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EDI Project No: 16Y0089

Assessment and Abandoned Mines Branch (AAM) K-419
Department of Energy, Mines and Resources, Yukon Government
Room 2C Royal Center, 4114-4th Avenue
PO 2703, Whitehorse, YT, Y1A 2C6

Attention: Erik Pit, Type II Project Manager

RE: Mount Nansen Water Resources Investigations – Monthly Report: May 2016 - FINAL

Trip dates:	May 9 - 11, 2016
EDI field staff:	Dawn Hansen, Megan Sandford and Danny Skookum
Weather during trip:	Conditions ranged from clear skies to light rain with calm winds and temperatures up to 12°C.

This monthly report includes a summary of site conditions and data collected during EDI's May 2016 trip to Mount Nansen as part of the 2016/17 Water Resources Investigations. This report includes site conditions, meteorology, hydrology, water quality, program recommendations, and additional trip information (Table 1).

Table 1. Summary of information provided in this monthly report.

Report Section	Description
Site Conditions	• Summary of weather and general site conditions
Meteorology	• Statement on station status and identification of any data gaps or QA/QC issues
Hydrology	• Discussion of hydrology data for this month • Statement of QA/QC for the data collected this month
Water Quality	• Summary of water quality results for this month • Statement on QA/QC sample results for this month
Program Recommendations	• Program recommendations for meteorological, hydrology and water quality programs
Additional Trip Information	• Project Safety Concerns • Wildlife sightings • Budget and schedule considerations

Report Section	Description
List of Attachments	1. Maps of Hydrometric Stations and Water Quality Sites 2. Site and Station Photos from the trip 3. Hydrology Summary Data Tables (May 2016) 4. Water Quality Summary Data Tables (May 2016) 5. Laboratory Certificates of Analysis (COA) & Yukon Environmental Health Services Bacteriological Results (May 2016).

SITE CONDITIONS

The May 2016 trip was reflective of post-freshet conditions transitioning to summer. Water levels receded substantially since the April 2016 trips during freshet conditions. A few small, isolated patches of ice remained in shaded areas, particularly in the Dome Creek watershed where overflow ice accumulated during the winter. With the exception of H-DC-D1b, all channels were free of ice and snow in the vicinity of the measurement and sampling locations. All ice had melted from the tailings pond and a staff gauge reading was possible for the first time since September 2014 due to low water levels in the tailings pond.

METEOROLOGY

Meteorological data was collected at the ATM-ROAD station throughout the month of May 2016. EDI conducted a QA/QC review of the May 2016 data and all sensors appear to be functioning properly. Meteorological data will be summarized and analyzed at the end of the open-water season, in the October 2016 Monthly Report. All snow in the vicinity of the meteorological station melted prior to the April 26 – 28, 2016 visit with no new snowfall during May. The snow sensor consistently recorded snow depths less than 1 cm throughout May which are within the acceptable margins of error for the sensor type.

HYDROLOGY

Discharge measurements were collected at all stations with suitable conditions during the May 2016 trip. The continuous station at H-DC-B was re-installed for the open water period. Hydrometric measurements could not be collected at H-DC-D1b during April due to prohibitive ice conditions. The H-VC-R station was discontinued on May 9, 2016 by removing the stilling well, staff gauge, continuous logger and survey benchmarks. The station at H-VC-R+290 provides preferable site conditions for year-round continuous monitoring.

Continuous water level logger records are available for the following eight stations for the month of May up to when each logger was downloaded: H-DC-M WP, H-DC-R, H-VC-U, H-BC, H-VC-DBC, H-VC-UMN, H-VC-R and H-VC-R+290. A preliminary review of the continuous logger files indicates that all loggers are functioning properly.

Surface water conditions and hydrometric monitoring tasks completed at each station in May 2016 are summarized in Attachment 3. Site observations for the May trip are included in the subsection below. Quality control and quality assurance for the hydrometric data was conducted on both the instantaneous and continuous datasets.

Field Results - May

- Discharge measurements were collected with an ADV using the velocity-area method at the five Victoria Creek stations: H-VC-U, H-VC-DBC, H-VC-UMN, H-VC-R and H-VC-R+290. Discharge values ranged from 0.775 to 0.997 m^3/s. The May 2016 trip discharges represent flow conditions lower than the April 26 – 28, 2016 trip.
- Hydraulic conditions were suitable for velocity-area measurements at H-BC in May; the discharge was of 0.076 m^3/s, which represents a decrease from the discharge measured on April 27, 2016.
- The discharge measured at H-VC-UMN (0.997 m^3/s) in May was greater than at the downstream stations at H-VC-R and H-VC-R+290 (0.845 m^3/s and 0.912 m^3/s, respectively). Typically discharge increases in the downstream direction of a watercourse as the contributing watershed area increases. As discussed at the end of the 2015/16 winter season, the local groundwater influences between H-VC-UMN and H-VC-R/H-VC-R+290 are not clearly defined at this time. This pattern of decreasing flows between the two locations was observed in November 2015, January 2016 and February 2016.
- Discharge measurements were completed using salt dilution gauging along Dome Creek at H-DC-B, H-DC-M WP and H-DC-R. Discharges ranged from 0.032 to 0.042 m^3/s during the May trip.
- At H-DC-M WP, water continues to leak between the metal weir plate and the wooden support structure. Additionally, water continues to flow over the structure along the right downstream side of the support structure. Volumetric measurements cannot be accurately collected due to the leakage; however, salt dilution gauging can be conducted downstream. Some sediment was excavated from the weir pond during the May 2016 visit. The continuous logger is encased in sediment and is now outside of the wetted channel. This logger should be removed during the next site visit.
    - Off-site testing will be conducted to determine if the pressure transducer is drifting. This will be completed once the logger is removed and will determine if the logger can be re-used elsewhere at the Mount Nansen site.
- The H-SEEP volumetric discharge measurement on May 10, 2016 (0.002 m^3/s) was less than the flow rate observed at the pump in the seepage pond shack (0.003 m^3/s). At this time, no calibration activities are suggested; both measurements should continue to be collected and compared.
- Placer mining operations during the 2016 season were first noticed on May 9, 2016. Large earthworks operations were observed at this time. This produced non-representative hydrologic conditions along Pony Creek.

WATER QUALITY

Water quality samples and in-situ data were collected at all planned sites during the May 2016 trip. This included opportunistic sampling of seeps around the mill site. A total of 24 sites were sampled and remaining sites had no evidence of flow (Attachment 4). The drinking water sample, including a bacteriological sample, was collected from the pumphouse well (WQ-PW) on May 11. All samples were submitted for analysis through ALS Laboratories under chain of custody documentation, except for the bacteriological sample which was submitted to Yukon Government – Health and Social Services for analysis.

Site conditions were noted and a record of the samples collected were compiled (Attachment 4). In-situ and laboratory results summary tables as well as the lab certificates of analysis are attached (Attachment 4 and Attachment 5). Parameters that exceeded the Canadian Council of Ministers of the Environment Freshwater Aquatic Life (CCME-AL) guidelines and/or the Mount Nansen Effluent Quality Standards (EQS) criteria are highlighted.

Results reflect post-freshet conditions when increased surface runoff and sediment introduction often results in elevated concentrations of total metals. A summary of the results and comments on the sample QA/QC data are included in the subsections below.

May Water Quality Results Summary

- The WQ-SEEP samples exceeded CCME-AL guidelines for ammonia, cyanide, total and dissolved arsenic and iron. Total iron and manganese exceeded Mount Nansen EQS. The cyanide concentration in this sample was elevated over concentrations generally found in samples collected at this site, and is in stark contrast to the general data trend.
- Tailings Pond (WQ-TP) samples exceeded CCME-AL guidelines for total and dissolved arsenic, cadmium, copper, iron and zinc. Total silver and lead also exceeded CCME-AL guidelines. Total manganese exceeded Mount Nansen EQS.
- All samples from Dome Creek exceeded the CCME-AL guidelines for total and dissolved arsenic. CCME-AL guidelines were also exceeded for the following parameters and sites: total aluminum (WQ-DC-DX, WQ-DC-D1B, WQ-DC-U), total cadmium (WQ-DC-DX+105, WQ-DC-D1B), dissolved cadmium (WQ-DC-DX+105), total and dissolved copper (WQ-DC-DX+105), total and dissolved iron (WQ-DC-DX, WQ-DC-D1B, WQ-DC-U, WQ-DC-R), total lead (WQ-DC-DX, WQ-DC-D1B), total mercury (WQ-DC-DX), total and dissolved zinc (WQ-DC-DX, WQ-DC-D1B). Total iron exceeded Mount Nansen EQS for WQ-DC-DX, WQ-DC-D1B, WQ-DC-U and WQ-DC-R. Total manganese exceeded Mount Nansen EQS for WQ-DC-D1B and WQ-DC-U. Total suspended solids also exceeded Mount Nansen EQS for WQ-DC-DX and WQ-DC-U.
- Diversion Channel (WQ-DC-B) samples exceeded the CCME-AL guidelines for total aluminum, total and dissolved arsenic, total copper, total and dissolved iron, total zinc. Mount Nansen EQS were exceeded for total iron and total suspended solids.

- All samples from Victoria Creek during the April 19 trip exceeded CCME-AL guideline for total aluminum, total and dissolved copper, total iron, total lead. The CCME-AL guidelines were also exceeded for the following parameters and sites: total cadmium (WQ-VC-R, WQ-VC-DBC, WQ-VC-UMN), total arsenic (WQ-VC-UMN), total mercury (WQ-VC-DBC). Mount Nansen EQS were exceeded for total iron and total suspended solids at all Victoria Creek sites.
- Back Creek (WQ-BC) samples exceeded CCME-AL guidelines for total aluminum, arsenic, cadmium, copper, iron, lead, mercury, and dissolved aluminum and copper. Total iron and suspended solids also exceeded Mount Nansen EQS.
- The upstream (WQ-PC-U) and downstream (WQ-PC-D) Pony Creek sites had samples that exceeded CCME-AL guidelines for total aluminum, arsenic, cadmium, copper, iron, lead, mercury, silver, zinc and dissolved iron. Dissolved cadmium and copper also exceeded CCME-AL guidelines at WQ-PC-D. Mount Nansen EQS were exceeded for total iron and total suspended solids at both sites.
- The upwelling seep above CH-P-13-01 exceeded Mount Nansen EQS for pH, total manganese and zinc. Samples exceeded CCME-AL guidelines for total and dissolved aluminum, cadmium and zinc.
- Dome East Slope Seep samples WQ-DESS-01, WQ-DESS-02 and WQ-DESS-03 all exceeded CCME-AL guideline for total aluminum. CCME-AL guidelines were also exceeded for the following parameters and sites: pH (WQ-DESS-01, WQ-DESS-03), total arsenic (WQ-DESS-02), total cadmium (WQ-DESS-01), total copper (WQ-DESS-02, WQ-DESS-03), total iron, mercury and silver (WQ-DESS-02), total and dissolved zinc (WQ-DESS-01), dissolved aluminum and cadmium (WQ-DESS-01, WQ-DESS-03), dissolved copper (WQ-DESS-03). Mount Nansen EQS were exceeded for total iron and total suspended solids at WQ-DESS-02, and for total manganese and zinc at WQ-DESS-01.
- Mill Site Seep sites samples WQ-MS-S-03, WQ-MS-S-09, WQ-MS-S-10 and WQ-MS-S-A all exceeded CCME-AL guidelines for total and dissolved arsenic, cadmium and zinc. CCME-AL guidelines were also exceeded for the following parameters and sites: fluoride (WQ-MS-S-03), total aluminum, copper, iron, lead and silver (WQ-MS-S-03, WQ-MS-S-09, WQ-MS-S-A), total mercury (WQ-MS-S-09), dissolved copper (WQ-MS-S-09, WQ-MS-S-A) and dissolved iron (WQ-MS-S-03). Mount Nansen EQS were exceeded for total iron (WQ-MS-S-03, WQ-MS-S-09, WQ-MS-S-A), total manganese (WQ-MS-S-03, WQ-MS-S-A) and total zinc (all sites).
- Sites WQ-NW-SEEP-02, WQ-ADIT-SEEP and WQ-LW-SEEP-01 were dry during the May 9 - 11, 2016 visit.
- The bacteriological sample collected at WQ-PW on May 11, 2016 was absent of total coliforms and E. coli.

QA/QC Samples

May 9-11, 2016 Trip

Travel Blank Sample – did not have any parameters above detection limit. No contamination from storage or transport is suspected.

Field Blank Sample – did not have any parameters above detection limits. No contamination from field sampling methodology is suspected.

Replicate Sample(s) – the average RPD of the replicate sample WQ-DC-B-r was 9% with an average difference of 14% for total and 3% for dissolved metals. Total calcium, magnesium, potassium, strontium, sulfur, titanium and uranium had RPD>20%. Total suspended solids had a RPD of 36%.

The average RPD of the replicate sample WQ-VC-DBC-r was 9% with an average difference of 10% for total and 10% for dissolved metals. Dissolved zinc had a RPD of 107% and total suspended solids had a RPD of 53%. All other parameters had RPD<20%.

PROGRAM RECOMMENDATIONS

- Conduct velocity-area and salt tracer discharge measurements at all hydrometric stations during the open water season, where possible, to continue to validate the salt tracer method.
- As first noted in January 2016, water leaks between the metal weir plate and the wooden structure at H-DC-M WP. Water also breaches the support structure along the right downstream side. Volumetric discharge measurements cannot be made at the station because all of the water cannot be captured. Once flows have receded, the condition of the weir plate should be assessed and repaired as required to facilitate future volumetric discharge measurements.
- Accumulated fine sediment in the weir pond at H-DC-M WP continues to cause concern that channel instability in the diversion channel banks upstream (particularly following rain storms and excavation work) is causing sedimentation in the weir pond, and decreasing the function of the weir and continuous water level logger. Sedimentation in the pond decreases capacity, causing water to flow over the edges of the wooden support structure and has buried the continuous water level logger. The thawed ground in the weir pond allowed for some sediment to be manually excavated during the May 2016 trip. This station should be converted to a discrete measurement location by removing the logger and periodically removing sediment manually.
- Once removed the water level logger at H-DC-M WP should be tested by EDI for drift and assessed for re-deployment, as required, elsewhere at the Mount Nansen site.
- Placer mining operations along Pony Creek upstream of the WQ-PC-U site were observed for the first time in 2016 on May 9. Large earthwork operations were observed, including the construction of an earthen dam. Similar operations were observed during the 2015 open water

season. These operations result in non-representative hydrologic and water quality sampling conditions at downstream stations including, WQ-PC-U and WQ-PC-D. Additionally, the accumulation of sediment and augmentation of flows along Pony Creek produces channel instability and non-representative hydrological conditions at H-PC-DSP.

ADDITIONAL TRIP INFORMATION

Any changes to project scope (i.e. additional sites sampled):	None. All sampling and monitoring was conducted within scope. The next trip is scheduled for July 4 – 6, 2016. The next trip will be the fifth of the 2016/2017 Water Resources Investigation.
Any alterations to sample schedule/budget:	None
Additional Comments:	Conditions were reflective of post-freshet. Water levels remained high but have reduced since the freshet conditions. Minor patches of snow and overflow ice remain in shaded areas, including along Dome Creek.
Wildlife Sightings:	A wolf was observed crossing the road between Victoria and Dome Creek on May 9, 2016.
Site concerns (safety):	None

ATTACHMENT 1: MAPS OF HYDROMETRIC STATIONS AND WATER QUALITY SITES

Regional Overview Map of Mount Nansen Site

Legend

Local Drainage Area

- Back Creek
- Dome Creek
- Minnesota Creek
- Pony Creek
- Victoria Creek

- Topographic Contour
- Secondary Road
- Highway

Data sources
1:250,000 Topographic Spatial Data courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Digital Elevation Model provided by Geomatics Yukon - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

This document is not an official land survey and the spatial data presented is subject to change.

