------------------|--------------|-------|-------|------------------------|--------------|-------|-------|---|
| Released by: <i>Saul Marfabe</i> | Date (dd-mm-yy): <i>13 07 17</i> | Time (hh-mm): <i>9:45-09</i> | Received by: | Date: | Time: | Temperature: <i>0C</i> | Verified by: | Date: | Time: | Observers: Yes / No ? If Yes add SIF |
| Meghan Marjanovic | 9 May 13 09-09 | | | | | | | | | |



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

Date Received: 17-JUL-13
Report Date: 31-JUL-13 10:33 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1334035
Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 13-Y-0167
C of C Numbers: 1
Legal Site Desc:

Comments:

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 | L1334035-1 Water 17-JUL-13 12:00 0167-130717-025 | L1334035-2 Water 17-JUL-13 12:00 0167-130717-024 | L1334035-3 Water 17-JUL-13 12:00 0167-130717-023 | L1334035-4 Water 17-JUL-13 12:00 0167-130717-030 |
|-----------------------------|---|--|--|--|--|
| Grouping | Analyte | | | | |
| WATER | | | | | |
| Physical Tests | Colour, True (CU) | | | | <5.0 |
| | Conductivity (uS/cm) | 1500 | 1460 | 2090 | 395 |
| | Hardness (as CaCO3) (mg/L) | 950 | 950 | 1450 | 196 |
| | pH (pH) | 8.08 | 8.07 | 7.40 | 7.75 |
| | Total Suspended Solids (mg/L) | <3.0 | <3.0 | 4.0 | |
| | Total Dissolved Solids (mg/L) | 1230 | 1230 | 1990 | 212 |
| | Turbidity (NTU) | 0.36 | 0.28 | 1.19 | <0.10 |
| Anions and Nutrients | Alkalinity, Bicarbonate (as CaCO3) (mg/L) | 128 | 128 | 191 | |
| | Alkalinity, Carbonate (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | |
| | Alkalinity, Hydroxide (as CaCO3) (mg/L) | <1.0 | <1.0 | <1.0 | |
| | Alkalinity, Total (mg/L) | | | | 174 |
| | Alkalinity, Total (as CaCO3) (mg/L) | 128 | 128 | 191 | |
| | Ammonia, Total (as N) (mg/L) | <0.0050 | <0.0050 | <0.0050 | |
| | Chloride (Cl) (mg/L) | <5.0 ^{DLA} | <5.0 ^{DLA} | <10 ^{DLA} | <0.50 |
| | Fluoride (F) (mg/L) | 0.27 | 0.27 | <0.40 ^{DLA} | 0.096 |
| | Nitrate (as N) (mg/L) | <0.050 ^{DLA} | <0.050 ^{DLA} | <0.10 ^{DLA} | 0.143 |
| | Nitrite (as N) (mg/L) | <0.010 ^{DLA} | <0.010 ^{DLA} | <0.020 ^{DLA} | <0.0010 |
| | Sulfate (SO4) (mg/L) | 806 | 804 | 1350 | 36.1 |
| | Anion Sum (meq/L) | 19.4 | 19.3 | 31.9 | 4.24 |
| | Cation Sum (meq/L) | 19.5 | 19.5 | 29.7 | 4.15 |
| | Cation - Anion Balance (%) | 0.3 | 0.4 | -3.6 | -1.1 |
| Total Metals | Aluminum (Al)-Total (mg/L) | 0.0068 | 0.0088 | 0.0156 | <0.010 |
| | Antimony (Sb)-Total (mg/L) | 0.00420 | 0.00413 | 0.00152 | <0.00050 |
| | Arsenic (As)-Total (mg/L) | 0.00690 | 0.00705 | 0.0267 | 0.00053 |
| | Barium (Ba)-Total (mg/L) | 0.0158 | 0.0158 | 0.0144 | 0.083 |
| | Beryllium (Be)-Total (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | |
| | Bismuth (Bi)-Total (mg/L) | <0.00050 | <0.00050 | <0.0010 ^{DLA} | |
| | Boron (B)-Total (mg/L) | <0.010 | <0.010 | <0.020 ^{DLA} | <0.10 |
| | Cadmium (Cd)-Total (mg/L) | 0.00353 | 0.00358 | 0.00608 | <0.00020 |
| | Calcium (Ca)-Total (mg/L) | 253 | 255 | 393 | 45.4 |
| | Chromium (Cr)-Total (mg/L) | 0.00011 | <0.00010 | <0.00020 ^{DLA} | <0.0020 |
| | Cobalt (Co)-Total (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | |
| | Copper (Cu)-Total (mg/L) | 0.00212 | 0.00230 | 0.0045 | <0.0010 |
