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March 15, 2017

EDI Project No: 16Y0089

Assessment and Abandoned Mines
Department of Energy, Mines and Resources
Government of Yukon
Box 2703, K-419
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Attention: Emilie Hamm, A/Project Manager

RE: Mount Nansen Water Resources Investigations – Monthly Report: February 2017 - FINAL

This monthly report provides a summary of site conditions and data collected during EDI's February 2017 trip to Mount Nansen as part of the 2016/17 Water Resources Investigation. This report describes site conditions, meteorology, hydrology, water quality data, program recommendations, and additional trip information (Table 1). This February 2017 trip represents the fourth monitoring event of the winter season.

Trip dates:	February 7 to 9, 2017
EDI field staff:	Scott Dilling, Alexandre Mischler, and Danny Skookum
Weather during trip:	Air temperatures ranged from -25°C to -12°C, with clear skies on February 7 and 8 and overcast conditions on February 9.

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 meteorological station status and identification of any data gaps or QA/QC issues
Hydrology	• Discussion of hydrology data for February • Statement of QA/QC for the data collected this month
Water Quality	• Summary of water quality results for February • 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 3. Hydrology Summary Data Tables 4. Water Quality Summary Data Tables 5. Laboratory Certificates of Analysis (COA) & Yukon Environmental Health Services Bacteriological Results.

SITE CONDITIONS

The hydrologic and water quality conditions observed during the February 2017 trip were reflective of winter conditions. Air temperatures ranged from lows of -25°C, to daytime highs of -12°C; with clear to overcast skies during the three day sampling event. Seeps and small streams remain frozen, and no samples will be collected at these stations until spring melt. Stations and sites along Pony Creek and Back Creek were frozen to bed. Some sites and stations along Dome Creek (H/WQ-DC-B, H/WQ-DC-R) were covered with overflow ice with no detectable flow under the ice layers. Snow and ice were present at all locations and water levels were low at sites where flowing water was detected.

METEOROLOGY

Meteorological data was collected at the ATM-ROAD station throughout February 2017 and EDI conducted a preliminary QA/QC review of the available data and all sensors appear to be functioning properly and there are no gaps in the February data. No unnatural disturbance to the snow under the snow depth sensor of the meteorological station was observed at the time of visit on February 7. There were no tracks inside the fenced area.

HYDROLOGY

Seven hydrometric stations provided suitable conditions for discharge measurements during the February 7-9, 2017 trip. A total of nine discharge measurements were scheduled at the Mount Nansen site; however, sites H-DC-B and H-BC did not provide suitable conditions for discharge measurements. Flow rates in Victoria Creek were low at all stations in February 2017 and similar to the January 2017 conditions. Continuous water level logger records are available for the following three stations: H-VC-U, H-VC-UMN and H-VC-R+290. Data from the logger at H-VC-DBC was not successfully downloaded in the field; the data remains stored on the logger and will be downloaded during the March field visit. A review of the available continuous hydrometric and barometric data files indicates that all sensors were functioning properly.

Surface water conditions and hydrometric monitoring tasks completed at each station in February 2017 are summarized in Attachment 3. Quality control and quality assurance for the hydrometric data was conducted on both the instantaneous and continuous datasets.

Field Results

- Discharge measurements were collected using salt dilution gauging at all four Victoria Creek stations, H-VC-U, H-VC-DBC, H-VC-UMN and H-VC-R+290, with discharge values ranging from 0.008 to 0.032 m^3/s. There was ice within the channels during the salt tracer measurements, which adds measurement uncertainty to the discharge value.
- The discharge at H-VC-DBC (0.019 m^3/s) is greater than the discharge downstream at H-VC-UMN (0.013 m^3/s). As identified during the 2015/16 winter period, there is a suspected loss of surface water to groundwater pathways between these two stations.
- Ice was relatively thin on the creeks throughout the Mount Nansen site. Ice thickness ranged from 0.03 to 0.30 m at the Victoria Creek stations.
- Salt dilution gauging methods were attempted at H-DC-DX+105, however flows were too low to measured. Discharge was estimated to be below the reportable confidence limits (0.001 m^3/s).
- A discharge of 0.003 m^3/s was calculated at H-DC-M WP. There was ice within the channels during the salt tracer measurements, which adds measurement uncertainty to the discharge value.
- The H-SEEP volumetric discharge measurement of 0.002 m^3/s, equal to the flow rate observed at the pump in the seepage pond shack (0.002 m^3/s).