0 2.5 5 10 15
kilometers

Map Scale: 1:200,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 8N

Drawn:	Checked:	Date:	
LG	MM / JB	14/07/2016	**FIGURE 1**

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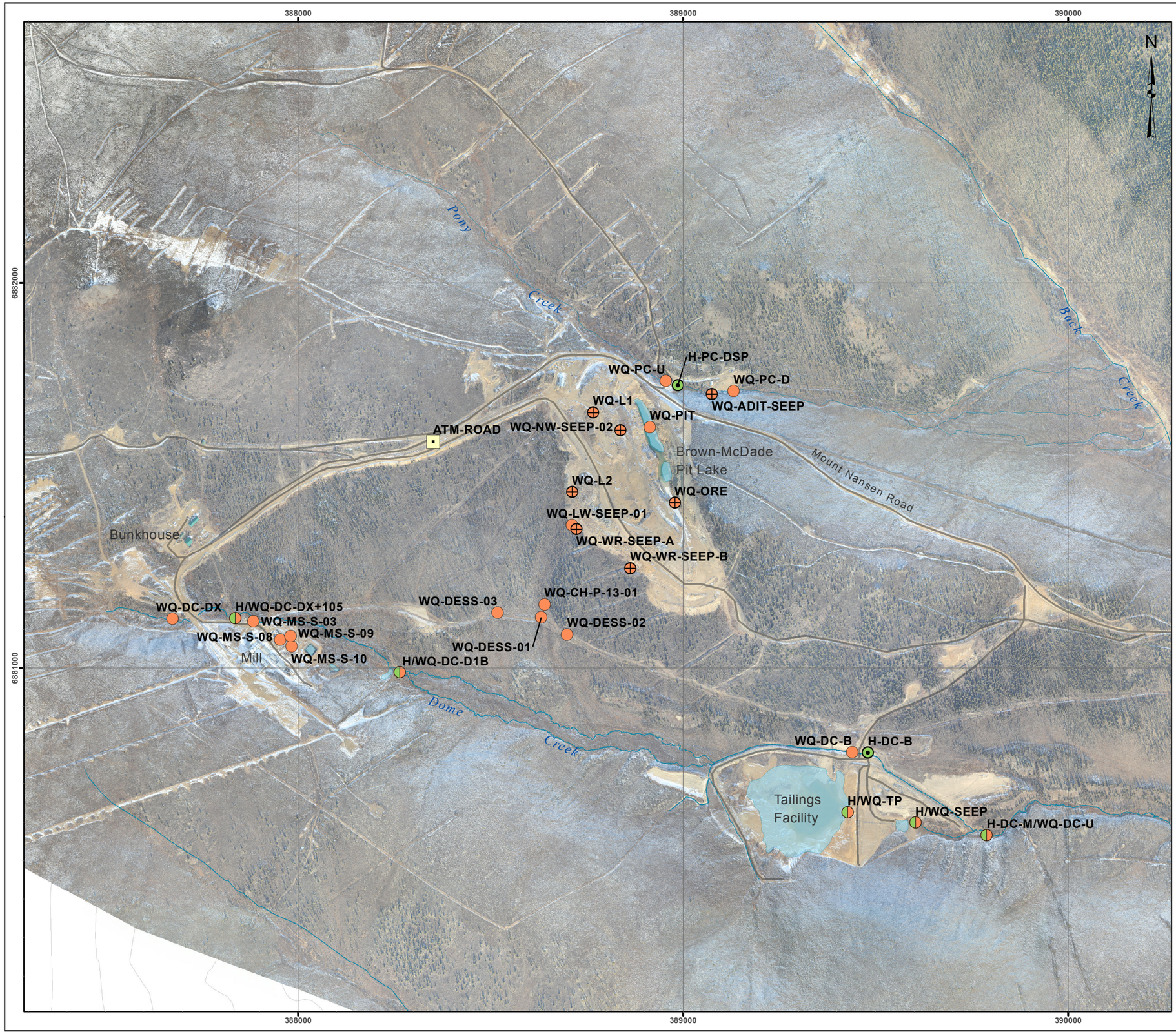

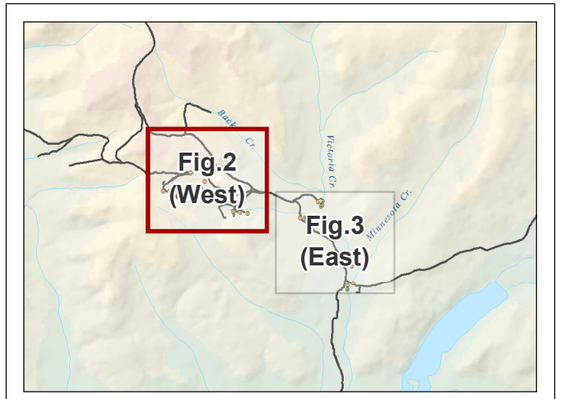

Legend

- Atmospheric Station (label e.g. ATM-ROAD)
- Hydrometric Station and Water Quality Site (label e.g. H/WQ-VC-UMN)
- Hydrometric Station (label e.g. H-VC-R)
- Water Quality Site (label e.g. WQ-PC-U)
- Temporary Water Quality Site (label e.g. WQ-MS-S-03)
- Unpaved Road/Access

Mount Nansen Site (West): Hydrometric Stations and Water Quality Sites

Notes:

1:50,000 and 1:250,000 Topographic Spatial Data provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

Watercourse, drainage areas and Mount Nansen Road layers digitized / modified by EDI (2011) using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).

Imagery provided by Yukon Government - Energy, Mines and Resources - Abandoned Mines Branch.

Project data displayed is site specific. Data collected by EDI Environmental Dynamics Inc. (2015) was obtained using Garmin GPS technology.

0 50 100 200 300 400 500
metres

Map Scale = 1:10,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 8N

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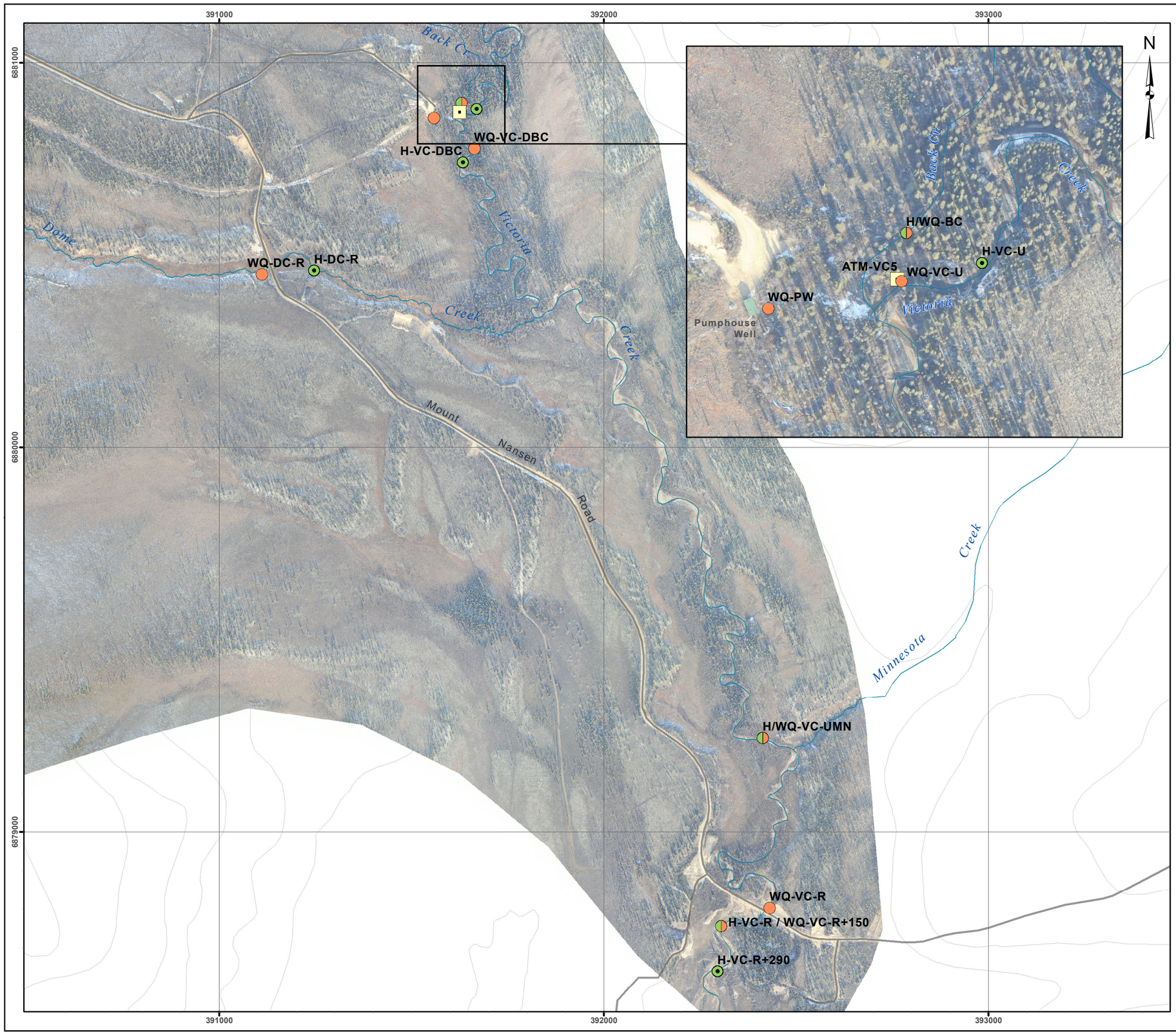

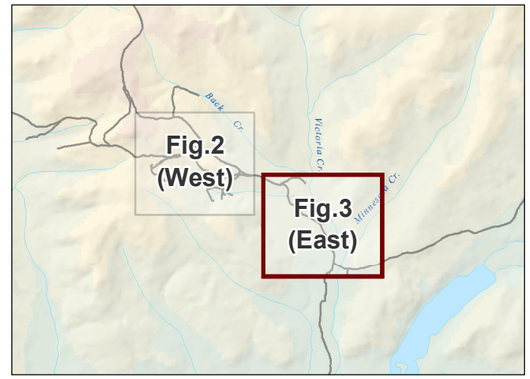

Legend

- Atmospheric Station (label e.g. ATM-ROAD)
- Hydrometric Station and Water Quality Site (label e.g. H/WQ-VC-UMN)
- Hydrometric Station (label e.g. H-VC-R)
- Water Quality Site (label e.g. WQ-PC-U)
- Temporary Water Quality Site (label e.g. WQ-MS-S-03)
- Unpaved Road/Access

Mount Nansen Site (East): Hydrometric Stations and Water Quality Sites

Notes:

1:50,000 and 1:250,000 Topographic Spatial Data provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

Watercourse, drainage areas and Mount Nansen Road layers digitized / modified by EDI (2011) using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).

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0 50 100 200 300 400 500
metres

Map Scale = 1:10,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 8N

Drawn:	Checked:	Date:	
MP	MM/SD	14/07/2016	**FIGURE 3**

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ATTACHMENT 2: SITE AND STATION PHOTOS

Photo 1. WQ-DC-DX – looking upstream.

Photo 2. H/WQ-DC-DX+105 – looking downstream.

Photo 3. H/WQ-DC-D1b – looking downstream. Water flowing on top of ice.

Photo 4. WQ-DESS-01 – overview of site.

Photo 5. WQ-DESS-02 – overview of site. Water seeping from multiple points along bank.

Photo 6. WQ-DESS-03 – overview of site.

Photo 7. WQ-LW-SEEP-01 – site dry.

Photo 8. WQ-CH-P-13-01 – overview of site.

Photo 9. WQ-DC-B – looking downstream

Photo 10. H-DC-B – looking downstream

Photo 11. H-DC-B – overview showing re-installed station.

Photo 12. WQ-TP –overview of tailings pond.

Photo 13. H-TP – overview showing wetted lower staff gauge.

Photo 14. H/WQ-SEEP – looking downstream.

Photo 15. H-DC-M WP – overview of weir pond.

Photo 16. WQ-DC-U – looking downstream.

Photo 17. WQ-DC-R – looking downstream.

Photo 18. H-DC-R – looking upstream.

Photo 19. WQ-PC-U – looking upstream.

Photo 20. H-PC-DSP – looking upstream.

Photo 21. Placer mining works upstream of WQ-PC-U.

Photo 22. Placer mining works upstream of WQ-PC-U.

Photo 23. WQ-ADIT-SEEP – looking upstream. Site dry.

Photo 24. WQ-PC-D – looking upstream.

Photo 25. WQ-NW-SEEP-02 – overview of site. No water collected in sample bag.

Photo 26. H/WQ-BC – overview of site.

Photo 27. H-VC-U – looking downstream.

Photo 28. WQ-VC-U – looking upstream.

Photo 29. WQ-VC-DBC - overview of sample site.

Photo 30. H-VC-DBC – overview of sample site.

Photo 31. WQ-PW – looking downstream at discharge site.

Photo 32. WQ-VC-UMN – looking upstream.

Photo 33. H-VC-UMN – looking downstream.

Photo 34. WQ-VC-R – looking upstream.

Photo 35. H-VC-R – looking upstream.

Photo 36. H-VC-R+290 – looking upstream.

Photo 37. WQ-MS-S-08 – site dry.

Photo 38. WQ-MS-S-03 – looking upstream.

Photo 39. WQ-MS-S-09 – opportunistic mill site seep

Photo 40. WQ-MS-S-10 – opportunistic mill site seep

Photo 41. WQ-MS-S-A – opportunistic mill site seep.

ATTACHMENT 3: MAY HYDROLOGY DATA TABLES

Measurement ID	Hydrometric Identifier (HID)	Measurement Date	Measurement Time	Discharge Measurement Method	Discharge (m^3/s)	Discharge Data Flag	Surveyed Water Elevation (m)	Survey Data Flag	Comments
1430	ATM-VC5	09/05/2016	17:50					N	Barologger sucessfully downloaded.
1432	H-DC-DX+105	10/05/2016	18:50	V	0.004			N	Flows have receeded significantly since previous visit. All flow contained within banks of channel.
1433	H-DC-D1b	10/05/2016	17:10	N				N	Site conditions not suitable for discharge measurement. Flow flowing on top of ice and between layers of ice.
1423	H-DC-B	10/05/2016	13:22	SS	0.042		2.061		Stilling well, staff gauge, and continuous logger re-established at same location as the 2015 open water season. Salt tracer completed for discharge measurement.
1437	H-TP	10/05/2016	16:40					N	Water level remains low in tailing pond but has increased since previous visit. No ice present on pond. Lower staff gauge now wetted.
1436	H-SEEP	10/05/2016	11:30	V	0.002			N	Volumetric measurement collected at pipe outlet. Flow rate at pump at 11:35 156.071 L/min (0.004 m3/s).
1434	H-DC-M WP	10/05/2016	10:52	SS	0.032	E		N	Minor amount of water breaching weir pond structure along right downstream side. Salt tracer completed for discharge estimate.
1429	H-DC-R	10/05/2016	9:42	SS	0.034		0.632		Salt tracer completed for discharge estimate. All flow contained in single channel with no snow or ice along measurement reach.
1431	H-PC-DSP	10/05/2016	9:00	V	0.006	E		N	Active placer mining works upstream of measurement location. Extensive earthworks in progress, including the construction of an earthen dam.
1424	H-BC	09/05/2016	18:26	ADV-MID	0.076		1.888		Discharge measurement completed with ADV. Turbid water flowing in channel.
1428	H-VC-U	09/05/2016	17:37	ADV-MID	0.775		2.160		Discharge measurement completed with ADV. High water level with turbid water. Sediment accumulation along right downstream side of channel.
1427	H-VC-DBC	09/05/2016	16:54	ADV-MID	0.852		1.913		Discharge measurement completed with ADV. Deposition of fine sediment along channel bed.
1426	H-VC-UMN	09/05/2016	15:17	ADV-MID	0.997		1.722		Discharge measurement completed with ADV. All snow and ice has melted from channel banks.
1435	H-VC-R	09/05/2016	12:45	ADV-MID	0.850			N	Station discontinued with stilling well, continuous logger and staff gauge removed from site. Final concurrent discharge measurement with H-VC-R+290 collected at station using ADV. Station replaced with H-VC-R+290.
1425	H-VC-R+290	09/05/2016	13:44	ADV-MID	0.912		2.498		Discharge measurement completed with ADV. Water more turbid than normal for this time of year. All flow contained within main channel.

Discharge Measurement Method Legend

Measurement Method ID	Measurement Method	Measurement Description
ADV-MID	Mid Section Method - Acoustic Doppler Velocimeter	Cross-sectional velocity using an ADV, mid-section method.
SS	Brine Salt Slug Tracer	Salt dilution gauging using a brine salt slug.
V	Volumetric	Volumetric measurement obtained by filling a graduated contained at a culvert, pipe outlet or weir.
W	Weir	Measurement obtained by a rated structure (v-notch weir).
N	None	No measurement could be obtained.
SD	Dry Salt Slug Tracer	Salt dilution gauging using a dry salt slug.
HWM	High Water Mark - Indirect Method	Indirect method using high water mark in the slope-area calculation for estimating high discharges.
ADCP	Acoustic Doppler Current Profiler	Cross-sectional velocity using an ADCP, mid-section method.
SC	Constant Rate Salt Tracer	Salt dilution gauging using the constant rate method.
CM-MID	Mid Section Method - Current Meter	Cross-sectional velocity using a velocimeter (Swoffer or Pygmy AA)

Hydrometric Stations

Hydrometric ID	Hydrometric Stations
ATM-VC5	Atmospheric Barologger (5) at Victoria Creek
H-BC	Back Creek
H-DC-B	Diversion Channel at Bridge
H-DC-D1B	Dome Creek at D1b
H-DC-DX	Dome Creek at DX
H-DC-DX+105	Dome Creek at DX+105
H-DC-M-WP	Middle Dome Creek at Weir Pond
H-DC-R	Dome Creek at Road
H-PC-DSP	Pony Creek Downstream of Pit
H-SEEP	Seepage Pond Outflow
H-TP	Tailings Pond
H-VC-DBC	Victoria Creek Downstream of Back Creek
H-VC-R	Victoria Creek at Road
H-VC-R+290	Victoria Creek at Road + 290
H-VC-U	Upper Victoria Creek
H-VC-UMN	Victoria Creek Upstream of Minnesota Creek

Discharge Data Flag Legend

Discharge Data Flag	Discharge Data Flag Description
E	Estimated value
B	Backwater effects (ice related)
F	Instrument malfunction
M	Manual measurement
A	Automated measurement (logged)
ML	Missing length data
MD	Missing depth data
MW	Missing width data
O	Outside of measurement reporting range
S	Suspect data
X	Poor channel conditions for discharge measurement
MI	Missing Data
SH-L	Data logger Shift
SH-SG	Staff Gauge Shift
UR	Under review

Survey Data Flag Legend

Survey Flag	Survey Flag Description
S	Suspect data
MI	Missing data
UR	Under review
F	Instrument Malfunction
O	Outside measurement Accuracy (+/-0.003 m)
N	No survey conducted

ATTACHMENT 4: MAY WATER QUALITY DATA TABLES

Water Quality Site	Sample Collected? (Y/N)	Measurement Date	Comments
WQ-DC-DX	Y	10-May-16	Moderate flow, water is clear.
WQ-DC-DX+105	Y	10-May-16	Moderate flow, water is clear.
WQ-MS-S-A	Y	10-May-16	Seep in front of mill.
WQ-MS-S-03	Y	10-May-16	Average conditions at sampling location.
WQ-DC-D1b	Y	10-May-16	Location where sample is usually taken is frozen w water flowing through ice. Sample taken along RDB in flowing water.
WQ-DESS-02	Y	10-May-16	No continuous flow, water dripping from several locations from bank.
WQ-CH-P-13-01	Y	10-May-16	Low turbidity.
WQ-DESS-01	Y	10-May-16	Moderate flow, water clear.
WQ-DESS-03	Y	10-May-16	Minimal flow.
WQ-MS-S-08	N	10-May-16	Hole appears to be in-filling, dry at time of visit.
WQ-DC-B	Y	10-May-16	Moderate flow, lots of particulates in water. Replicate completed at 12:30.
WQ-TP	Y	10-May-16	No ice on pond. Windy.
WQ-SEEP	Y	10-May-16	Litres per min seep pump house 156.071
WQ-DC-U	Y	10-May-16	Water fairly clear, 90% of snow/ice has melted along creek banks.
WQ-DC-R	Y	10-May-16	Small patch of snow/ice at sampling site. Creek flowing freely up and DS of culvert.
WQ-PC-U	Y	10-May-16	Turbid. Active placer mine upstream.
WQ-ADIT-SEEP	N	10-May-16	Site is dry.
WQ-PC-D	Y	10-May-16	Creek is turbid.
WQ-BC	Y	09-May-16	Moderate flow with turbid water.
WQ-VC-U	Y	09-May-16	Creek very turbid, high water levels but not flooding.