| | Iron (Fe)-Total (mg/L) | 0.025 | 0.020 | 0.071 | <0.030 |
| | Lead (Pb)-Total (mg/L) | 0.000523 | 0.000507 | 0.00153 | 0.00057 |
| | Lithium (Li)-Total (mg/L) | 0.00784 | 0.00748 | 0.0105 | |
| | Magnesium (Mg)-Total (mg/L) | 69.0 | 68.5 | 113 | 20.1 |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| Sample ID Description Sampled Date Sampled Time Client ID | L1334035-1 Water 17-JUL-13 12:00 0167-130717-025 | L1334035-2 Water 17-JUL-13 12:00 0167-130717-024 | L1334035-3 Water 17-JUL-13 12:00 0167-130717-023 | L1334035-4 Water 17-JUL-13 12:00 0167-130717-030 | |
|---|--|--|--|--|----------|
| Grouping | Analyte | | | | |
| WATER | | | | | |
| Total Metals | Manganese (Mn)-Total (mg/L) | 0.0294 | 0.0296 | 0.397 | <0.0020 |
| | Mercury (Hg)-Total (mg/L) | <0.000010 | <0.000010 | <0.000010 | <0.00020 |
| | Molybdenum (Mo)-Total (mg/L) | 0.000187 | 0.000173 | <0.00010 ^{DLA} | |
| | Nickel (Ni)-Total (mg/L) | 0.00055 | 0.00051 | 0.0015 | |
| | Phosphorus (P)-Total (mg/L) | <0.050 | <0.050 | <0.050 | |
| | Potassium (K)-Total (mg/L) | 3.06 | 3.04 | 4.43 | 0.91 |
| | Selenium (Se)-Total (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | <0.0010 |
| | Silicon (Si)-Total (mg/L) | 2.53 | 2.53 | 2.64 | |
| | Silver (Ag)-Total (mg/L) | 0.000018 | 0.000013 | <0.000020 ^{DLA} | |
| | Sodium (Na)-Total (mg/L) | 9.10 | 9.33 | 18.8 | 4.8 |
| | Strontium (Sr)-Total (mg/L) | 0.809 | 0.799 | 1.24 | |
| | Sulfur (S)-Total (mg/L) | 267 | 266 | 429 | |
| | Thallium (Tl)-Total (mg/L) | 0.000082 | 0.000082 | 0.000098 | |
| | Tin (Sn)-Total (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | |
| | Titanium (Ti)-Total (mg/L) | <0.010 | <0.010 | <0.020 ^{DLA} | |
| | Uranium (U)-Total (mg/L) | 0.00306 | 0.00292 | 0.00451 | 0.00202 |
| | Vanadium (V)-Total (mg/L) | <0.0010 | <0.0010 | <0.0020 ^{DLA} | |
| | Zinc (Zn)-Total (mg/L) | 0.360 | 0.364 | 0.733 | <0.050 |
| Dissolved Metals | Dissolved Metals Filtration Location | FIELD | FIELD | FIELD ^{DLA} | |
| | Aluminum (Al)-Dissolved (mg/L) | <0.0010 | <0.0010 | <0.0020 ^{DLA} | |
| | Antimony (Sb)-Dissolved (mg/L) | 0.00410 | 0.00398 | 0.00151 | |
| | Arsenic (As)-Dissolved (mg/L) | 0.00648 | 0.00639 | 0.0154 | |
| | Barium (Ba)-Dissolved (mg/L) | 0.0161 | 0.0159 | 0.0114 | |
| | Beryllium (Be)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | |
| | Bismuth (Bi)-Dissolved (mg/L) | <0.00050 | <0.00050 | <0.0010 ^{DLA} | |
| | Boron (B)-Dissolved (mg/L) | <0.010 | <0.010 | <0.020 ^{DLA} | |
| | Cadmium (Cd)-Dissolved (mg/L) | 0.00352 | 0.00349 | 0.00481 | |
| | Calcium (Ca)-Dissolved (mg/L) | 265 | 265 | 395 | |
| | Chromium (Cr)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | |
| | Cobalt (Co)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | |
| | Copper (Cu)-Dissolved (mg/L) | 0.00172 | 0.00170 | 0.00246 | |
| | Iron (Fe)-Dissolved (mg/L) | <0.010 | <0.010 | <0.010 | |
| | Lead (Pb)-Dissolved (mg/L) | 0.000195 | 0.000183 | 0.00021 | |
| | Lithium (Li)-Dissolved (mg/L) | 0.00748 | 0.00733 | 0.0092 | |
| | Magnesium (Mg)-Dissolved (mg/L) | 70.1 | 69.8 | 112 | |
| | Manganese (Mn)-Dissolved (mg/L) | 0.0287 | 0.0280 | 0.311 | |
| | Mercury (Hg)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000010 | |