WATER QUALITY

Water quality samples and in-situ data were collected at the scheduled sites with flowing water during the February 2017 trip. A total of nine sites were sampled (Attachment 4). The drinking water sample, including a bacteriological sample, was collected from the pumphouse well (WQ-PW) on February 9, 2017. All samples were submitted for analysis through ALS Laboratories under chain of custody documentation, including the bacteriological sample, since submission to Yukon Government – Health and Social Services was not possible due to lab closure on Friday, February 10, 2017.

Site conditions were noted and a record of the samples collected was 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). Many results reflect typical winter conditions at Mount Nansen when water levels are low and watercourses are covered in ice. 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 in Attachment 6 and discussed below.

Water Quality Results Summary

Analysis of the February 7-9, 2017 samples indicated that the following parameters exceeded applicable guidelines and standards for each site:

- The WQ-SEEP samples exceeded CCME-AL guidelines for total and dissolved arsenic, total cadmium, total copper, total and dissolved iron, total and dissolved zinc. Total iron and manganese exceeded Mount Nansen EQS.
    - Laboratory analysis for the December 2016 sample collected at the WQ-SEEP estimated a 96-hour LC50 result of 100% trout survival (%v/v). All fish appeared normal with no signs of stress at 96 hours.
- Tailings Pond (WQ-TP) samples exceeded CCME-AL guidelines for fluoride, total and dissolved arsenic, total and dissolved cadmium, total and dissolved copper, total and dissolved iron, total lead, and total and dissolved zinc. Total iron, total manganese, total zinc and dissolved arsenic exceeded Mount Nansen EQS. Replicate sample also exceeded Mount Nansen EQS for total suspended solids.
- On Upper Dome Creek site WQ-DC-DX+105, CCME-AL guidelines were exceeded for fluoride, total and dissolved arsenic, total and dissolved cadmium, and total and dissolved zinc. Total manganese and total zinc exceeded Mount Nansen EQS.
- On Lower Dome Creek site WQ-DC-U, the CCME-AL guidelines were exceeded for total and dissolved arsenic, total and dissolved iron. Total iron and total manganese exceeded Mount Nansen EQS.
- On all Victoria Creek sites (WQ-VC-U, WQ-VC-DBC, WQ-VC-UMN and WQ-VC-R+150), no parameters exceeded CCME-AL guidelines, except for total copper at WQ-VC-R+150.
- The bacteriological sample collected at WQ-PW on February 9, 2017 was absent of total coliforms and E. coli.

QA/QC Samples

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-TP-r was 7% with an average difference of 7% for total and 2% for dissolved metals. Total suspended solids, total aluminum, total lead, total silver had RPD>20%.

PROGRAM RECOMMENDATIONS

- During each winter trip, collect photographs of the meteorological station compound to support a coarse validation of snow depths recorded by the sensor (such as large snowfall accumulations and when all the snow below the sensor has melted).
- Where feasible, EDI will collect concurrent discharge measurements whenever salt tracer tests are completed during the 2016/17 winter season using a secondary method (such as velocity-area or volumetric). The secondary measurement is used to validate the winter measurements if poor hydraulic conditions due to complex ice formations are present. The low flow conditions throughout the Mount Nansen site have prohibited the use of secondary discharge methods during the 2016/17 winter period.