Water Quality Site	Sample Collected? (Y/N)	Measurement Date	Comments
WQ-VC-DBC	Y	09-May-16	WQ-VC-DBC-r completed at 17:20. Water level moderate, turbidity moderate. All snow/ice melted from site.
WQ-VC-UMN	Y	09-May-16	Creek levels high, though not flooding. Water is fairly turbid. No snow/ice remaining on either bank. No water flowing along trail to site, however, area is still wet.
WQ-VC-R	Y	09-May-16	Creek open and flowing, snow/ice remains along LDB and RDB. Sample taken approx. 50m US from LDB due to rotten ice US of culvert.
WQ-MS-S-10	Y	11-May-16	New seep in front of mill.
WQ-MS-S-9	Y	11-May-16	New seep in front of mill.
WQ-LW-SEEP-01	N	11-May-16	Site dry, no evidence of seepage.
WQ-NW-SEEP-02	N	11-May-16	Taped bag on pipe 10 May 2016 @ 08:13. Checked bag last night at 19:30 and no water in bag. Recheck this morning at 07:47 and still no water. Removed bag from pipe. Site dry.
WQ-PW	Y	11-May-16	Collect BacT at 10:35

Summary of Water Quality Results for the May 09-11, 2016 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	L1767348-21 WQ-SEEP 10/05/2016 11:35	L1767348-10 WQ-TP 10/05/2016 12:05	L1767348-13 WQ-DC-DX 10/05/2016 19:05	L1767348-1 WQ-DC-DX+105 10/05/2016 18:40	L1767348-4 WQ-DC-D1B 10/05/2016 17:10	L1767348-17 WQ-DC-U 10/05/2016 10:45	L1767348-26 WQ-DC-R 10/05/2016 9:25	L1767348-23 WQ-DC-B 10/05/2016 12:20	L1767348-24 WQ-DC-B-r 10/05/2016 12:30	QA/QC WQ-DC-B Replicate Analysis	L1767348-8 WQ-VC-U 09/05/2016 17:45	L1767348-14 WQ-VC-R 09/05/2016 12:45	L1767348-7 WQ-VC-DBC 09/05/2016 17:15	L1767348-18 WQ-VC-DBC-r 09/05/2016 17:20	QA/QC WQ-VC-DBC Replicate Analysis	L1767348-9 WQ-VC-UMN 09/05/2016 15:20	L1767348-19 WQ-BC 09/05/2016 19:05
Temperature (in-situ)	°C	-	-	-	2.6	6.7	-0.1	1.6	-0.3	1	0.2	1.3		-	1.9	2.1	2.5		-	3.3	3.9
Specific Conductivity (in-situ)	µS/cm	-	-	-	1436	842	129.5	195.8	369.3	762.1	794.8	673.7		-	85.4	137.1	106.7		-	138.6	139.8
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	6.95	7.7	7.55	7.34	7.88	7.95	7.62	7.84		-	7.58	7.51	7.61		-	7.63	7.83
Dissolved Oxygen (in-situ)	mg/L	-	-	-	3.87	9.44	11.1	9.85	11.2	11.07	10.52	11.13		-	10.69	10.96	10.58		-	10.53	10.53
Turbidity (In-situ)	NTU	-	-	-	48.6	26.3	5.35	2.51	17.35	10.79	3.51	25.9		-	18	29.3	31.9		-	36.8	39.3
Colour, True	CU	15	-	5										-					-		
Conductivity	µS/cm	-	-	2	1460	875	137	206	734	788	821	720	711	1%	103	138	109	110	1%	141	149
Hardness (as CaCO3)	mg/L	-	-	0.5	810	466	68.4	102	401	447	469	417	411	1%	53.2	70.5	55.7	56.7	2%	71.6	76.1
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.3	7.87	7.6	7.41	8.05	8.05	8.02	8.01	8.01	0%	7.69	7.77	7.67	7.74	1%	7.77	7.73
Total Suspended Solids	mg/L	-	50	3	44	26.7	***51.3***	<3.0	10	***54.7***	6.7	***92***	***133***	36%	***220***	***91.3***	***127***	***219***	53%	***149***	***97.3***
Total Dissolved Solids	mg/L	-	-	1	1100	609	74.9	116	476	524	549	479	474	1%	53.5	74.2	56.4	57.5	2%	77.1	83.1
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	230	54.1	39.9	44.3	121	117	119	108	106	2%	42.2	47.2	41.4	42.6	3%	47.2	42.7
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	<DL	<1.0	<1.0	<1.0	<1.0	<DL	<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	<DL	<1.0	<1.0	<1.0	<1.0	<DL	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	230	54.1	39.9	44.3	121	117	119	108	106	2%	42.2	47.2	41.4	42.6	3%	47.2	42.7
Ammonia, Total (as N)	mg/L	0.75	-	0.005	***3.99***	0.174	0.0106	0.0081	0.13	0.346	0.212	0.0495	0.0416	17%	0.0056	0.008	0.0076	0.0071	<2xDL	0.008	0.0073
Chloride (Cl)	mg/L	120	-	0.5	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<DL	<0.50	<0.50	<0.50	<0.50	<DL	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.10	***0.142***	0.064	0.062	0.095	0.087	0.08	0.083	0.077	<2xDL	0.053	0.05	0.042	0.046	<2xDL	0.06	0.049
Nitrate (as N)	mg/L	13	-	0.005	0.325	0.204	<0.0050	<0.0050	0.0062	0.0424	0.158	0.0246	0.0254	3%	0.0339	0.0433	0.0297	0.0299	1%	0.0424	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	0.0205	0.0058	<0.0010	<0.0010	0.0012	0.0018	0.0038	<0.0010	0.001	<DL	<0.0010	<0.0010	<0.0010	<0.0010	<DL	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	605	390	22.6	49.2	261	292	305	266	264	1%	7.44	18.5	9.81	9.83	0%	21.1	27.2
Anion Sum	meq/L	-	-	-	17.2	9.22	1.27	1.91	7.86	8.42	8.73	7.69	7.61	-	1	1.33	1.04	1.06	-	1.39	1.42
Cation Sum	meq/L	-	-	-	19.1	9.9	1.5	2.19	8.26	9.3	9.79	8.57	8.47	-	1.15	1.52	1.21	1.23	-	1.54	1.65
Cation - Anion Balance	%	-	-	-	5.1	3.6	8.1	6.7	2.5	5	5.7	5.4	5.3	-	6.9	6.7	7.7	7.3	-	5.2	7.6
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<DL	<0.0050	<0.0050	<0.0050	<0.0050	<DL	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	***0.349***	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<DL	<0.0050	<0.0050	<0.0050	<0.0050	<DL	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	2.7	<0.20	<0.20	<2.0	<0.20	0.23	<0.20	<0.20	<0.20	<DL	<0.20	<0.20	<0.20	<0.20	<DL	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	5.06	<0.50	0.61	0.63	<0.50	<0.50	<0.50	<0.50	<0.50	<DL	<0.50	<0.50	<0.50	<0.50	<DL	<0.50	0.66
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0256	***0.193***	***0.947***	0.0843	***0.126***	***0.579***	0.0776	***1.36***	***1.53***	12%	***1.62***	***1.6***	***1.83***	***2.07***	12%	***2.17***	***1.67***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00049	0.0353	0.00128	0.00262	0.00521	0.00211	0.00259	0.00294	0.00246	18%	0.00016	0.00036	0.00022	0.00021	<2xDL	0.00036	0.00061
Arsenic (As)-Total	mg/L	0.005	-	0.0001	***0.0811***	***0.104***	***0.0145***	***0.0103***	***0.0541***	***0.0121***	***0.0214***	***0.0194***	***0.0169***	14%	0.00205	0.00452	0.00317	0.0036	13%	***0.00508***	***0.0119***
Barium (Ba)-Total	mg/L	-	1.0	0.00005	0.0658	0.0108	0.0321	0.0234	0.0303	0.0399	0.033	0.0587	0.0497	17%	0.0851	0.0797	0.096	0.105	9%	0.0911	0.0654
Beryllium (Be)-Total	mg/L	-	-	0.00002	<0.000020	<0.000020	0.000046	<0.000020	<0.000020	0.000028	<0.000020	0.000059	0.00006	<2xDL	0.000073	0.000074	0.000094	0.000086	<2xDL	0.000079	0.00008
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.000050	0.0008	<0.000050	<0.000050	0.000093	<0.000050	<0.000050	<0.000050	<0.000050	<DL	<0.000050	<0.000050	<0.000050	<0.000050	<DL	<0.000050	0.000132
Boron (B)-Total	mg/L	-	-	0.01	0.049	0.035	<0.010	<0.010	0.017	0.013	0.013	0.012	0.01	<2xDL	<0.010	<0.010	<0.010	<0.010	<DL	<0.010	<0.010
Cadmium (Cd)-Total *(Lab Result)*	mg/L	0.00009	0.02	0.00001	0.000297	***0.00278***	0.0000649	***0.000744***	***0.000579***	0.000148	0.000129	0.000231	0.000218	6%	0.0000676	***0.000126***	***0.000114***	***0.000119***	4%	***0.000126***	***0.000271***
Cadmium (Cd)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00001*	*0.000370*	*0.000370*	*0.000116*	*0.000161*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	-	*0.000094*	*0.000119*	*0.000098*	*0.000099*	-	*0.000120*	*0.000126*
Calcium (Ca)-Total	mg/L	-	-	0.05	232	134	18.8	29.1	96.7	109	116	131	102	25%	14.8	19.1	15.7	16.5	5%	19.4	20.6
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00056	0.00027	0.00116	0.00017	0.00021	0.00104	0.00024	0.00248	0.00247	0%	0.00226	0.00214	0.00252	0.0028	11%	0.00293	0.00195
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00752	0.00073	0.00064	<0.00010	0.00027	0.00107	0.00069	0.00124	0.0012	3%	0.00108	0.00103	0.00135	0.00153	13%	0.00134	0.00094
Copper (Cu)-Total *(Lab Result)*	mg/L	0.002	0.2	0.0005	0.00263	***0.0409***	***0.00401***	***0.00531***	0.00255	0.00272	0.0016	***0.00509***	***0.00451***	12%	***0.00615***	***0.00624***	***0.00655***	***0.00732***	11%	***0.00688***	***0.00688***
Copper (Cu)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.0005*	*0.00400*	*0.00400*	*0.00200*	*0.00241*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	-	*0.00200*	*0.00200*	*0.00200*	*0.00200*	-	*0.00200*	*0.00200*
Iron (Fe)-Total	mg/L	0.3	1	0.01	***17.4***	***0.99***	***1.65***	0.159	***2.39***	***2.07***	***1.36***	***4.39***	***4.2***	4%	***2.8***	***2.74***	***3.21***	***3.35***	4%	***3.45***	***2.41***
Lead (Pb)-Total *(Lab Result)*	mg/L	0.001	0.1	0.00005	0.000181	***0.0524***	***0.00234***	0.0012	***0.0107***	0.00132	0.00439	0.00325	0.00303	7%	***0.00184***	***0.00309***	***0.00313***	***0.00265***	17%	***0.00338***	***0.00637***
Lead (Pb)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00005*	*0.00700*	*0.00700*	*0.00196*	*0.00326*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	-	*0.00100*	*0.00204*	*0.00100*	*0.00100*	-	*0.00208*	*0.00225*
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.0010	0.0045	<0.0010	0.0011	0.0037	0.002	0.0017	0.0033	0.0032	3%	0.0011	<0.0010	0.0014	0.001	<2xDL	0.0014	0.0015
Magnesium (Mg)-Total	mg/L	-	-	0.1	51.3	25.3	5.31	7.58	37.5	40.2	39.4	50.5	38	28%	4.94	6.31	5.06	5.27	4%	6.41	5.34
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***6.11***	***0.844***	0.0455	0.0737	***0.628***	***0.752***	0.366	0.464	0.402	14%	0.107	0.122	0.144	0.163	12%	0.15	0.258
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.0000061	0.0000242	***0.0000286***	0.000016	0.0000082	0.000013	0.0000062	0.0000147	0.0000167	<2xDL	0.0000243	0.0000238	***0.0000264***	0.0000243	<2xDL	0.0000253	***0.0000357***
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000924	0.00078	0.000073	0.000106	0.000197	0.000281	0.000332	0.000311	0.000264	16%	0.000254	0.000382	0.000335	0.000286	16%	0.000341	0.000618
Nickel (Ni)-Total *(Lab Result)*	mg/L	0.025	0.3	0.0005	0.00248	0.00157	0.00103	0.00082	0.00061	0.00153	0.00071	0.00269	0.00223	19%	0.00204	0.00201	0.00224	0.00253	12%	0.0024	0.0018
Nickel (Ni)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.0005*	*0.15000*	*0.15000*	*0.07161*	*0.09703*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	*0.02500*	*0.02500*	*0.07328*	*0.02500*	*0.02500*	*0.02500*	*0.07415*	*0.07766*
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	0.14	<0.050	<0.050	0.072	<0.050	0.18	0.163	<2xDL	0.175	0.093	0.272	0.33	19%	0.124	0.065
Potassium (K)-Total	mg/L	-	-	0.1	5.54	7.14	3.11	2.8	2.49	2.54	2.49	3.03	2.34	26%	0.8	1.01	0.85	0.93	9%	1.03	1.19
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.000211	0.000052	<0.000050	0.000089	0.000075	0.000092	0.000078	0.000113	0.000099	<2xDL	0.000071	0.000079	0.000071	0.00007	<2xDL	0.0001	0.000063
Silicon (Si)-Total	mg/L	-	-	0.05	7.43	2.03	4.52	3.82	4.32	4.87	3.94	7.14	6.23	14%	5.92	6.77	6.16	6.59	7%	7.19	6.38
Silver (Ag)-Total	mg/L	0.00025	0.1	0.00001	0.000033	***0.00123***	0.000047	0.000068	0.000164	0.000038	0.000076	0.000059	0.000064	8%	0.000019	0.000038	0.000033	0.000027	<2xDL	0.000041	0.000109
Sodium (Na)-Total	mg/L	-	-	0.05	35.1	8.11	0.987	1.26	3.01	5.41	7.1	4.44	3.72	18%	1.36	1.7	1.39	1.48	6%	1.75	1.75
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.674	0.326	0.0597	0.0744	0.262	0.335	0.354	0.4	0.314	24%	0.148	0.174	0.166	0.138	18%	0.156	0.131
Sulfur (S)-Total	mg/L	-	-	0.5	213	140	8.37	18.3	95.6	105	109	124	94.5	27%	2.95	6.87	3.77	3.79	1%	7.77	9.38
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	0.00016	0.00003	0.000017	0.000033	0.000017	<0.000010	0.000025	0.000025	<2xDL	0.000015	0.000024	0.000021	0.000019	<2xDL	0.000024	0.000033
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	<DL	<0.00010	<0.00010	<0.00010	<0.00010	<DL	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.0003	0.00145	0.00136	0.0539	0.00154	0.00467	0.03	0.00285	0.0626	0.0773	21%	0.0497	0.0545	0.053	0.0578	9%	0.0742	0.0555
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00137	0.000626	0.000104	0.000255	0.000857	0.00144	0.00147	0.00193	0.00157	21%	0.000647	0.000736	0.000778	0.000752	3%	0.000746	0.000698
Vanadium (V)-Total	mg/L	-	-	0.0005	0.00273	0.00052	0.00427	<0.00050	0.00088	0.0026	0.00068	0.00638	0.00643	1%	0.00592	0.00546	0.00683	0.00729	7%	0.00729	0.00432
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0204	***0.231***	0.0093	***0.132***	***0.119***	0.0157	0.0075	***0.0331***	0.0288	14%	0.0106	0.0126	0.0136	0.0157	14%	0.0166	0.0192
Zirconium (Zr)-Total	mg/L	-	-	0.0003	0.00065	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<DL	<0.00030	0.00048	0.00036	<0.00030	<DL	0.00034	0.00052
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.001	0.0114	0.0095	0.0411	0.0586	0.0056	0.0535	0.0121	0.0509	0.052	2%	0.0747	0.0786	0.0833	0.0815	2%	0.0788	***0.157***
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00044	0.0275	0.00082	0.00229	0.00347	0.00191	0.00142	0.00205	0.00203	1%	<0.00010	0.00014	<0.00010	<0.00010	<DL	0.00014	0.00027
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.0464***	***0.0368***	***0.00527***	***0.00779***	***0.0197***	***0.00607***	***0.00639***	***0.00541***	***0.00521***	4%	0.00035	0.00088	0.00058	0.0006	3%	0.00089	0.00242
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0627	0.00709	0.0192	0.022	0.0258	0.0267	0.0306	0.0257	0.0248	4%	0.0421	0.0457	0.0423	0.0425	0%	0.0453	0.0372
Beryllium (Be)-Dissolved	mg/L	-	-	0.00002	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<DL	<0.000020	<0.000020	<0.000020	<0.000020	<DL	<0.000020	0.000026
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<DL	<0.000050	<0.000050	<0.000050	<0.000050	<DL	<0.000050	<0.000050
Boron (B)-Dissolved	mg/L	-	-	0.01	0.048	0.034	<0.010	<0.010	0.015	0.012	0.01	<0.010	<0.010	<DL	<0.010	<0.010	<0.010	<0.010	<DL	<0.010	<0.010
Cadmium (Cd)-Dissolved *(Lab Result)*	mg/L	0.00009	-	0.00001	0.000227	***0.00226***	0.0000225	***0.000668***	0.00017	0.0000537	0.000041	0.0000506	0.0000436	15%	0.0000171	0.0000276	0.0000248	0.0000312	<2xDL	0.0000274	0.0000993
Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00001*	*0.000370*	*0.000370*	*0.000116*	*0.000161*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	-	*0.000094*	*0.000119*	*0.000098*	*0.000099*	-	*0.000120*	*0.000126*
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	239	143	19	28.7	98.6	112	121	103	102	1%	13.9	18.6	14.7	15	2%	18.9	21.7
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00039	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	<DL	0.00013	0.00014	0.00012	0.00011	<2xDL	0.0001	0.00018
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00732	0.00064	<0.00010	<0.00010	0.00022	0.00068	0.00068	0.00028	0.00028	<2xDL	<0.00010	0.00012	0.00011	<0.00010	<DL	0.00011	0.00017
Copper (Cu)-Dissolved *(Lab Result)*	mg/L	0.002	-	0.0002	0.00148	***0.025***	0.002	***0.00496***	0.00103	0.00119	0.00114	0.00116	0.00115	1%	***0.00269***	***0.00294***	***0.00284***	***0.0028***	1%	***0.00273***	***0.00383***
Copper (Cu)-Diss. (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00200*	*0.00400*	*0.00400*	*0.00200*	*0.00241*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	-	*0.00200*	*0.00200*	*0.00200*	*0.00200*	-	*0.00200*	*0.00200*
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	***13.9***	0.045	0.071	0.114	***0.355***	***0.557***	***0.48***	***0.433***	***0.422***	3%	0.17	0.243	0.173	0.184	6%	0.188	0.244
Lead (Pb)-Dissolved *(Lab Result)*	mg/L	0.001	-	0.00005	<0.000050	0.0016	0.000064	0.000372	0.000343	0.000126	0.00123	0.000147	0.000126	<2xDL	<0.000050	0.000089	0.000073	0.000079	<2xDL	0.00011	0.000359
Lead (Pb)-Diss. (Hardness Adjusted Guideline)	*mg/L*			*0.00005*	*0.00700*	*0.00700*	*0.00196*	*0.00326*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	-	*0.00100*	*0.00204*	*0.00100*	*0.00100*	-	*0.00208*	*0.00225*
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.0010	0.0042	<0.0010	<0.0010	0.0033	0.0025	0.0017	0.0019	0.0022	<2xDL	<0.0010	<0.0010	<0.0010	<0.0010	<DL	<0.0010	<0.0010
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	51.7	26.8	5.11	7.44	37.7	40.8	40.4	38.7	38.1	2%	4.51	5.86	4.59	4.67	2%	5.95	5.32
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	5.95	0.767	0.0147	0.0678	0.502	0.673	0.34	0.286	0.306	7%	0.0197	0.035	0.0353	0.0344	3%	0.0315	0.165
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.0000050	0.0000071	0.0000103	0.0000173	<0.0000050	0.0000053	<0.0000050	0.0000051	0.000006	<2xDL	0.0000144	0.0000091	0.0000166	0.0000096	<2xDL	0.0000155	0.0000118
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000889	0.000755	0.000055	0.000078	0.000142	0.000241	0.000268	0.000189	0.00019	<2xDL	0.000228	0.000275	0.000264	0.000234	12%	0.000277	0.000523
Nickel (Ni)-Dissolved *(Lab Result)*	mg/L	0.025	-	0.0005	0.00231	0.00155	<0.00050	0.00076	<0.00050	0.00073	0.00075	0.00064	0.00058	<2xDL	0.00057	0.00061	0.0006	0.00064	<2xDL	0.00062	0.00071
Nickel (Ni)-Diss. (Hardness Adjusted Guideline)	*mg/L*			*0.0005*	*0.15000*	*0.15000*	*0.07161*	*0.09703*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	-	*0.02500*	*0.07328*	*0.02500*	*0.02500*	-	*0.07415*	*0.07766*
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	<DL	<0.050	<0.050	<0.050	<0.050	<DL	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	5.75	7.36	3.07	2.82	2.54	2.56	2.6	2.22	2.21	0%	0.64	0.75	0.68	0.71	4%	0.75	0.91
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.000221	<0.000050	0.000055	0.000066	0.000055	0.000067	0.000144	<0.000050	0.000066	<DL	<0.000050	<0.000050	<0.000050	<0.000050	<DL	<0.000050	<0.000050
Silicon (Si)-Dissolved	mg/L	-	-	0.05	7.41	1.58	3.24	3.65	3.97	3.98	3.86	3.82	3.76	2%	3.58	4.02	3.6	3.65	1%	3.78	3.85
Silver (Ag)-Dissolved	mg/L	0.00025	-	0.00001	<0.000010	0.000129	<0.000010	0.000027	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<DL	<0.000010	<0.000010	<0.000010	<0.000010	<DL	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	34.5	7.79	0.921	1.19	2.85	5.16	6.99	3.42	3.55	4%	1.24	1.67	1.3	1.27	2%	1.58	1.69
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.665	0.33	0.0556	0.07	0.253	0.335	0.293	0.304	0.302	1%	0.146	0.158	0.146	0.136	7%	0.162	0.138
Sulfur (S)-Dissolved	mg/L	-	-	0.5	208	143	8.21	17.4	94.9	104	109	94.3	93.4	1%	2.93	6.62	3.72	3.69	1%	7.6	9.79
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000137	<0.000010	0.000014	0.000022	<0.000010	<0.000010	<0.000010	<0.000010	<DL	<0.000010	<0.000010	<0.000010	<0.000010	<DL	<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	<DL	<0.00010	<0.00010	<0.00010	<0.00010	<DL	<0.00010	0.00015
Titanium (Ti)-Dissolved	mg/L	-	-	0.0003	0.00089	<0.00030	0.00069	0.00089	<0.00030	0.00058	0.00042	0.00059	0.00063	<2xDL	0.00076	0.00109	0.001	0.00102	<2xDL	0.00105	0.00246
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00139	0.000619	0.000032	0.00023	0.000797	0.0014	0.00124	0.00137	0.00136	1%	0.000282	0.000364	0.000319	0.000299	6%	0.000371	0.000575
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.0018	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<DL	<0.00050	<0.00050	<0.00050	<0.00050	<DL	<0.00050	<0.00050
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0191	***0.195***	0.0015	***0.132***	***0.0801***	0.0073	0.0042	0.0092	0.0084	9%	0.0011	0.001	0.0043	0.0013	107%	0.0016	0.0065
Zirconium (Zr)-Dissolved	mg/L	-	-	0.0003	0.00063	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<DL	<0.00030	<0.00030	<0.00030	<0.00030	<DL	<0.00030	<0.00030