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

| Sample ID | Description | Sampled Date | Sampled Time | Client ID | L1334035-1 | L1334035-2 | L1334035-3 | L1334035-4 |
|-------------------------|----------------------------------|--------------|--------------|--------------------------|-----------------|-----------------|-----------------|-----------------|
| | | | | | Water | Water | Water | Water |
| | | 17-JUL-13 | 12:00 | 0167-130717-025 | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 | 17-JUL-13 |
| | | | | | 12:00 | 12:00 | 12:00 | 12:00 |
| | | | | | 0167-130717-025 | 0167-130717-024 | 0167-130717-023 | 0167-130717-030 |
| Grouping | Analyte | | | | | | | |
| WATER | | | | | | | | |
| Dissolved Metals | Molybdenum (Mo)-Dissolved (mg/L) | 0.000164 | 0.000164 | <0.00010 ^{DLA} | | | | |
| | Nickel (Ni)-Dissolved (mg/L) | <0.00050 | <0.00050 | <0.0010 ^{DLA} | | | | |
| | Phosphorus (P)-Dissolved (mg/L) | <0.050 | <0.050 | <0.050 | | | | |
| | Potassium (K)-Dissolved (mg/L) | 3.05 | 3.03 | 4.33 | | | | |
| | Selenium (Se)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | | | | |
| | Silicon (Si)-Dissolved (mg/L) | 2.54 | 2.56 | 2.58 | | | | |
| | Silver (Ag)-Dissolved (mg/L) | <0.000010 | <0.000010 | <0.000020 ^{DLA} | | | | |
| | Sodium (Na)-Dissolved (mg/L) | 9.19 | 9.28 | 14.3 | | | | |
| | Strontium (Sr)-Dissolved (mg/L) | 0.800 | 0.814 | 1.20 | | | | |
| | Sulfur (S)-Dissolved (mg/L) | 264 | 265 | 411 | | | | |
| | Thallium (Tl)-Dissolved (mg/L) | 0.000080 | 0.000079 | 0.000096 | | | | |
| | Tin (Sn)-Dissolved (mg/L) | <0.00010 | <0.00010 | <0.00020 ^{DLA} | | | | |
| | Titanium (Ti)-Dissolved (mg/L) | <0.010 | <0.010 | <0.020 ^{DLA} | | | | |
| | Uranium (U)-Dissolved (mg/L) | 0.00292 | 0.00290 | 0.00429 | | | | |
| | Vanadium (V)-Dissolved (mg/L) | <0.0010 | <0.0010 | <0.0020 ^{DLA} | | | | |
| | Zinc (Zn)-Dissolved (mg/L) | 0.360 | 0.354 | 0.572 | | | | |

* 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 | Aluminum (Al)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Antimony (Sb)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Arsenic (As)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Beryllium (Be)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Bismuth (Bi)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Chromium (Cr)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Cobalt (Co)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Lead (Pb)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Nickel (Ni)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Selenium (Se)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Silver (Ag)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Thallium (Tl)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Tin (Sn)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Titanium (Ti)-Dissolved | DLA | L1334035-1, -2, -3 |
| Duplicate | Vanadium (V)-Dissolved | DLA | L1334035-1, -2, -3 |
| Matrix Spike | Antimony (Sb)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Arsenic (As)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Molybdenum (Mo)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Sulfate (SO4) | MS-B | L1334035-1, -2, -3, -4 |
| Matrix Spike | Sulfate (SO4) | MS-B | L1334035-1, -2, -3, -4 |
| Matrix Spike | Sulfate (SO4) | MS-B | L1334035-1, -2, -3, -4 |
| Matrix Spike | Barium (Ba)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Boron (B)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Sodium (Na)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Aluminum (Al)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Barium (Ba)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Sodium (Na)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Strontium (Sr)-Dissolved | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Antimony (Sb)-Total | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Arsenic (As)-Total | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Barium (Ba)-Total | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Manganese (Mn)-Total | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Sodium (Na)-Total | MS-B | L1334035-1, -2, -3 |
| Matrix Spike | Strontium (Sr)-Total | MS-B | L1334035-1, -2, -3 |

Qualifiers for Individual Parameters Listed:

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

Test Method References:

| ALS Test Code | Matrix | Test Description | Method Reference** |
|--|--------|--------------------------------|------------------------|
| ALK-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 |

Reference Information

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

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

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

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

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

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

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

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

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

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

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

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

"This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Apparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit."