ADDITIONAL TRIP INFORMATION

Any changes to project scope (i.e. additional sites sampled):	All sampling and monitoring was conducted within scope. The next trip is scheduled for March 6-8, 2017. The next trip will be the fifth of the winter season and the final trip of the 2016/2017 Water Resources Investigation.
Any alterations to sample schedule/budget:	None
Additional Comments:	Sites that have been determined to be dry or frozen to bed will not be visited until the beginning of spring melt.
Wildlife Sightings:	On February 8, field crew observed a lynx at site H-VC-UMN and three more lynxes on the road near site WQ-DC-R. On February 9, a snowshoe hare was observed going in and out of a snow drift near the H-VC-U station.
Site concerns (safety):	None

ATTACHMENT 1: MAPS OF HYDROMETRIC STATIONS AND WATER QUALITY SITES

388000 389000 390000

6882000 6881000

N

Pony Creek

Buck Creek

Mount Nansen Road

Brown-McDade Pit Lake

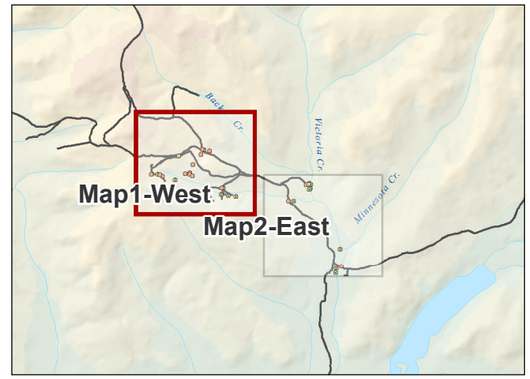
Tailings Facility

Bunkhouse

Mill

Dome Creek

H-PC-DSP
WQ-PC-U
WQ-PC-D
WQ-ADIT-SEEP
WQ-L1
WQ-PIT
ATM-ROAD
WQ-NW-SEEP-02
WQ-L2
WQ-ORE
WQ-LW-SEEP-01
WQ-WR-SEEP-A
WQ-WR-SEEP-B
WQ-DC-DX
H/WQ-DC-DX+105
WQ-MS-S-03
WQ-MS-S-08
WQ-DESS-03
WQ-CH-P-13-01
WQ-DESS-02
WQ-DESS-01
H/WQ-DC-D1B
WQ-DC-B
H-DC-B
H/WQ-TP
H/WQ-SEEP
H-DC-M/WQ-DC-U



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

Drawn: MP	Checked: MM/SD	Date: 21/09/2015	MAP 1

Yukon EDI

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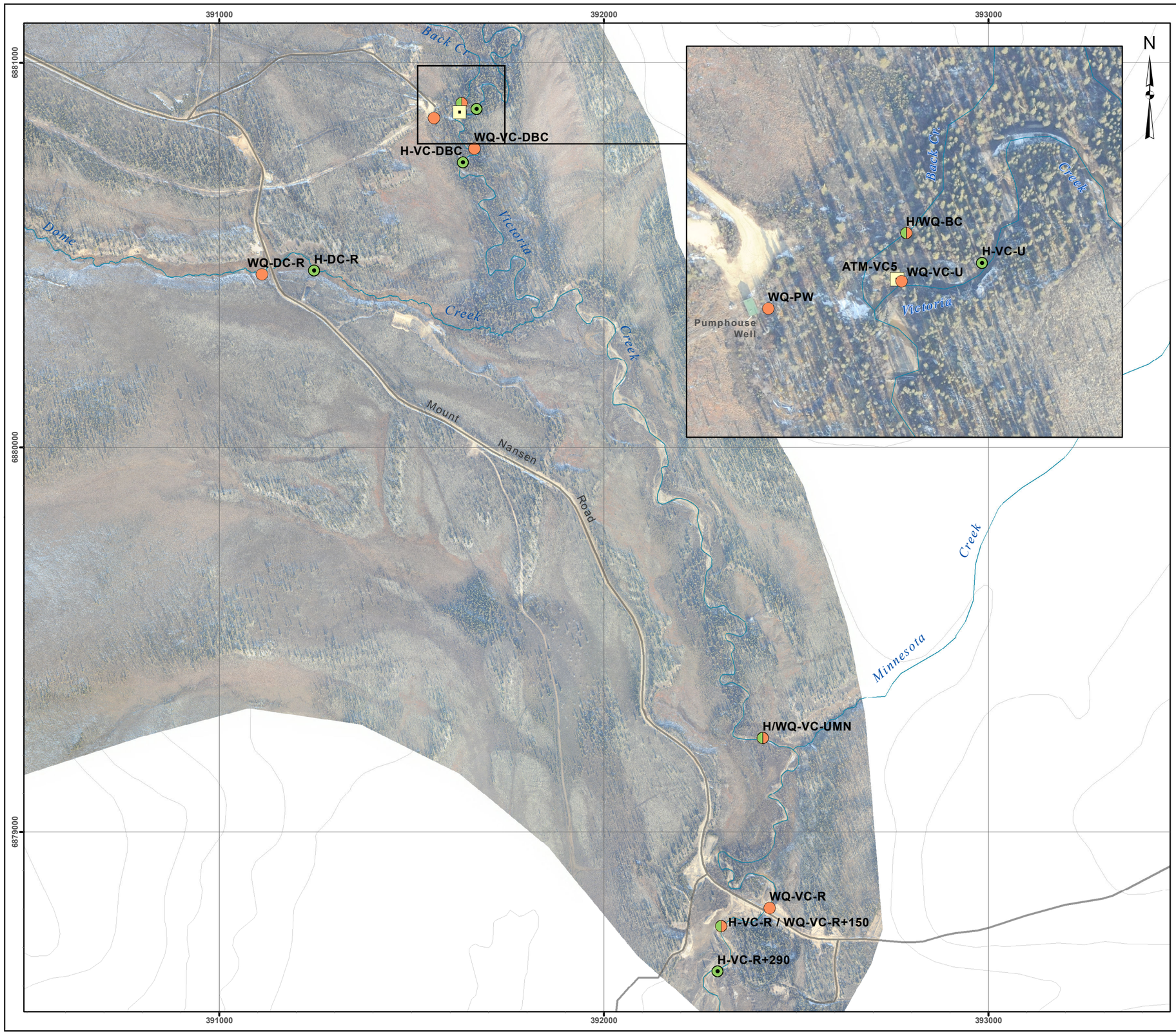