Applied Guidelines: 'Federal CCME Canadian Environmental Quality Guidelines (January 2015), CCME: Freshwater Aquatic Life 'Mount Nansen Effluent Discharge Standards

COLOUR KEY:
Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds Hardness Dependent Calculated Guideline (CCME)
Data flag for Detection Limit Adjustment --> Please refer to the lab COA report and lab excel report for more info
QA/QC Codes: RPD - Relative Percent Difference, <DL - below detection limit, and <2XDL - less than two times the detection limit.

Notes:

QA/QC Comments:

The **Travel Blank** sample did not have any parameters above detection limit. No contamination from storage or transport is suspected.

The **Field Blank** did not have any parameters above detection limits. No contamination from field sampling methodology is suspected.

QA/QC Replicate Analysis -

The average RPD of the replicate sample WQ-DC-B-R was 9% with an average difference of 14% for total and 3% for dissolved metals.
Total calcium, magnesium, potassium, strontium, sulfur, titanium and uranium had RPD>20%. Total suspended solids had an RPD of 36%.

The average RPD of the replicate sample WQ-VC-DBC-R was 9% with an average difference of 10% for total and 10% for dissolved metals.
Dissolved zinc had a RPD of 107% and total suspended solids had a RPD of 53%. All other parameters had RPD<20%.

Summary of Water Quality Results for the May 09-11, 2016 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	L1767348-16 WQ-PC-U 10/05/2016 8:55	L1767348-5 WQ-PC-D 10/05/2016 8:30	L1767348-6 WQ-CH-P-13-01 10/05/2016 16:10	L1767348-2 WQ-DESS-01 10/05/2016 15:55	L1767348-20 WQ-DESS-02 10/05/2016 16:20	L1767348-22 WQ-DESS-03 10/05/2016 15:40	L1767348-3 WQ-MS-S-03 10/05/2016 17:50	L1767348-11 WQ-MS-S-09 11/05/2016 8:55	L1767348-12 WQ-MS-S-10 11/05/2016 9:05	L1767348-15 WQ-MS-S-A 10/05/2016 18:20	L1767348-25 WQ-FIELD BLANK 10/05/2016 11:40	L1767348-27 TRAVEL BLANK 10/05/2016 18:40	L1767406-1 WQ-PW 11/05/2016 10:30
Temperature (in-situ)	°C	-	-	-	-0.1	0.2	0.4	1.2	1.6	0.9	1.2	3.1	3.7	5.4			0.4
Specific Conductivity (in-situ)	µS/cm	-	-	-	220.7	229.1	1481	567	1083	48.4	1175	2057	1305	1349			376.8
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.29	7.47	***5.17***	***6.22***	7.03	6.97	7.17	7.11	7.44	8.13			7.72
Dissolved Oxygen (in-situ)	mg/L	-	-	-	10.97	11.25	11.07	10.89	11.03	10.6	3.9	7.72	9.59	9.83			2.2
Turbidity (In-situ)	NTU	-	-	-	130	98.1	1.25	0.9	0.55	4.96	11.72	2.54	0.53	55.6			<0.10
Colour, True	CU	15	-	5													<5.0
Conductivity	µS/cm	-	-	2	227	238	1530	1060	1120	41.6	1210	2010	2160	1380	<2.0	<2.0	386
Hardness (as CaCO3)	mg/L	-	-	0.5	111	112	919	620	672	25.4	704	1260	1420	873	<0.50	<0.50	203
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.46	7.53	***4.92***	***6.06***	7.88	***6.29***	7.75	7.93	7.97	8.23	***5.54***	***5.55***	8.19
Total Suspended Solids	mg/L	-	50	3	***193***	***363***	<3.0	<3.0	***158***	3.3	23.3	42.7	8.7	34	<3.0	<3.0	
Total Dissolved Solids	mg/L	-	-	1	134	140	1200	777	832	19.3	839	1600	1770	1020	<1.0	<1.0	212
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	39.6	42.1	<1.0	3.5	65.9	6.6	263	209	337	209	<1.0	<1.0	
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	39.6	42.1	<1.0	3.5	65.9	6.6	263	209	337	209	<1.0	<1.0	171
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.217	0.192	0.0298	0.0128	0.0107	0.0096	0.0367	<0.0050	<0.0050	0.0122	<0.0050	0.0081	
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<2.5	<1.0	<1.0	<0.50	<1.0	<2.5	<2.5	<1.0	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.064	0.053	<0.10	0.042	0.06	0.031	***0.192***	0.1	0.11	0.094	<0.020	<0.020	0.104
Nitrate (as N)	mg/L	13	-	0.005	0.0424	0.064	0.026	0.012	0.034	<0.0050	0.033	0.435	0.816	0.045	<0.0050	<0.0050	0.115
Nitrite (as N)	mg/L	0.06	-	0.001	0.0015	0.0022	<0.0050	<0.0020	<0.0020	<0.0010	<0.0020	<0.0050	<0.0050	<0.0020	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	64.2	68.5	888	563	539	3.41	427	1040	1070	598	<0.30	<0.30	35.3
Anion Sum	meq/L	-	-	-	2.14	2.28	18.5	11.8	12.5	0.2	14.2	25.9	29	16.6	<0.10	<0.10	4.16
Cation Sum	meq/L	-	-	-	2.48	2.47	18.8	12.7	13.8	0.62	14.5	25.9	29.3	17.8	<0.10	<0.10	4.3
Cation - Anion Balance	%	-	-	1	7.5	4.2	1	3.7	4.6	50.5	1.3	0.2	0.4	3.5	0	0	1.7
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Cyanate	mg/L	-	-	0.2	0.29	0.26	<0.20	<0.20	0.27	0.32	<0.20	<0.20	<0.20	<2.0	<0.20	<0.20	
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	0.68	0.63	0.74	0.57	1.44	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Aluminum (Al)-Total	mg/L	0.1	-	0.003	***4.76***	***3.64***	***0.291***	***0.208***	***1.44***	***0.319***	***0.591***	***0.546***	0.0062	***0.729***	<0.0030	<0.0030	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00218	0.00269	0.00013	0.00015	0.0006	0.00015	0.0176	0.102	0.0263	0.0344	<0.00010	<0.00010	<0.00050
Arsenic (As)-Total	mg/L	0.005	-	0.0001	***0.0232***	***0.0274***	0.00113	0.00136	***0.0193***	0.00149	***0.183***	***0.253***	***0.0547***	***0.141***	<0.00010	<0.00010	0.00039
Barium (Ba)-Total	mg/L	-	1.0	0.00005	0.155	0.127	0.0225	0.0312	0.0403	0.0316	0.0292	0.0171	0.0248	0.0304	<0.000050	<0.000050	0.09
Beryllium (Be)-Total	mg/L	-	-	0.00002	0.000229	0.00018	0.000056	0.000041	0.00006	0.000029	0.00003	0.000055	<0.000040	0.000039	<0.000020	<0.000020	
Bismuth (Bi)-Total	mg/L	-	-	0.0005	0.000183	0.000249	<0.000050	<0.000050	<0.000050	<0.000050	0.000136	0.000064	<0.00010	0.000367	<0.000050	<0.000050	
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.036	0.362	0.023	<0.010	<0.010	<0.10
Cadmium (Cd)-Total *(Lab Result)*	mg/L	0.00009	0.02	0.00001	***0.000595***	***0.00119***	***0.0192***	***0.00925***	0.000223	0.0000498	***0.00385***	***0.0552***	***0.0062***	***0.0168***	<0.0000050	<0.0000050	<0.00020
Cadmium (Cd)-Total (Hardness Adjusted Guideline)	*mg/L*	*-*	*-*	*0.00001*	*0.000173*	*0.000174*	*0.000370*	*0.000370*	*0.000370*	*0.000051*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	*0.000285*
Calcium (Ca)-Total	mg/L	-	-	0.05	34.2	33.7	178	133	199	7.14	184	282	312	191	<0.050	<0.050	47.5
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00651	0.00506	0.00018	0.00017	0.00148	0.00027	0.00069	0.00056	<0.00020	0.00102	<0.00010	<0.00010	<0.0020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00224	0.00205	0.00017	0.00079	0.00062	<0.00010	0.00173	0.00107	<0.00020	0.00134	<0.00010	<0.00010	
Copper (Cu)-Total *(Lab Result)*	mg/L	0.002	0.2	0.0005	***0.0131***	***0.0269***	0.00161	0.00224	***0.00494***	***0.00359***	***0.023***	***0.0428***	0.003	***0.0252***	<0.00050	<0.00050	<0.0010
Copper (Cu)-Total (Hardness Adjusted Guideline)	*mg/L*	*-*	*-*	*0.00005*	*0.00259*	*0.00261*	*0.00400*	*0.00400*	*0.00400*	*0.00200*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	*0.00400*
Iron (Fe)-Total	mg/L	0.3	1	0.01	***8.09***	***6.88***	0.082	0.155	***1.73***	0.169	***4.66***	***2.1***	0.019	***1.95***	<0.010	<0.010	<0.030
Lead (Pb)-Total *(Lab Result)*	mg/L	0.001	0.1	0.00005	***0.0165***	***0.0201***	0.000062	<0.000050	0.00439	<0.000050	***0.029***	***0.235***	0.00202	***0.0817***	<0.000050	<0.000050	0.00056
Lead (Pb)-Total (Hardness Adjusted Guideline)	*mg/L*	*-*	*-*	*0.00005*	*0.00363*	*0.00368*	*0.00700*	*0.00700*	*0.00700*	*0.00100*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	*0.00700*
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0035	0.0028	0.0034	0.0026	<0.0010	<0.0010	0.0108	0.0119	0.0101	0.0097	<0.0010	<0.0010	
Magnesium (Mg)-Total	mg/L	-	-	0.1	7.99	8.05	110	71.1	35.9	1.41	63.9	143	156	94.5	<0.10	<0.10	20.5
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.353	0.433	***1.05***	***0.851***	0.117	0.00663	***1.62***	0.327	0.00811	***0.718***	<0.00010	<0.00010	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	***0.0000466***	***0.0000365***	0.0000139	0.0000137	***0.0000347***	0.000024	0.0000066	***0.0000719***	<0.0000050	0.0000169	<0.0000050	<0.0000050	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00039	0.000391	<0.000050	<0.000050	0.000108	<0.000050	0.000351	0.000319	0.00032	0.000384	<0.000050	<0.000050	
Nickel (Ni)-Total *(Lab Result)*	mg/L	0.025	0.3	0.0005	0.00416	0.00345	0.0106	0.00612	0.00157	0.00136	0.00226	0.00495	0.0021	0.00293	<0.00050	<0.00050	
Nickel (Ni)-Total (Hardness Adjusted Guideline)	*mg/L*	*-*	*-*	*0.0005*	*0.10347*	*0.10417*	*0.15000*	*0.15000*	*0.15000*	*0.02500*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	
Phosphorus (P)-Total	mg/L	-	-	0.05	0.181	0.141	<0.050	<0.050	0.136	<0.050	0.061	0.059	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Total	mg/L	-	-	0.1	1.62	1.56	2.22	1.95	3.04	1.29	3.6	5.59	6.71	4.45	<0.10	<0.10	0.94
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.000154	0.000116	0.000101	0.00008	0.000086	<0.000050	0.000073	0.000675	0.00064	0.000347	<0.000050	<0.000050	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	12.2	9.85	4.6	4.53	9.07	3.13	7.88	5.56	5.18	4.66	<0.050	<0.050	
Silver (Ag)-Total	mg/L	0.00025	0.1	0.00001	***0.000289***	***0.000307***	0.000017	0.000012	0.000182	<0.000010	***0.000424***	***0.00208***	0.000048	***0.00147***	<0.000010	<0.000010	
Sodium (Na)-Total	mg/L	-	-	0.05	2.64	2.67	3.58	2.74	5.42	0.801	5.24	8.7	17.8	5.34	<0.050	<0.050	5
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.217	0.22	0.461	0.339	0.37	0.0331	0.431	0.681	0.79	0.47	<0.00020	<0.00020	
Sulfur (S)-Total	mg/L	-	-	0.5	22.8	24.6	310	203	186	1.49	156	374	379	211	<0.50	<0.50	
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000087	0.000074	<0.000010	<0.000010	0.000033	<0.000010	0.000123	0.000332	0.000122	0.00037	<0.000010	<0.000010	
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	0.00014	<0.00010	<0.00010	
Titanium (Ti)-Total	mg/L	-	-	0.0003	0.134	0.102	0.00034	0.00077	0.0407	0.00139	0.0372	0.0244	<0.00060	0.0263	<0.00030	<0.00030	
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00161	0.00127	<0.000010	0.00001	0.000282	0.000014	0.00404	0.00393	0.00485	0.00347	<0.000010	<0.000010	0.00189
Vanadium (V)-Total	mg/L	-	-	0.0005	0.0158	0.0129	<0.00050	<0.00050	0.00331	<0.00050	0.00286	0.00311	<0.0010	0.0028	<0.00050	<0.00050	
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.0448***	***0.091***	***6.45***	***3.02***	0.0202	0.0076	***0.954***	***4.79***	***1.53***	***1.31***	<0.0030	<0.0030	<0.050
Zirconium (Zr)-Total	mg/L	-	-	0.0003	0.00034	0.00039	<0.00030	<0.00030	0.00037	0.00031	<0.00030	<0.00030	<0.00060	<0.00030	<0.00030	<0.00030	
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.001	0.0057	0.0608	***0.245***	***0.196***	0.0093	***0.3***	0.0011	0.0029	<0.0020	0.0058	0.0011		
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00079	0.0011	<0.00010	0.00011	0.00011	0.00011	0.0131	0.084	0.0265	0.0238	<0.00010		
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00445	0.00477	0.00097	0.00115	0.00299	0.00146	***0.0656***	***0.0364***	***0.056***	***0.0378***	<0.00010		
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0585	0.0509	0.022	0.0306	0.021	0.0326	0.0156	0.00781	0.0253	0.0198	<0.000050		
Beryllium (Be)-Dissolved	mg/L	-	-	0.00002	<0.000020	<0.000020	0.000052	0.000035	<0.000020	0.000028	<0.000020	<0.000020	<0.000040	<0.000020	<0.000020		
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050	<0.000050		
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.035	0.339	0.024	<0.010		
Cadmium (Cd)-Dissolved *(Lab Result)*	mg/L	0.00009	-	0.00001	0.0000306	***0.000249***	***0.0176***	***0.00912***	0.0000194	***0.0000509***	***0.000831***	***0.0481***	***0.00618***	***0.0161***	<0.0000050		
Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)	*mg/L*	*-*	*-*	*0.00001*	*0.000173*	*0.000174*	*0.000370*	*0.000370*	*0.000370*	*0.000051*	*0.000370*	*0.000370*	*0.000370*	*0.000370*	*0.000370*		
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	32.7	32.6	186	133	208	7.68	181	280	312	192	<0.050		
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00012	0.0007	<0.00010	0.00012	<0.00010	0.00017	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010		
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00035	0.00036	0.00017	0.00074	<0.00010	<0.00010	0.00104	0.00013	<0.00020	0.00101	<0.00010		
Copper (Cu)-Dissolved *(Lab Result)*	mg/L	0.002	-	0.0002	0.00148	***0.011***	0.00146	0.00209	0.00037	***0.00358***	0.00062	***0.0123***	0.00274	***0.00862***	<0.00020		
Copper (Cu)-Diss. (Hardness Adjusted Guideline)	*mg/L*	*-*	*-*	*0.00200*	*0.00259*	*0.00261*	*0.00400*	*0.00400*	*0.00400*	*0.00200*	*0.00400*	*0.00400*	*0.00400*	*0.00400*	*0.00400*		
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	***1.84***	***1.51***	0.058	0.141	<0.010	0.137	***1.6***	<0.010	<0.010	0.013	<0.010		
Lead (Pb)-Dissolved *(Lab Result)*	mg/L	0.001	-	0.00005	0.000815	0.00138	<0.000050	<0.000050	<0.000050	<0.000050	0.000119	0.00258	0.00115	0.00105	<0.000050		
Lead (Pb)-Diss. (Hardness Adjusted Guideline)	*mg/L*			*0.00005*	*0.00363*	*0.00368*	*0.00700*	*0.00700*	*0.00700*	*0.00100*	*0.00700*	*0.00700*	*0.00700*	*0.00700*	*0.00700*		
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.0010	<0.0010	0.0033	0.0024	<0.0010	<0.0010	0.0101	0.0115	0.01	0.0087	<0.0010		
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	7.08	7.34	110	70.2	37.2	1.52	61.2	137	155	95.5	<0.10		
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.266	0.3	0.898	0.817	0.00387	0.00337	1.39	0.14	0.00735	0.632	<0.00010		
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	0.0000061	0.0000112	0.0000126	0.0000145	<0.0000050	0.000022	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050		
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.00017	0.000302	<0.000050	<0.000050	<0.000050	<0.000050	0.000284	0.000265	0.00025	0.000339	<0.000050		
Nickel (Ni)-Dissolved *(Lab Result)*	mg/L	0.025	-	0.0005	<0.00050	0.0007	0.0096	0.00584	<0.00050	0.00135	0.00163	0.00443	0.0021	0.00262	<0.00050		
Nickel (Ni)-Diss. (Hardness Adjusted Guideline)	*mg/L*			*0.0005*	*0.10347*	*0.10417*	*0.15000*	*0.15000*	*0.15000*	*0.02500*	*0.15000*	*0.15000*	*0.15000*	*0.15000*	*0.15000*		
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Potassium (K)-Dissolved	mg/L	-	-	0.1	1.08	1.05	2.32	1.95	3.03	1.42	3.32	5.21	6.5	4.24	<0.10		
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.000053	<0.000050	0.000086	0.000072	<0.000050	<0.000050	<0.000050	0.000567	0.00059	0.000357	<0.000050		
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.05	3.91	4.89	4.45	7.37	3.33	6.61	4.53	5.04	3.1	<0.050		
Silver (Ag)-Dissolved	mg/L	0.00025	-	0.00001	<0.000010	0.000013	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000043	<0.000020	0.00005	<0.000010		
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.48	2.45	3.54	2.66	5.56	0.81	4.93	7.99	17.6	5.1	<0.050		
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.198	0.202	0.455	0.331	0.373	0.034	0.414	0.664	0.761	0.458	<0.00020		
Sulfur (S)-Dissolved	mg/L	-	-	0.5	22.8	24.1	314	201	190	1.54	147	357	370	210	<0.50		
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000074	0.000288	0.000119	0.000315	<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	<0.00020	<0.00010	<0.00010		
Titanium (Ti)-Dissolved	mg/L	-	-	0.0003	0.00121	0.00121	<0.00030	0.00051	<0.00030	0.00077	<0.00030	<0.00030	<0.00060	<0.00030	<0.00030		
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000345	0.000366	<0.000010	<0.000010	0.000193	<0.000010	0.0038	0.00377	0.00474	0.00345	<0.000010		
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.00139	0.00133	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050		
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0051	0.0264	***6.29***	***3.01***	0.0024	0.0081	***0.835***	***4.37***	***1.57***	***1.25***	<0.0010		
Zirconium (Zr)-Dissolved	mg/L	-	-	0.0003	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0.00034	<0.00030	<0.00030	<0.00060	<0.00030	<0.00030		