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

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

HARDNESS-CALC-VA Water Hardness APHA 2340B

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

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

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

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

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

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

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

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

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

Reference Information

| | | | |
|---|-------|--|---|
| MET-D-CCMS-VA | Water | Dissolved Metals in Water by CRC ICPMS | APHA 3030 B&E / EPA SW-846 6020A |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).</p> | | | |
| MET-DIS-LOW-ICP-VA | Water | Dissolved Metals in Water by ICPOES | EPA 3005A/6010B |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).</p> | | | |
| MET-T-CCMS-VA | Water | Total Metals in Water by CRC ICPMS | APHA 3030 B&E / EPA SW-846 6020A |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).</p> | | | |
| MET-TOT-ICP-VA | Water | Total Metals in Water by ICPOES | EPA SW-846 3005A/6010B |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The 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).</p> | | | |
| MET-TOT-LOW-ICP-VA | Water | Total Metals in Water by ICPOES | EPA 3005A/6010B |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The 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).</p> | | | |
| MET-TOT-LOW-MS-VA | Water | Total Metals in Water by ICPMS(Low) | EPA SW-846 3005A/6020A |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).</p> | | | |
| NH3-F-VA | Water | Ammonia in Water by Fluorescence | J. ENVIRON. MONIT., 2005, 7, 37-42, RSC |
| <p>This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Weston et al.</p> | | | |
| PH-MAN-WR | Water | pH by Meter | APHA 4500-H (B) |
| <p>"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."</p> | | | |
| S-DIS-ICP-VA | Water | Dissolved Sulfur in Water by ICPOES | EPA SW-846 3005A/6010B |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The 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).</p> | | | |
| <p>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.</p> | | | |
| S-TOT-ICP-VA | Water | Total Sulfur in Water by ICPOES | EPA SW-846 3005A/6010B |
| <p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The 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).</p> | | | |
| <p>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.</p> | | | |
| TDS-CALC-VA | Water | TDS (Calculated) | APHA 1030E (20TH EDITION) |

Reference Information

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

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

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

TURBIDITY-WR Water Turbidity by Nephelometer APHA 2130

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

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

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

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

Chain of Custody Numbers:

1

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.



Appendix C:
YG Environmental Health Services Reports



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

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

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

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

Contact Information • Coordonnées de la personne-ressource

Contact Person / Personne-ressource: Meghan Marjanovic Phone / Téléphone: 867 393 4882
 Mailing address / Adresse postale: 2195 - 2nd Ave Fax / Télécopieur: 867 393 4883
Whitehorse YT Postal code / Code postal: Y1A 3T8

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

Agent: ENVIRONMENTAL DYNAMIC INC Fax / Télécopieur: _____

Sampling Location • Lieu de la prise d'échantillon

Municipal Address / Adresse municipale: WQ - PW Subdivision / Lotissement: _____
 Legal Description Lot / Désignation officielle Lot: _____ Quad / Quadrilatère: _____ Plan no. / Plan n°: _____

Other Information (e.g., Location, Business / Building Name) / Autres renseignements (ex.: emplacement, nom de l'entreprise, nom de l'édifice): Purplewell

Sample Collection / Prélèvement de l'échantillon

Sample Collected By / Échantillon prélevé par: JM DS, BSM Date / Date: 130717 Time / Heure: _____ am / pm
 YY/MM/DD • AA/MM/JJ

Sampling Site (e.g., kitchen tap) / Point d'échantillonnage (ex.: robinet de cuisine): Well (Flaw Pipe) NANSEN

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

Sample Supply / Source d'approvisionnement en eau

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

Sample Source / Provenance de l'échantillon

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

Water Treatment / Traitement de l'eau

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

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

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

Receipt of Sample / Réception de l'échantillon: Date / Date: 13-07-17 Time / Heure: 3:15 am / pm By / Par: SS
 YY/MM/DD • AA/MM/JJ

Condition of Sample / État de l'échantillon: Satisfactory / Satisfaisant Unsatisfactory / Non satisfaisant Details / Précisez: 10.40C

Incubation / Incubation: Date / Date: 13-07-17 Time / Heure: 3:40 am / pm By / Par: SS Incubator / Incubateur: 1
 YY/MM/DD • AA/MM/JJ

Analysis Completed / Analyse terminée: Date / Date: 13-07-18 Time / Heure: 4:15 am / pm By / Par: SS
 YY/MM/DD • AA/MM/JJ

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

| | |
|--|--|
| Total Coliforms / Coliformes totaux <input type="checkbox"/> Present / Présence <input checked="" type="checkbox"/> Absent / Absence | E. coli / E. coli <input type="checkbox"/> Present / Présence <input checked="" type="checkbox"/> Absent / Absence |
|--|--|

Comments / Commentaires

Report Authorized By / Rapport autorisé par: SS Position / Poste: WLT Date / Date: 13-07-18
 YY/MM/DD • AA/MM/JJ

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

YG(4649)NC3 Rev.11/2010 Sample Number / Numéro de l'échantillon: **53425**