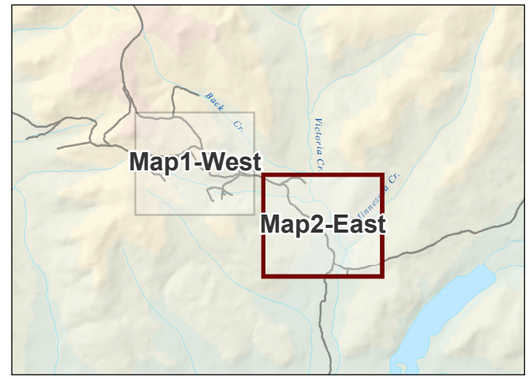

Legend

- 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).

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

Drawn:	Checked:	Date:	
MP	MM/SD	21/09/2015	**MAP 2**

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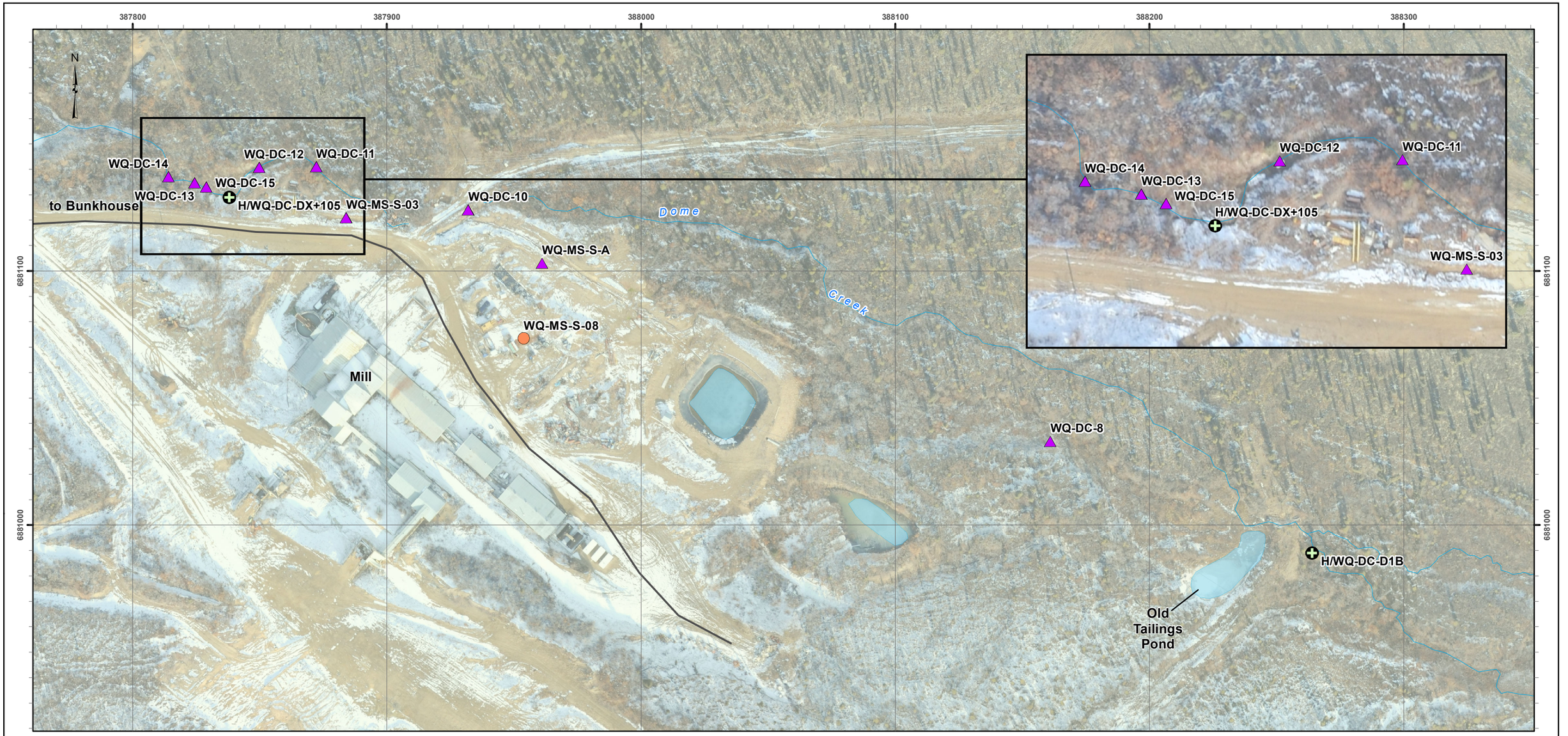


Dome Creek Investigation Sites

Legend

- Investigation Site
- Hydrometric Station and Water Quality Site
- Water Quality Site (label e.g. WQ-PC-U)
- Unpaved Road/Access

1 centimetre = 15 metres

Map Projection: North American Datum 1983 UTM Zone 8N

0 20 40 60 80 100

Metres

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.

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

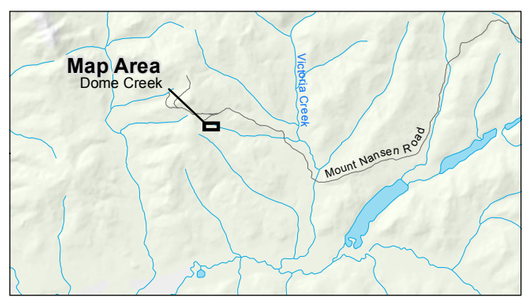
Watercourse, drainage areas and Mount Nansen Road layers digitized / modified by EDI (2011) using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).

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.

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

Drawn:	Checked:		
MP	MM/SD	**MAP 3**	Date: 23/09/2015



Yukon EDI

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ATTACHMENT 2: SITE AND STATION PHOTOS

Photo 1. H/WQ-DC-DX+105 – looking upstream at discharge measurement site.

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

Photo 3. H/WQ-DC-B – looking upstream (stagnant water at site).

Photo 4. H/WQ-DC-B – looking downstream (stagnant water at site).

Photo 5. WQ-TP – overview of tailings pond.

Photo 6. H-TP – lower staff gauge encased in ice.

Photo 7. H/WQ-SEEP – looking downstream.

Photo 8. H-DC-M WP – looking upstream at weir pond.

Photo 9. H-DC-M WP – looking downstream.

Photo 10. WQ-DC-U – looking downstream.

Photo 11. H/WQ-BC – overview of site (site dry).