Applied Guidelines: 'Federal CCME Canadian Environmental Quality Guidelines (January 2015), CCME: Freshwater Aquatic Life 'Mount Nansen Effluent Discharge Standards

COLOUR KEY:
Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds Hardness Dependent Calculated Guideline (CCME)
Data flag for Detection Limit Adjustment --> Please refer to the lab COA report and lab excel report for more info
QA/QC Codes: RPD - Relative Percent Difference, <DL - below detection limit, and <2XDL - less than two times the detection limit.

ATTACHMENT 5: LABORATORY CERTIFICATES OF ANALYSIS AND YUKON ENVIRONMENTAL HEALTH SERVICES BACTERIOLOGICAL RESULTS

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

Date Received: 11-MAY-16
Report Date: 02-JUN-16 16:06 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1767348

Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANAEN 16-Y-0089
C of C Numbers: 1, 2, 3, 4, 5, 6
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-1 WATER 10-MAY-16 18:40 WQ-DC-DX+105	L1767348-2 WATER 10-MAY-16 15:55 WQ-DESS-01	L1767348-3 WATER 10-MAY-16 17:50 WQ-MS-S-03	L1767348-4 WATER 10-MAY-16 17:10 WQ-DC-D1B	L1767348-5 WATER 10-MAY-16 08:30 WQ-PC-D
WATER						
Physical Tests	Conductivity (uS/cm)	206	1060	1210	734	238
	Hardness (as CaCO3) (mg/L)	102	620	704	401	112
	pH (pH)	7.41	6.06	7.75	8.05	7.53
	Total Suspended Solids (mg/L)	<3.0	<3.0	23.3	10.0	363
	Total Dissolved Solids (mg/L)	116	777	839	476	140
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	44.3	3.5	263	121	42.1
	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)	44.3	3.5	263	121	42.1
	Ammonia, Total (as N) (mg/L)	0.0081	0.0128	0.0367	0.130	0.192
	Chloride (Cl) (mg/L)	<0.50	<1.0 DLDS	<1.0 DLDS	<0.50	<0.50
	Fluoride (F) (mg/L)	0.062	0.042	0.192	0.095	0.053
	Nitrate (as N) (mg/L)	<0.0050	0.012	0.033	0.0062	0.0640
	Nitrite (as N) (mg/L)	<0.0010	<0.0020 DLDS	<0.0020 DLDS	0.0012	0.0022
	Sulfate (SO4) (mg/L)	49.2	563	427	261	68.5
	Anion Sum (meq/L)	1.91	11.8	14.2	7.86	2.28
	Cation Sum (meq/L)	2.19	12.7	14.5	8.26	2.47
	Cation - Anion Balance (%)	6.7	3.7	1.3	2.5	4.2
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)	<2.0 DLIS	<0.20	<0.20	<0.20	0.26
	Thiocyanate (SCN) (mg/L)	0.63	0.74	<0.50	<0.50	0.68 SP
Total Metals	Aluminum (Al)-Total (mg/L)	0.0843	0.208	0.591	0.126	3.64
	Antimony (Sb)-Total (mg/L)	0.00262	0.00015	0.0176	0.00521	0.00269
	Arsenic (As)-Total (mg/L)	0.0103	0.00136	0.183	0.0541	0.0274
	Barium (Ba)-Total (mg/L)	0.0234	0.0312	0.0292	0.0303	0.127
	Beryllium (Be)-Total (mg/L)	<0.000020	0.000041	0.000030	<0.000020	0.000180
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	0.000136	0.000093	0.000249
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	0.017	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000744	0.00925	0.00385	0.000579	0.00119
	Calcium (Ca)-Total (mg/L)	29.1	133	184	96.7	33.7
	Chromium (Cr)-Total (mg/L)	0.00017	0.00017	0.00069	0.00021	0.00506
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00079	0.00173	0.00027	0.00205
	Copper (Cu)-Total (mg/L)	0.00531	0.00224	0.0230	0.00255	0.0269
	Iron (Fe)-Total (mg/L)	0.159	0.155	4.66	2.39	6.88
	Lead (Pb)-Total (mg/L)	0.00120	<0.000050	0.0290	0.0107	0.0201
	Lithium (Li)-Total (mg/L)	0.0011	0.0026	0.0108	0.0037	0.0028

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-6 WATER 10-MAY-16 16:10 WQ-CH-P-13-01	L1767348-7 WATER 09-MAY-16 17:15 WQ-VC-DBC	L1767348-8 WATER 09-MAY-16 17:45 WQ-VC-U	L1767348-9 WATER 09-MAY-16 15:20 WQ-VC-UMN	L1767348-10 WATER 10-MAY-16 12:05 WQ-TP
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
WATER						
Physical Tests	Conductivity (uS/cm)	1530	109	103	141	875
	Hardness (as CaCO3) (mg/L)	919	55.7	53.2	71.6	466
	pH (pH)	4.92	7.67	7.69	7.77	7.87
	Total Suspended Solids (mg/L)	<3.0	127	220	149	26.7
	Total Dissolved Solids (mg/L)	1200	56.4	53.5	77.1	609
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	41.4	42.2	47.2	54.1
	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)	<1.0	41.4	42.2	47.2	54.1
	Ammonia, Total (as N) (mg/L)	0.0298	0.0076	0.0056	0.0080	0.174
	Chloride (Cl) (mg/L)	<2.5 DLDS	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.10 DLDS	0.042	0.053	0.060	0.142
	Nitrate (as N) (mg/L)	0.026	0.0297	0.0339	0.0424	0.204
	Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.0010	<0.0010	<0.0010	0.0058
	Sulfate (SO4) (mg/L)	888	9.81	7.44	21.1	390
	Anion Sum (meq/L)	18.5	1.04	1.00	1.39	9.22
	Cation Sum (meq/L)	18.8	1.21	1.15	1.54	9.90
	Cation - Anion Balance (%)	1.0	7.7	6.9	5.2	3.6
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)	0.63	<0.50	<0.50	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.291	1.83	1.62	2.17	0.193
	Antimony (Sb)-Total (mg/L)	0.00013	0.00022	0.00016	0.00036	0.0353
	Arsenic (As)-Total (mg/L)	0.00113	0.00317	0.00205	0.00508	0.104
	Barium (Ba)-Total (mg/L)	0.0225	0.0960	0.0851	0.0911	0.0108
	Beryllium (Be)-Total (mg/L)	0.000056	0.000094	0.000073	0.000079	<0.000020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000800
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	0.035
	Cadmium (Cd)-Total (mg/L)	0.0192	0.000114	0.0000676	0.000126	0.00278
	Calcium (Ca)-Total (mg/L)	178	15.7	14.8	19.4	134
	Chromium (Cr)-Total (mg/L)	0.00018	0.00252	0.00226	0.00293	0.00027
	Cobalt (Co)-Total (mg/L)	0.00017	0.00135	0.00108	0.00134	0.00073
	Copper (Cu)-Total (mg/L)	0.00161	0.00655	0.00615	0.00688	0.0409
	Iron (Fe)-Total (mg/L)	0.082	3.21	2.80	3.45	0.990
	Lead (Pb)-Total (mg/L)	0.000062	0.00313	0.00184	0.00338	0.0524
	Lithium (Li)-Total (mg/L)	0.0034	0.0014	0.0011	0.0014	0.0045

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-11 WATER 11-MAY-16 08:55 WQ-MS-S-09	L1767348-12 WATER 11-MAY-16 09:05 WQ-MS-S-10	L1767348-13 WATER 10-MAY-16 19:05 WQ-DC-DX	L1767348-14 WATER 09-MAY-16 12:45 WQ-VC-R	L1767348-15 WATER 10-MAY-16 18:20 WQ-MS-S-A
WATER						
Physical Tests	Conductivity (uS/cm)	2010	2160	137	138	1380
	Hardness (as CaCO3) (mg/L)	1260	1420	68.4	70.5	873
	pH (pH)	7.93	7.97	7.60	7.77	8.23
	Total Suspended Solids (mg/L)	42.7	8.7	51.3	91.3	34.0
	Total Dissolved Solids (mg/L)	1600	1770	74.9	74.2	1020
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	209	337	39.9	47.2	209
	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)	209	337	39.9	47.2	209
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0106	0.0080	0.0122
	Chloride (Cl) (mg/L)	<2.5 DLDS	<2.5 DLDS	<0.50	<0.50	<1.0 DLDS
	Fluoride (F) (mg/L)	0.10	0.11	0.064	0.050	0.094
	Nitrate (as N) (mg/L)	0.435	0.816	<0.0050	0.0433	0.045
	Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.0050 DLDS	<0.0010	<0.0010	<0.0020 DLDS
	Sulfate (SO4) (mg/L)	1040	1070	22.6	18.5	598
	Anion Sum (meq/L)	25.9	29.0	1.27	1.33	16.6
	Cation Sum (meq/L)	25.9	29.3	1.50	1.52	17.8
	Cation - Anion Balance (%)	-0.2	0.4	8.1	6.7	3.5
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<2.0 DLIS
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	0.61	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.546	0.0062	0.947	1.60	0.729
	Antimony (Sb)-Total (mg/L)	0.102	0.0263	0.00128	0.00036	0.0344
	Arsenic (As)-Total (mg/L)	0.253	0.0547	0.0145	0.00452	0.141
	Barium (Ba)-Total (mg/L)	0.0171	0.0248	0.0321	0.0797	0.0304
	Beryllium (Be)-Total (mg/L)	0.000055	<0.000040 DLA	0.000046	0.000074	0.000039
	Bismuth (Bi)-Total (mg/L)	0.000064	<0.00010 DLA	<0.000050	<0.000050	0.000367
	Boron (B)-Total (mg/L)	0.036	0.362	<0.010	<0.010	0.023
	Cadmium (Cd)-Total (mg/L)	0.0552	0.00620	0.0000649	0.000126	0.0168
	Calcium (Ca)-Total (mg/L)	282	312	18.8	19.1	191
	Chromium (Cr)-Total (mg/L)	0.00056	<0.00020 DLA	0.00116	0.00214	0.00102
	Cobalt (Co)-Total (mg/L)	0.00107	<0.00020 DLA	0.00064	0.00103	0.00134
	Copper (Cu)-Total (mg/L)	0.0428	0.0030	0.00401	0.00624	0.0252
	Iron (Fe)-Total (mg/L)	2.10	0.019	1.65	2.74	1.95
	Lead (Pb)-Total (mg/L)	0.235	0.00202	0.00234	0.00309	0.0817
	Lithium (Li)-Total (mg/L)	0.0119	0.0101	<0.0010	<0.0010	0.0097

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-16 WATER 10-MAY-16 08:55 WQ-PC-U	L1767348-17 WATER 10-MAY-16 10:45 WQ-DC-U	L1767348-18 WATER 09-MAY-16 17:20 WQ-VC-DBL-R	L1767348-19 WATER 09-MAY-16 19:05 WQ-BC	L1767348-20 WATER 10-MAY-16 16:20 WQ-DESS-02
WATER						
Physical Tests	Conductivity (uS/cm)	227	788	110	149	1120
	Hardness (as CaCO3) (mg/L)	111	447	56.7	76.1	672
	pH (pH)	7.46	8.05	7.74	7.73	7.88
	Total Suspended Solids (mg/L)	193	54.7	219	97.3	158
	Total Dissolved Solids (mg/L)	134	524	57.5	83.1	832
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	39.6	117	42.6	42.7	65.9
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	39.6	117	42.6	42.7	65.9
	Ammonia, Total (as N) (mg/L)	0.217	0.346	0.0071	0.0073	0.0107
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<1.0 DLDS
	Fluoride (F) (mg/L)	0.064	0.087	0.046	0.049	0.060
	Nitrate (as N) (mg/L)	0.0424	0.0424	0.0299	<0.0050	0.034
	Nitrite (as N) (mg/L)	0.0015	0.0018	<0.0010	<0.0010	<0.0020 DLDS
	Sulfate (SO4) (mg/L)	64.2	292	9.83	27.2	539
	Anion Sum (meq/L)	2.14	8.42	1.06	1.42	12.5
	Cation Sum (meq/L)	2.48	9.30	1.23	1.65	13.8
	Cation - Anion Balance (%)	7.5	5.0	7.3	7.6	4.6
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanate (mg/L)	0.29	0.23	<0.20	<0.20	0.27
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	0.66	0.57
Total Metals	Aluminum (Al)-Total (mg/L)	4.76	0.579	2.07	1.67	1.44
	Antimony (Sb)-Total (mg/L)	0.00218	0.00211	0.00021	0.00061	0.00060
	Arsenic (As)-Total (mg/L)	0.0232	0.0121	0.00360	0.0119	0.0193
	Barium (Ba)-Total (mg/L)	0.155	0.0399	0.105	0.0654	0.0403
	Beryllium (Be)-Total (mg/L)	0.000229	0.000028	0.000086	0.000080	0.000060
	Bismuth (Bi)-Total (mg/L)	0.000183	<0.000050	<0.000050	0.000132	<0.000050
	Boron (B)-Total (mg/L)	<0.010	0.013	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000595	0.000148	0.000119	0.000271	0.000223
	Calcium (Ca)-Total (mg/L)	34.2	109	16.5	20.6	199
	Chromium (Cr)-Total (mg/L)	0.00651	0.00104	0.00280	0.00195	0.00148
	Cobalt (Co)-Total (mg/L)	0.00224	0.00107	0.00153	0.00094	0.00062
	Copper (Cu)-Total (mg/L)	0.0131	0.00272	0.00732	0.00688	0.00494
	Iron (Fe)-Total (mg/L)	8.09	2.07	3.35	2.41	1.73
	Lead (Pb)-Total (mg/L)	0.0165	0.00132	0.00265	0.00637	0.00439
	Lithium (Li)-Total (mg/L)	0.0035	0.0020	0.0010	0.0015	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1767348-21	L1767348-22	L1767348-23	L1767348-24	L1767348-25
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	10-MAY-16	10-MAY-16	10-MAY-16	10-MAY-16	10-MAY-16
Sampled Time	11:35	15:40	12:20	12:30	11:40
Client ID	WQ-SEEP	WQ-DESS-03	WQ-DC-B	WQ-DC-B-R	WQ-FEILD BLANK
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	1460	41.6	720	711	<2.0
Hardness (as CaCO3) (mg/L)	810	25.4	417	411	<0.50
pH (pH)	7.30	6.29	8.01	8.01	5.54
Total Suspended Solids (mg/L)	44.0	3.3	92.0	133	<3.0
Total Dissolved Solids (mg/L)	1100	19.3	479	474	<1.0
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	230	6.6	108	106	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	230	6.6	108	106	<1.0
Ammonia, Total (as N) (mg/L)	3.99	0.0096	0.0495	0.0416	<0.0050
Chloride (Cl) (mg/L)	<2.5 DLDS	<0.50	<0.50	<0.50	<0.50
Fluoride (F) (mg/L)	<0.10 DLDS	0.031	0.083	0.077	<0.020
Nitrate (as N) (mg/L)	0.325	<0.0050	0.0246	0.0254	<0.0050
Nitrite (as N) (mg/L)	0.0205	<0.0010	<0.0010	0.0010	<0.0010
Sulfate (SO4) (mg/L)	605	3.41	266	264	<0.30
Anion Sum (meq/L)	17.2	0.20	7.69	7.61	<0.10
Cation Sum (meq/L)	19.1	0.62	8.57	8.47	<0.10
Cation - Anion Balance (%)	5.1	50.5	5.4	5.3	0.0
Cyanides Cyanide, Weak Acid Diss (mg/L)	<0.050 HTD	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total (mg/L)	0.349 HTD	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate (mg/L)	2.70	0.32	<0.20	<0.20	<0.20
Thiocyanate (SCN) (mg/L)	5.06	1.44	<0.50	<0.50	<0.50
Total Metals Aluminum (Al)-Total (mg/L)	0.0256	0.319	1.36	1.53	<0.0030
Antimony (Sb)-Total (mg/L)	0.00049	0.00015	0.00294	0.00246	<0.00010
Arsenic (As)-Total (mg/L)	0.0811	0.00149	0.0194	0.0169	<0.00010
Barium (Ba)-Total (mg/L)	0.0658	0.0316	0.0587	0.0497	<0.000050
Beryllium (Be)-Total (mg/L)	<0.000020	0.000029	0.000059	0.000060	<0.000020
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	0.049	<0.010	0.012	0.010	<0.010
Cadmium (Cd)-Total (mg/L)	0.000297	0.0000498	0.000231	0.000218	<0.0000050
Calcium (Ca)-Total (mg/L)	232	7.14	131	102	<0.050
Chromium (Cr)-Total (mg/L)	0.00056	0.00027	0.00248	0.00247	<0.00010
Cobalt (Co)-Total (mg/L)	0.00752	<0.00010	0.00124	0.00120	<0.00010
Copper (Cu)-Total (mg/L)	0.00263	0.00359	0.00509	0.00451	<0.00050
Iron (Fe)-Total (mg/L)	17.4	0.169	4.39	4.20	<0.010
Lead (Pb)-Total (mg/L)	0.000181	<0.000050	0.00325	0.00303	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	0.0033	0.0032	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1767348-26	L1767348-27			
	Description	WATER	WATER			
	Sampled Date	10-MAY-16	10-MAY-16			
	Sampled Time	09:25	18:40			
	Client ID	WQ-DC-R	TRAVEL BLANK			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	821	<2.0			
	Hardness (as CaCO3) (mg/L)	469	<0.50			
	pH (pH)	8.02	5.55			
	Total Suspended Solids (mg/L)	6.7	<3.0			
	Total Dissolved Solids (mg/L)	549	<1.0			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	119	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	119	<1.0			
	Ammonia, Total (as N) (mg/L)	0.212	0.0081 RRV			
	Chloride (Cl) (mg/L)	<0.50	<0.50			
	Fluoride (F) (mg/L)	0.080	<0.020			
	Nitrate (as N) (mg/L)	0.158	<0.0050			
	Nitrite (as N) (mg/L)	0.0038	<0.0010			
	Sulfate (SO4) (mg/L)	305	<0.30			
	Anion Sum (meq/L)	8.73	<0.10			
	Cation Sum (meq/L)	9.79	<0.10			
	Cation - Anion Balance (%)	5.7	0.0			
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050			
	Cyanide, Total (mg/L)	<0.0050	<0.0050			
	Cyanate (mg/L)	<0.20	<0.20			
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0776	<0.0030			
	Antimony (Sb)-Total (mg/L)	0.00259	<0.00010			
	Arsenic (As)-Total (mg/L)	0.0214	<0.00010			
	Barium (Ba)-Total (mg/L)	0.0330	<0.000050			
	Beryllium (Be)-Total (mg/L)	<0.000020	<0.000020			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	0.013	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.000129	<0.0000050			
	Calcium (Ca)-Total (mg/L)	116	<0.050			
	Chromium (Cr)-Total (mg/L)	0.00024	<0.00010			
	Cobalt (Co)-Total (mg/L)	0.00069	<0.00010			
	Copper (Cu)-Total (mg/L)	0.00160	<0.00050			
	Iron (Fe)-Total (mg/L)	1.36	<0.010			
	Lead (Pb)-Total (mg/L)	0.00439	<0.000050			
	Lithium (Li)-Total (mg/L)	0.0017	<0.0010			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1767348-1	L1767348-2	L1767348-3	L1767348-4	L1767348-5
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	10-MAY-16	10-MAY-16	10-MAY-16	10-MAY-16	10-MAY-16
Sampled Time	18:40	15:55	17:50	17:10	08:30
Client ID	WQ-DC-DX+105	WQ-DESS-01	WQ-MS-S-03	WQ-DC-D1B	WQ-PC-D
Grouping / **Analyte**					
WATER					
Total Metals Magnesium (Mg)-Total (mg/L)	7.58	71.1	63.9	37.5	8.05
Manganese (Mn)-Total (mg/L)	0.0737	0.851	1.62	0.628	0.433
Mercury (Hg)-Total (mg/L)	0.0000160	0.0000137	0.0000066	0.0000082	0.0000365
Molybdenum (Mo)-Total (mg/L)	0.000106	<0.000050	0.000351	0.000197	0.000391
Nickel (Ni)-Total (mg/L)	0.00082	0.00612	0.00226	0.00061	0.00345
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	0.061	<0.050	0.141
Potassium (K)-Total (mg/L)	2.80	1.95	3.60	2.49	1.56
Selenium (Se)-Total (mg/L)	0.000089	0.000080	0.000073	0.000075	0.000116
Silicon (Si)-Total (mg/L)	3.82	4.53	7.88	4.32	9.85
Silver (Ag)-Total (mg/L)	0.000068	0.000012	0.000424	0.000164	0.000307
Sodium (Na)-Total (mg/L)	1.26	2.74	5.24	3.01	2.67
Strontium (Sr)-Total (mg/L)	0.0744	0.339	0.431	0.262	0.220
Sulfur (S)-Total (mg/L)	18.3	203	156	95.6	24.6
Thallium (Tl)-Total (mg/L)	0.000017	<0.000010	0.000123	0.000033	0.000074
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	0.00154	0.00077	0.0372	0.00467	0.102
Uranium (U)-Total (mg/L)	0.000255	0.000010	0.00404	0.000857	0.00127
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	0.00286	0.00088	0.0129
Zinc (Zn)-Total (mg/L)	0.132	3.02	0.954	0.119	0.0910
Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	0.00039
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0586	0.196	0.0011	0.0056	0.0608
Antimony (Sb)-Dissolved (mg/L)	0.00229	0.00011	0.0131	0.00347	0.00110
Arsenic (As)-Dissolved (mg/L)	0.00779	0.00115	0.0656	0.0197	0.00477
Barium (Ba)-Dissolved (mg/L)	0.0220	0.0306	0.0156	0.0258	0.0509
Beryllium (Be)-Dissolved (mg/L)	<0.000020	0.000035	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.015	<0.010
Cadmium (Cd)-Dissolved (mg/L)	0.000668	0.00912	0.000831	0.000170	0.000249
Calcium (Ca)-Dissolved (mg/L)	28.7	133	181	98.6	32.6
Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00012	<0.00010	<0.00010	0.00070
Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00074	0.00104	0.00022	0.00036
Copper (Cu)-Dissolved (mg/L)	0.00496	0.00209	0.00062	0.00103	0.0110
Iron (Fe)-Dissolved (mg/L)	0.114	0.141	1.60	0.355	1.51
Lead (Pb)-Dissolved (mg/L)	0.000372	<0.000050	0.000119	0.000343	0.00138
Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0024	0.0101	0.0033	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1767348-6	L1767348-7	L1767348-8	L1767348-9	L1767348-10
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	10-MAY-16	09-MAY-16	09-MAY-16	09-MAY-16	10-MAY-16
Sampled Time	16:10	17:15	17:45	15:20	12:05
Client ID	WQ-CH-P-13-01	WQ-VC-DBC	WQ-VC-U	WQ-VC-UMN	WQ-TP
Grouping / **Analyte**					
WATER					
Total Metals Magnesium (Mg)-Total (mg/L)	110	5.06	4.94	6.41	25.3
Manganese (Mn)-Total (mg/L)	1.05	0.144	0.107	0.150	0.844
Mercury (Hg)-Total (mg/L)	0.0000139	0.0000264	0.0000243	0.0000253	0.0000242
Molybdenum (Mo)-Total (mg/L)	<0.000050	0.000335	0.000254	0.000341	0.000780
Nickel (Ni)-Total (mg/L)	0.0106	0.00224	0.00204	0.00240	0.00157
Phosphorus (P)-Total (mg/L)	<0.050	0.272	0.175	0.124	<0.050
Potassium (K)-Total (mg/L)	2.22	0.85	0.80	1.03	7.14
Selenium (Se)-Total (mg/L)	0.000101	0.000071	0.000071	0.000100	0.000052
Silicon (Si)-Total (mg/L)	4.60	6.16	5.92	7.19	2.03
Silver (Ag)-Total (mg/L)	0.000017	0.000033	0.000019	0.000041	0.00123
Sodium (Na)-Total (mg/L)	3.58	1.39	1.36	1.75	8.11
Strontium (Sr)-Total (mg/L)	0.461	0.166	0.148	0.156	0.326
Sulfur (S)-Total (mg/L)	310	3.77	2.95	7.77	140
Thallium (Tl)-Total (mg/L)	<0.000010	0.000021	0.000015	0.000024	0.000160
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	0.00034	0.0530	0.0497	0.0742	0.00136
Uranium (U)-Total (mg/L)	<0.000010	0.000778	0.000647	0.000746	0.000626
Vanadium (V)-Total (mg/L)	<0.00050	0.00683	0.00592	0.00729	0.00052
Zinc (Zn)-Total (mg/L)	6.45	0.0136	0.0106	0.0166	0.231
Zirconium (Zr)-Total (mg/L)	<0.00030	0.00036	<0.00030	0.00034	<0.00030
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.245	0.0833	0.0747	0.0788	0.0095
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00014	0.0275
Arsenic (As)-Dissolved (mg/L)	0.00097	0.00058	0.00035	0.00089	0.0368
Barium (Ba)-Dissolved (mg/L)	0.0220	0.0423	0.0421	0.0453	0.00709
Beryllium (Be)-Dissolved (mg/L)	0.000052	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	0.034
Cadmium (Cd)-Dissolved (mg/L)	0.0176	0.0000248	0.0000171	0.0000274	0.00226
Calcium (Ca)-Dissolved (mg/L)	186	14.7	13.9	18.9	143
Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00012	0.00013	0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	0.00017	0.00011	<0.00010	0.00011	0.00064
Copper (Cu)-Dissolved (mg/L)	0.00146	0.00284	0.00269	0.00273	0.0250
Iron (Fe)-Dissolved (mg/L)	0.058	0.173	0.170	0.188	0.045
Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000073	<0.000050	0.000110	0.00160
Lithium (Li)-Dissolved (mg/L)	0.0033	<0.0010	<0.0010	<0.0010	0.0042

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1767348-11	L1767348-12	L1767348-13	L1767348-14	L1767348-15
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	11-MAY-16	11-MAY-16	10-MAY-16	09-MAY-16	10-MAY-16
	Sampled Time	08:55	09:05	19:05	12:45	18:20
	Client ID	WQ-MS-S-09	WQ-MS-S-10	WQ-DC-DX	WQ-VC-R	WQ-MS-S-A
Grouping	**Analyte**					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)	143	156	5.31	6.31	94.5
	Manganese (Mn)-Total (mg/L)	0.327	0.00811	0.0455	0.122	0.718
	Mercury (Hg)-Total (mg/L)	0.0000719	<0.0000050	0.0000286	0.0000238	0.0000169
	Molybdenum (Mo)-Total (mg/L)	0.000319	0.00032	0.000073	0.000382	0.000384
	Nickel (Ni)-Total (mg/L)	0.00495	0.0021	0.00103	0.00201	0.00293
	Phosphorus (P)-Total (mg/L)	0.059	<0.050	0.140	0.093	<0.050
	Potassium (K)-Total (mg/L)	5.59	6.71	3.11	1.01	4.45
	Selenium (Se)-Total (mg/L)	0.000675	0.00064	<0.000050	0.000079	0.000347
	Silicon (Si)-Total (mg/L)	5.56	5.18	4.52	6.77	4.66
	Silver (Ag)-Total (mg/L)	0.00208	0.000048	0.000047	0.000038	0.00147
	Sodium (Na)-Total (mg/L)	8.70	17.8	0.987	1.70	5.34
	Strontium (Sr)-Total (mg/L)	0.681	0.790	0.0597	0.174	0.470
	Sulfur (S)-Total (mg/L)	374	379	8.37	6.87	211
	Thallium (Tl)-Total (mg/L)	0.000332	0.000122	0.000030	0.000024	0.000370
	Tin (Sn)-Total (mg/L)	0.00012	<0.00020 DLA	<0.00010	<0.00010	0.00014
	Titanium (Ti)-Total (mg/L)	0.0244	<0.00060 DLA	0.0539	0.0545	0.0263
	Uranium (U)-Total (mg/L)	0.00393	0.00485	0.000104	0.000736	0.00347
	Vanadium (V)-Total (mg/L)	0.00311	<0.0010 DLA	0.00427	0.00546	0.00280
	Zinc (Zn)-Total (mg/L)	4.79	1.53	0.0093	0.0126	1.31
	Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00060 DLA	<0.00030	0.00048	<0.00030
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0029	<0.0020 DLA	0.0411	0.0786	0.0058
	Antimony (Sb)-Dissolved (mg/L)	0.0840	0.0265	0.00082	0.00014	0.0238
	Arsenic (As)-Dissolved (mg/L)	0.0364	0.0560	0.00527	0.00088	0.0378
	Barium (Ba)-Dissolved (mg/L)	0.00781	0.0253	0.0192	0.0457	0.0198
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000040 DLA	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.035	0.339	<0.010	<0.010	0.024
	Cadmium (Cd)-Dissolved (mg/L)	0.0481	0.00618	0.0000225	0.0000276	0.0161
	Calcium (Ca)-Dissolved (mg/L)	280	312	19.0	18.6	192
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	0.00012	0.00014	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00013	<0.00020 DLA	<0.00010	0.00012	0.00101
	Copper (Cu)-Dissolved (mg/L)	0.0123	0.00274	0.00200	0.00294	0.00862
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	0.071	0.243	0.013
	Lead (Pb)-Dissolved (mg/L)	0.00258	0.00115	0.000064	0.000089	0.00105
	Lithium (Li)-Dissolved (mg/L)	0.0115	0.0100	<0.0010	<0.0010	0.0087

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1767348-16	L1767348-17	L1767348-18	L1767348-19	L1767348-20
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	10-MAY-16	10-MAY-16	09-MAY-16	09-MAY-16	10-MAY-16
Sampled Time	08:55	10:45	17:20	19:05	16:20
Client ID	WQ-PC-U	WQ-DC-U	WQ-VC-DBL-R	WQ-BC	WQ-DESS-02
Grouping / **Analyte**					
WATER					
Total Metals					
Magnesium (Mg)-Total (mg/L)	7.99	40.2	5.27	5.34	35.9
Manganese (Mn)-Total (mg/L)	0.353	0.752	0.163	0.258	0.117
Mercury (Hg)-Total (mg/L)	0.0000466	0.0000130	0.0000243	0.0000357	0.0000347
Molybdenum (Mo)-Total (mg/L)	0.000390	0.000281	0.000286	0.000618	0.000108
Nickel (Ni)-Total (mg/L)	0.00416	0.00153	0.00253	0.00180	0.00157
Phosphorus (P)-Total (mg/L)	0.181	0.072	0.330	0.065	0.136
Potassium (K)-Total (mg/L)	1.62	2.54	0.93	1.19	3.04
Selenium (Se)-Total (mg/L)	0.000154	0.000092	0.000070	0.000063	0.000086
Silicon (Si)-Total (mg/L)	12.2	4.87	6.59	6.38	9.07
Silver (Ag)-Total (mg/L)	0.000289	0.000038	0.000027	0.000109	0.000182
Sodium (Na)-Total (mg/L)	2.64	5.41	1.48	1.75	5.42
Strontium (Sr)-Total (mg/L)	0.217	0.335	0.138	0.131	0.370
Sulfur (S)-Total (mg/L)	22.8	105	3.79	9.38	186
Thallium (Tl)-Total (mg/L)	0.000087	0.000017	0.000019	0.000033	0.000033
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	0.134	0.0300	0.0578	0.0555	0.0407
Uranium (U)-Total (mg/L)	0.00161	0.00144	0.000752	0.000698	0.000282
Vanadium (V)-Total (mg/L)	0.0158	0.00260	0.00729	0.00432	0.00331
Zinc (Zn)-Total (mg/L)	0.0448	0.0157	0.0157	0.0192	0.0202
Zirconium (Zr)-Total (mg/L)	0.00034	<0.00030	<0.00030	0.00052	0.00037
Dissolved Metals					
Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0517	0.0535	0.0815	0.157	0.0093
Antimony (Sb)-Dissolved (mg/L)	0.00079	0.00191	<0.00010	0.00027	0.00011
Arsenic (As)-Dissolved (mg/L)	0.00445	0.00607	0.00060	0.00242	0.00299
Barium (Ba)-Dissolved (mg/L)	0.0585	0.0267	0.0425	0.0372	0.0210
Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	0.000026	<0.000020
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	0.012	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	0.0000306	0.0000537	0.0000312	0.0000993	0.0000194
Calcium (Ca)-Dissolved (mg/L)	32.7	112	15.0	21.7	208
Chromium (Cr)-Dissolved (mg/L)	0.00012	<0.00010	0.00011	0.00018	<0.00010
Cobalt (Co)-Dissolved (mg/L)	0.00035	0.00068	<0.00010	0.00017	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00148	0.00119	0.00280	0.00383	0.00037
Iron (Fe)-Dissolved (mg/L)	1.84	0.557	0.184	0.244	<0.010
Lead (Pb)-Dissolved (mg/L)	0.000815	0.000126	0.000079	0.000359	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0025	<0.0010	<0.0010	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-21 WATER 10-MAY-16 11:35 WQ-SEEP	L1767348-22 WATER 10-MAY-16 15:40 WQ-DESS-03	L1767348-23 WATER 10-MAY-16 12:20 WQ-DC-B	L1767348-24 WATER 10-MAY-16 12:30 WQ-DC-B-R	L1767348-25 WATER 10-MAY-16 11:40 WQ-FEILD BLANK
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)	51.3	1.41	50.5	38.0	<0.10
	Manganese (Mn)-Total (mg/L)	6.11	0.00663	0.464	0.402	<0.00010
	Mercury (Hg)-Total (mg/L)	0.0000061	0.0000240	0.0000147	0.0000167	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000924	<0.000050	0.000311	0.000264	<0.000050
	Nickel (Ni)-Total (mg/L)	0.00248	0.00136	0.00269	0.00223	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	0.180	0.163	<0.050
	Potassium (K)-Total (mg/L)	5.54	1.29	3.03	2.34	<0.10
	Selenium (Se)-Total (mg/L)	0.000211	<0.000050	0.000113	0.000099	<0.000050
	Silicon (Si)-Total (mg/L)	7.43	3.13	7.14	6.23	<0.050
	Silver (Ag)-Total (mg/L)	0.000033	<0.000010	0.000059	0.000064	<0.000010
	Sodium (Na)-Total (mg/L)	35.1	0.801	4.44	3.72	<0.050
	Strontium (Sr)-Total (mg/L)	0.674	0.0331	0.400	0.314	<0.00020
	Sulfur (S)-Total (mg/L)	213	1.49	124	94.5	<0.50
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	0.000025	0.000025	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.00145	0.00139	0.0626	0.0773	<0.00030
	Uranium (U)-Total (mg/L)	0.00137	0.000014	0.00193	0.00157	<0.000010
	Vanadium (V)-Total (mg/L)	0.00273	<0.00050	0.00638	0.00643	<0.00050
	Zinc (Zn)-Total (mg/L)	0.0204	0.0076	0.0331	0.0288	<0.0030
	Zirconium (Zr)-Total (mg/L)	0.00065	0.00031	<0.00030	<0.00030	<0.00030
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0114	0.300	0.0509	0.0520	0.0011 RRV
	Antimony (Sb)-Dissolved (mg/L)	0.00044	0.00011	0.00205	0.00203	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.0464	0.00146	0.00541	0.00521	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.0627	0.0326	0.0257	0.0248	<0.000050
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	0.000028	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.048	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000227	0.0000509	0.0000506	0.0000436	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	239	7.68	103	102	<0.050
	Chromium (Cr)-Dissolved (mg/L)	0.00039	0.00017	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00732	<0.00010	0.00028	0.00028	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00148	0.00358	0.00116	0.00115	<0.00020
	Iron (Fe)-Dissolved (mg/L)	13.9	0.137	0.433	0.422	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	0.000147	0.000126	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	0.0019	0.0022	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1767348-26	L1767348-27			
	Description	WATER	WATER			
	Sampled Date	10-MAY-16	10-MAY-16			
	Sampled Time	09:25	18:40			
	Client ID	WQ-DC-R	TRAVEL BLANK			
Grouping	**Analyte**					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)	39.4	<0.10			
	Manganese (Mn)-Total (mg/L)	0.366	<0.00010			
	Mercury (Hg)-Total (mg/L)	0.0000062	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000332	<0.000050			
	Nickel (Ni)-Total (mg/L)	0.00071	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	2.49	<0.10			
	Selenium (Se)-Total (mg/L)	0.000078	<0.000050			
	Silicon (Si)-Total (mg/L)	3.94	<0.050			
	Silver (Ag)-Total (mg/L)	0.000076	<0.000010			
	Sodium (Na)-Total (mg/L)	7.10	<0.050			
	Strontium (Sr)-Total (mg/L)	0.354	<0.00020			
	Sulfur (S)-Total (mg/L)	109	<0.50			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	0.00285	<0.00030			
	Uranium (U)-Total (mg/L)	0.00147	<0.000010			
	Vanadium (V)-Total (mg/L)	0.00068	<0.00050			
	Zinc (Zn)-Total (mg/L)	0.0075	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	0.0121				
	Antimony (Sb)-Dissolved (mg/L)	0.00142				
	Arsenic (As)-Dissolved (mg/L)	0.00639				
	Barium (Ba)-Dissolved (mg/L)	0.0306				
	Beryllium (Be)-Dissolved (mg/L)	<0.000020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.010				
	Cadmium (Cd)-Dissolved (mg/L)	0.0000410				
	Calcium (Ca)-Dissolved (mg/L)	121				
	Chromium (Cr)-Dissolved (mg/L)	0.00018				
	Cobalt (Co)-Dissolved (mg/L)	0.00068				
	Copper (Cu)-Dissolved (mg/L)	0.00114				
	Iron (Fe)-Dissolved (mg/L)	0.480				
	Lead (Pb)-Dissolved (mg/L)	0.00123				
	Lithium (Li)-Dissolved (mg/L)	0.0017				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1767348-1	L1767348-2	L1767348-3	L1767348-4	L1767348-5
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	10-MAY-16	10-MAY-16	10-MAY-16	10-MAY-16	10-MAY-16
Sampled Time	18:40	15:55	17:50	17:10	08:30
Client ID	WQ-DC-DX+105	WQ-DESS-01	WQ-MS-S-03	WQ-DC-D1B	WQ-PC-D
Grouping / **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	7.44	70.2	61.2	37.7	7.34
Manganese (Mn)-Dissolved (mg/L)	0.0678	0.817	1.39	0.502	0.300
Mercury (Hg)-Dissolved (mg/L)	0.0000173	0.0000145	<0.0000050	<0.0000050	0.0000112
Molybdenum (Mo)-Dissolved (mg/L)	0.000078	<0.000050	0.000284	0.000142	0.000302
Nickel (Ni)-Dissolved (mg/L)	0.00076	0.00584	0.00163	<0.00050	0.00070
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	2.82	1.95	3.32	2.54	1.05
Selenium (Se)-Dissolved (mg/L)	0.000066	0.000072	<0.000050	0.000055	<0.000050
Silicon (Si)-Dissolved (mg/L)	3.65	4.45	6.61	3.97	3.91
Silver (Ag)-Dissolved (mg/L)	0.000027	<0.000010	<0.000010	<0.000010	0.000013
Sodium (Na)-Dissolved (mg/L)	1.19	2.66	4.93	2.85	2.45
Strontium (Sr)-Dissolved (mg/L)	0.0700	0.331	0.414	0.253	0.202
Sulfur (S)-Dissolved (mg/L)	17.4	201	147	94.9	24.1
Thallium (Tl)-Dissolved (mg/L)	0.000014	<0.000010	0.000074	0.000022	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	0.00089	0.00051	<0.00030	<0.00030	0.00121
Uranium (U)-Dissolved (mg/L)	0.000230	<0.000010	0.00380	0.000797	0.000366
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00133
Zinc (Zn)-Dissolved (mg/L)	0.132	3.01	0.835	0.0801	0.0264
Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1767348-6	L1767348-7	L1767348-8	L1767348-9	L1767348-10
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	10-MAY-16	09-MAY-16	09-MAY-16	09-MAY-16	10-MAY-16
Sampled Time	16:10	17:15	17:45	15:20	12:05
Client ID	WQ-CH-P-13-01	WQ-VC-DBC	WQ-VC-U	WQ-VC-UMN	WQ-TP
Grouping / **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	110	4.59	4.51	5.95	26.8
Manganese (Mn)-Dissolved (mg/L)	0.898	0.0353	0.0197	0.0315	0.767
Mercury (Hg)-Dissolved (mg/L)	0.0000126	0.0000166	0.0000144	0.0000155	0.0000071
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000264	0.000228	0.000277	0.000755
Nickel (Ni)-Dissolved (mg/L)	0.00960	0.00060	0.00057	0.00062	0.00155
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	2.32	0.68	0.64	0.75	7.36
Selenium (Se)-Dissolved (mg/L)	0.000086	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	4.89	3.60	3.58	3.78	1.58
Silver (Ag)-Dissolved (mg/L)	0.000010	<0.000010	<0.000010	<0.000010	0.000129
Sodium (Na)-Dissolved (mg/L)	3.54	1.30	1.24	1.58	7.79
Strontium (Sr)-Dissolved (mg/L)	0.455	0.146	0.146	0.162	0.330
Sulfur (S)-Dissolved (mg/L)	314	3.72	2.93	7.60	143
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000137
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	0.00100	0.00076	0.00105	<0.00030
Uranium (U)-Dissolved (mg/L)	<0.000010	0.000319	0.000282	0.000371	0.000619
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	6.29	0.0043	0.0011	0.0016	0.195
Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-11 WATER 11-MAY-16 08:55 WQ-MS-S-09	L1767348-12 WATER 11-MAY-16 09:05 WQ-MS-S-10	L1767348-13 WATER 10-MAY-16 19:05 WQ-DC-DX	L1767348-14 WATER 09-MAY-16 12:45 WQ-VC-R	L1767348-15 WATER 10-MAY-16 18:20 WQ-MS-S-A
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	137	155	5.11	5.86	95.5
	Manganese (Mn)-Dissolved (mg/L)	0.140	0.00735	0.0147	0.0350	0.632
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000103	0.0000091	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000265	0.00025	0.000055	0.000275	0.000339
	Nickel (Ni)-Dissolved (mg/L)	0.00443	0.0021	<0.00050	0.00061	0.00262
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	5.21	6.50	3.07	0.75	4.24
	Selenium (Se)-Dissolved (mg/L)	0.000567	0.00059	0.000055	<0.000050	0.000357
	Silicon (Si)-Dissolved (mg/L)	4.53	5.04	3.24	4.02	3.10
	Silver (Ag)-Dissolved (mg/L)	0.000043	<0.000020 DLA	<0.000010	<0.000010	0.000050
	Sodium (Na)-Dissolved (mg/L)	7.99	17.6	0.921	1.67	5.10
	Strontium (Sr)-Dissolved (mg/L)	0.664	0.761	0.0556	0.158	0.458
	Sulfur (S)-Dissolved (mg/L)	357	370	8.21	6.62	210
	Thallium (Tl)-Dissolved (mg/L)	0.000288	0.000119	<0.000010	<0.000010	0.000315
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00060 DLA	0.00069	0.00109	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.00377	0.00474	0.000032	0.000364	0.00345
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.0010 DLA	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	4.37	1.57	0.0015	0.0010	1.25
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00060 DLA	<0.00030	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-16 WATER 10-MAY-16 08:55 WQ-PC-U	L1767348-17 WATER 10-MAY-16 10:45 WQ-DC-U	L1767348-18 WATER 09-MAY-16 17:20 WQ-VC-DBL-R	L1767348-19 WATER 09-MAY-16 19:05 WQ-BC	L1767348-20 WATER 10-MAY-16 16:20 WQ-DESS-02
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	7.08	40.8	4.67	5.32	37.2
	Manganese (Mn)-Dissolved (mg/L)	0.266	0.673	0.0344	0.165	0.00387
	Mercury (Hg)-Dissolved (mg/L)	0.0000061	0.0000053	0.0000096	0.0000118	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000170	0.000241	0.000234	0.000523	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00073	0.00064	0.00071	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	1.08	2.56	0.71	0.91	3.03
	Selenium (Se)-Dissolved (mg/L)	0.000053	0.000067	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	4.05	3.98	3.65	3.85	7.37
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.48	5.16	1.27	1.69	5.56
	Strontium (Sr)-Dissolved (mg/L)	0.198	0.335	0.136	0.138	0.373
	Sulfur (S)-Dissolved (mg/L)	22.8	104	3.69	9.79	190
	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	0.00015	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00121	0.00058	0.00102	0.00246	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.000345	0.00140	0.000299	0.000575	0.000193
	Vanadium (V)-Dissolved (mg/L)	0.00139	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0051	0.0073	0.0013	0.0065	0.0024
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1767348-21 WATER 10-MAY-16 11:35 WQ-SEEP	L1767348-22 WATER 10-MAY-16 15:40 WQ-DESS-03	L1767348-23 WATER 10-MAY-16 12:20 WQ-DC-B	L1767348-24 WATER 10-MAY-16 12:30 WQ-DC-B-R	L1767348-25 WATER 10-MAY-16 11:40 WQ-FEILD BLANK
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	51.7	1.52	38.7	38.1	<0.10
	Manganese (Mn)-Dissolved (mg/L)	5.95	0.00337	0.286	0.306	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	0.0000220	0.0000051	0.0000060	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000889	<0.000050	0.000189	0.000190	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00231	0.00135	0.00064	0.00058	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	5.75	1.42	2.22	2.21	<0.10
	Selenium (Se)-Dissolved (mg/L)	0.000221	<0.000050	<0.000050	0.000066	<0.000050
	Silicon (Si)-Dissolved (mg/L)	7.41	3.33	3.82	3.76	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	34.5	0.810	3.42	3.55	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.665	0.0340	0.304	0.302	<0.00020
	Sulfur (S)-Dissolved (mg/L)	208	1.54	94.3	93.4	<0.50
	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)	0.00089	0.00077	0.00059	0.00063	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.00139	<0.000010	0.00137	0.00136	<0.000010
	Vanadium (V)-Dissolved (mg/L)	0.00180	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0191	0.0081	0.0092	0.0084	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	0.00063	0.00034	<0.00030	<0.00030	<0.00030

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1767348-26	L1767348-27			
	Description	WATER	WATER			
	Sampled Date	10-MAY-16	10-MAY-16			
	Sampled Time	09:25	18:40			
	Client ID	WQ-DC-R	TRAVEL BLANK			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	40.4				
	Manganese (Mn)-Dissolved (mg/L)	0.340				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000268				
	Nickel (Ni)-Dissolved (mg/L)	0.00075				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	2.60				
	Selenium (Se)-Dissolved (mg/L)	0.000144				
	Silicon (Si)-Dissolved (mg/L)	3.86				
	Silver (Ag)-Dissolved (mg/L)	0.000011				
	Sodium (Na)-Dissolved (mg/L)	6.99				
	Strontium (Sr)-Dissolved (mg/L)	0.293				
	Sulfur (S)-Dissolved (mg/L)	109				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	0.00042				
	Uranium (U)-Dissolved (mg/L)	0.00124				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0042				
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030				

* 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	Cyanide, Weak Acid Diss	HTD	L1767348-21
Matrix Spike	Sulfate (SO4)	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Arsenic (As)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Copper (Cu)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Lead (Pb)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Manganese (Mn)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Titanium (Ti)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Arsenic (As)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Strontium (Sr)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Iron (Fe)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Silicon (Si)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sulfur (S)-Total	MS-B	L1767348-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Iron (Fe)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Silicon (Si)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Sulfur (S)-Total	MS-B	L1767348-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1767348-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLIS	Detection Limit Adjusted: Insufficient Sample
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
SP	Sample was Preserved at the laboratory

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by 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.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Reference Information

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

CL-IC-N-WR Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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

This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode

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

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

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

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

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

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

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

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

F-IC-N-WR Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

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 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

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 EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

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

Reference Information

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The 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	APHA 4500 NH3-NITROGEN (AMMONIA)

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

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

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

NO2-L-IC-N-WR	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-WR	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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

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

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

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

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

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

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

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

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

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

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

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

SO4-IC-N-WR	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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.

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

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

Reference Information

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2 3 4 5
6

GLOSSARY OF REPORT TERMS

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

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

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1767348-COFC

COC Number: 14 -

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Report To	
Company:	EDI
Contact:	Lyndsay Doetzel
Address:	2195 - 2nd Avenue Whitehorse, YT Y1A 3T8
Phone:	867-393-4882

Report Format /

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ Yes ☐ No

☐ Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ldoetzel@edynamics.com

Email 2 Emilie.Hamm@gov.yk.ca

Email 3 erik.pit@gov.yk.ca

... below (Rush Turnaround Time (TAT) is not available for all tests)

R ☑ Regular (Standard TAT if received by 3 pm - business days)

P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT

E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT

E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge

Specify Date Required for E2,E or P:

Invoice To		
Same as Report To	☑ Yes	☑ No
Copy of Invoice with Report	☑ Yes	☐ No
Company:	EDI	
Contact:	S Jenner	

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax sjenner@edynamics.com

Email 2 ldoetzel@edynamics.com

Project Information

ALS Quote #:	Q55559
Job #:	MOUNT NANSEN 16-Y-0089
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

Approver ID:	Cost Center:
GL Account:	Routing Code:
Activity Code:	
Location:	

ALS Lab Work Order # (lab use only) [redacted]

ALS Contact: Sean Slugget

Sampler: DH + MSa

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA,EC-PCT-VA,PH-PCT-VA	ANIONS-ALL-IC-WR,TSS-MAN-WR	CN-WAD-CFA-VA,CN-T-CFA-VA (P)	CN-CNO-WT (P)	CN-SCN-VA (P)	NH3-F-VA (P)	MET-T-BCMDG-VA (P)	MET-D-BCMDG-VA (F/P)	IONBALANC-VA, TDS-CALC-VA					Number of Containers
[redacted]	WQ-DC-DX+105	10-May-16	18:40	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-DESS-01	10-May-16	15:55	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-MS-S-03	10-May-16	17:50	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-DC-D16	10-May-16	17:10	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-PC-D	10-May-16	08:30	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	~~ ~~	~~-May-16~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~					~~9~~

Short Holding Time

● *Rush Processing*

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ Yes ☑ No

Are samples for human drinking water use?
☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

[redacted] SAMPLE CONDITION AS RECEIVED (lab use only) [redacted]

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C [redacted] FINAL COOLER TEMPERATURES °C [redacted]

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: [signature]	Date: 11 May 2016	Time: 09:47	Received by: [redacted]	Date: [redacted]	Time: [redacted]	Received by: [redacted]	Date: 12 May	Time: 17:50

Chain of Custody (COC) / Analytical Request Form

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COC Number: 14 -

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Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	EDI	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Lyndsay Doetzel	Quality Control (QC) Report with Report	☐ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2195 - 2nd Avenue Whitehorse, YT Y1A 3T8	☐ Criteria on Report - provide details below if box checked		E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
		Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-393-4882	Email 1 or Fax	ldoetzel@edynamics.com	Specify Date Required for E2,E or P:
		Email 2	Emilie.Hamm@gov.yk.ca	
		Email 3	erik.pit@gov.yk.ca	

Invoice To	Same as Report To	☑ Yes ☑ No	Invoice Distribution		
	Copy of Invoice with Report	☑ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	
Company:	EDI		Email 1 or Fax	sjenner@edynamics.com	
Contact:	S Jenner		Email 2	ldoetzel@edynamics.com	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q55559	Approver ID:	Cost Center:
Job #:	MOUNT NANSEN 16-Y-0089	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): [redacted]

ALS Contact: Sean Slugget

Sampler: MSa + DH

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA,EC-PCT-VA,PH-PCT-VA	ANIONS-ALL-IC-WR,TSS-MAN-WR	CN-WAD-CFA-VA,CN-T-CFA -VA	CN-CNO-WT	CN-SCN-VA	NH3-F-VA	MET-T-BCMDG-VA	MET-D-BCMDG-VA	IONBALANC-VA, TDS-CALC-VA					Number of Containers
							P	P	P	P	P	F/P						
[redacted]	WQ-CH-P-13-01	10-May-16	16:10	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-DBC	9-May-16	17:15	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-U	9-May-16	17:45	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-UMN	9-May-16	15:20	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-TP	10-May-16	12:05	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	~~[redacted]~~	~~-May-16~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~					~~9~~
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	
Are samples for human drinking water use? ☐ Yes ☑ No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | Ice packs Yes ☐ No ☐ | Cooling Initiated ☐ | SIF Observations? Yes ☐ No ☐ | Custody seal intact Yes ☐ No ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
5.1	[redacted]	[redacted]	2.3	3	4

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
M Sandfad	11 May 16	1000	[redacted]	[redacted]	[redacted]	[redacted]	12 May	17.40

Chain of Custody (COC) / Analytical Request Form

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COC Number: 14 -

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Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	EDI	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Lyndsay Doetzel	Quality Control (QC) Report with Report	☐ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2195 - 2nd Avenue Whitehorse, YT Y1A 3T8	☐ Criteria on Report - provide details below if box checked		E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
		Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-393-4882	Email 1 or Fax	ldoetzel@edynamics.com	Specify Date Required for E2,E or P:
		Email 2	Emilie.Hamm@gov.yk.ca	
		Email 3	erik.pit@gov.yk.ca	

Invoice To	Same as Report To ☑ Yes ☑ No	Invoice Distribution		
	Copy of Invoice with Report ☑ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	
Company:	EDI	Email 1 or Fax	sjenner@edynamics.com	
Contact:	S Jenner	Email 2	ldoetzel@edynamics.com	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q55559	Approver ID:	Cost Center:
Job #:	MOUNT NANSEN 16-Y-0089	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): [redacted]

ALS Contact: Sean Slugget

Sampler: DH + MSa

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA,EC-PCT-VA,PH-PCT-VA	ANIONS-ALL-IC-WR,TSS-MAN-WR	CN-WAD-CFA-VA,CN-T-CFA-VA	CN-CNO-WT	CN-SCN-VA	NH3-F-VA	MET-T-BCMDG-VA	MET-D-BCMDG-VA	IONBALANC-VA, TDS-CALC-VA					Number of Containers
							P	P	P	P	P	F/P						
[redacted]	WQ-MS-S-09	11-May-16	08:55	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-MS-S-10	11-May-16	09:05	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-DC-DX	10-May-16	19:05	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-R	09-May-16	12:45	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-MS-S-A	10-May-16	18:20	Water	R	R	R	R	R	R	R	R	R					9
[redacted]		-May-16		Water	R	R	R	R	R	R	R	R	R					9
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	
Are samples for human drinking water use? ☐ Yes ☑ No	

SAMPLE CONDITION AS RECEIVED (lab use only) [redacted]

Frozen ☐	SIF Observations Yes ☐ No ☐
Ice packs Yes ☐ No ☐	Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐	

INITIAL COOLER TEMPERATURES °C [redacted]			FINAL COOLER TEMPERATURES °C [redacted]		
7.3			3	3	4

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only) [redacted]			FINAL SHIPMENT RECEPTION (lab use only) [redacted]		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
[redacted]	11 May 2016	09:41	[redacted]	May-12-16	8:20am	JC	12 May	17:40

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1767348-COFC

COC Number: 14 -

Page ___ of ___

Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	EDI	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Lyndsay Doetzel	Quality Control (QC) Report with Report	☐ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2195 - 2nd Avenue Whitehorse, YT Y1A 3T8	☐ Criteria on Report - provide details below if box checked		E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
		Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-393-4882	Email 1 or Fax	ldoetzel@edynamics.com	Specify Date Required for E2,E or P:
		Email 2	Emilie.Hamm@gov.yk.ca	
		Email 3	erik.pit@gov.yk.ca	

Invoice To	Same as Report To ☑ Yes ☑ No	Invoice Distribution		Analysis Request
	Copy of Invoice with Report ☑ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	EDI	Email 1 or Fax	sjenner@edynamics.com	
Contact:	S Jenner	Email 2	ldoetzel@edynamics.com	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q55559	Approver ID:	Cost Center:
Job #:	MOUNT NANSEN 16-Y-0089	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): [redacted]

ALS Contact: Sean Slugget

Sampler: MSa + DH

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA,EC-PCT-VA,PH-PCT-VA	ANIONS-ALL-IC-WR,TSS-MAN-WR	CN-WAD-CFA-VA,CN-T-CFA-VA	CN-CNO-WT	CN-SCN-VA	NH3-F-VA	MET-T-BCMDG-VA	MET-D-BCMDG-VA	IONBALANC-VA, TDS-CALC-VA	Number of Containers
					P		P	P	P	P	P	F/P		
[redacted]	WQ - PC - U	10 -May-16	08:55	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ - DC - U	10 -May-16	10:45	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ - VC - DBC - r	9 -May-16	17:20	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ - BC	9 -May-16	19:05	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ - DESS - 02	10 -May-16	16:20	Water	R	R	R	R	R	R	R	R	R	9
[redacted]		-May-16		Water	R	R	R	R	R	R	R	R	R	9
[redacted]														
[redacted]														
[redacted]														
[redacted]														
[redacted]														
[redacted]														

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	
Are samples for human drinking water use? ☐ Yes ☑ No	

SAMPLE CONDITION AS RECEIVED (lab use only) [redacted]

Frozen		SIF Observations	Yes ☐	No ☐
Ice packs	Yes ☐ No ☐	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐			

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
2.8	[redacted]	[redacted]	3	3	4.7

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
[redacted] Sandford	11 May 16	09:53	[redacted]	[redacted]	[redacted]	[redacted]	12 May	7:40

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

Date Received: 11-MAY-16
Report Date: 24-MAY-16 14:27 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1767406

Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 16-Y-0089
C of C Numbers: 1
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1767406-1				
	Description	WATER				
	Sampled Date	11-MAY-16				
	Sampled Time	10:30				
	Client ID	WQ-PW				
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0				
	Conductivity (uS/cm)	386				
	Hardness (as CaCO3) (mg/L)	203				
	pH (pH)	8.19				
	Total Dissolved Solids (mg/L)	212				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	171				
	Chloride (Cl) (mg/L)	<0.50				
	Fluoride (F) (mg/L)	0.104				
	Nitrate (as N) (mg/L)	0.115				
	Nitrite (as N) (mg/L)	<0.0010				
	Sulfate (SO4) (mg/L)	35.3				
	Anion Sum (meq/L)	4.16				
	Cation Sum (meq/L)	4.30				
	Cation - Anion Balance (%)	1.7				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.010				
	Antimony (Sb)-Total (mg/L)	<0.00050				
	Arsenic (As)-Total (mg/L)	0.00039				
	Barium (Ba)-Total (mg/L)	0.090				
	Boron (B)-Total (mg/L)	<0.10				
	Cadmium (Cd)-Total (mg/L)	<0.00020				
	Calcium (Ca)-Total (mg/L)	47.5				
	Chromium (Cr)-Total (mg/L)	<0.0020				
	Copper (Cu)-Total (mg/L)	<0.0010				
	Iron (Fe)-Total (mg/L)	<0.030				
	Lead (Pb)-Total (mg/L)	0.00056				
	Magnesium (Mg)-Total (mg/L)	20.5				
	Manganese (Mn)-Total (mg/L)	<0.0020				
	Mercury (Hg)-Total (mg/L)	<0.00020				
	Potassium (K)-Total (mg/L)	0.94				
	Selenium (Se)-Total (mg/L)	<0.0010				
	Sodium (Na)-Total (mg/L)	5.0				
	Uranium (U)-Total (mg/L)	0.00189				
	Zinc (Zn)-Total (mg/L)	<0.050				

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfate (SO4)	MS-B	L1767406-1
Matrix Spike	Sulfate (SO4)	MS-B	L1767406-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L1767406-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1767406-1
Matrix Spike	Selenium (Se)-Total	MS-B	L1767406-1
Matrix Spike	Uranium (U)-Total	MS-B	L1767406-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
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-TITR-VA	Water	Alkalinity Species by 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.

CL-IC-N-WR	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-VA	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength

This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." 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.
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

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

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

F-IC-N-WR	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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-TOT-CVAFS-VA	Water	Total Hg in Water by CVAFS LOR=50ppt	EPA 1631E (mod)

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-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

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

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

Reference Information

6010B).

NO2-L-IC-N-WR	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-WR	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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

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

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

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

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

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

SO4-IC-N-WR	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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".

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

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

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

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

** 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
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.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1767406-COFC

COC Number: 14 -

Page ____ of ____

Report To		Report Format / Distribution		Rush Turnaround Time (TAT) is not available for all tests
Company:	EDI	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
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		Select Distribution:	☐ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-393-4882	Email 1 or Fax	ldoetzel@edynamics.com	Specify Date Required for E2,E or P:
		Email 2	Emilie.Hamm@gov.yk.ca	
		Email 3	erik.pit@gov.yk.ca	

Invoice To		Invoice Distribution	
	Same as Report To ☑ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☑ Yes ☐ No	Email 1 or Fax	sjenner@edynamics.com
Company:	EDI	Email 2	ldoetzel@edynamics.com
Contact:	S Jenner		

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q55556	Approver ID:	Cost Center:
Job #:	MOUNT NANSEN 16-Y-0089	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): [redacted]

ALS Contact: Sean Sluggett

Sampler: HSa - DH

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	FULL-TOT-DW-WR	Number of Containers
[redacted]	WQ-PW	11 - May-16	10:30	Water	R	3

Short Holding Time

Rush Processing

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☐ No Are samples for human drinking water use? ☐ Yes ☐ No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations ☐ Yes ☐ No

Ice packs ☐ Yes ☐ No | Custody seal intact ☐ Yes ☐ No

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
9.6	[redacted]	[redacted]	9.4	3	3

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
[redacted] Sandford	11 May 16	10:32	[redacted]	[redacted]	[redacted]	JC	12 May	17:40

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-00256-V09 Front/04 January 2014

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.