Photo 12. H-VC-U – overview of site.

Photo 13. H-VC-U – looking downstream.

Photo 14. WQ-VC-U – looking upstream.

Photo 15. WQ-VC-U – looking downstream at confluence of Victoria Creek and Back Creek.

Photo 16. WQ-VC-DBC – looking downstream.

Photo 17. H-VC-DBC – looking upstream.

Photo 18. H/WQ-VC-UMN – looking downstream.

Photo 19. WQ-VC-R+150 – looking downstream.

Photo 20. H-VC-R+290 – looking upstream.

Photo 21. H-VC-R+290 – looking downstream.

Photo 22. WQ-PW – pipe outlet.

Photo 23. Meteorological Station overview

Photo 24. Meteorological Station overview

ATTACHMENT 3: HYDROLOGY SUMMARY DATA TABLES

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
B	Backwater effects (ice related)

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
1546	ATM-VC5	2017-02-09	12:05	N	-	-	-	-	Barologger downloaded at 12:05 and functioning properly.
1547	H-DC-DX+105	2017-02-08	10:00	SS	0.000	X	-	-	Salt tracer attempted for discharge measurement. Tracer aborted due to very slow flow. Discharge estimated to be less than 0.001 m3/s. Anchor ice along bed.
1548	H-DC-B	2017-02-08	13:30	N	-	X	-	-	Conditions not suitable for discharge measurement and flow less than 0.001 m3/s. Stagnant water 0.10 m deep at site below multiple layers of ice and slush with total thickness of 0.20 m. Fresh overflow ice is visible approximately 50 m upstream of site.
1549	H-DC-M WP	08/02/2017	11:40	SS	0.003	B	-	-	Salt tracer completed for discharge measurement. Overflow ice along right bank of pond and upstream. Weir pond covered with thick overflow ice. Thin ice in downstream channel.
1550	H-VC-U	2017-02-09	11:55	SS	0.032	B	-	-	Salt tracer completed for discharge measurement. Water is clear, level is low, velocity is moderate. Ice is thin (0.03m) with a few small open leads upstream of site. Logger downloaded at 12:25 and is functioning properly.
1551	H-VC-DBC	2017-02-09	09:25	SS	0.019	B	-	-	Salt tracers completed for discharge measurement. Ice thickness up to 0.20m. Level low, water clear and velocity moderate. Logger downloaded in field but during data review discovered that file is incomplete.
1552	H-BC	2017-02-08	18:40	N	-	X	-	-	Site frozen to bed. Hole augured through ice 0.75 m thick. Multiple layers of ice with no air voids between. Overflow ice fills channel to 0.05 m above bankfull elevation. Ice surface is approximately 0.2 m above bankfull elevation 10 m upstream of confluence with Victoria Creek.
1553	H-VC-UMN	2017-02-08	15:15	SS	0.013	B	-	-	Salt tracer completed for discharge measurement. Water level is low with moderate velocity and flow depth of approximately 0.25 m. Water is clear. Logger downloaded at 14:55 and functioning properly.
1554	H-VC-R+290	2017-02-07	15:15	SS	0.008	B	-	-	Salt tracer completed for discharge measurement. Very low flow in channel. Multiple layers of shelf ice and ice up to 0.3 m thick. Logger downloaded and functioning properly.
1555	H-SEEP	2017-02-08	12:40	V	0.002	-	-	-	Volumetric discharge measurement collected. Thick ice inside stilling culvert. Pump house reading 134.239 L/min (0.002 m3/s) at 12:40. Ice layer approximately 0.01 m thick in channel downstream.
1556	H-TP	2017-02-08	14:00	N	-	-	-	-	Staff gauge encased in ice. Snow cover on pond is 0.2m deep.

ATTACHMENT 4: WATER QUALITY SUMMARY DATA TABLES

Water Quality Site	Sample Collected? (Y/N)	Measurement Date	Comments
WQ-SEEP	Y	08/02/2017	Flow rate is moderate, turbidity light. Open water downstream of pipe outlet. LC50 collected.
WQ-TP	Y	07/02/2017	Thick ice cover (0.6m) under 0.2m of snow. Pond level low, water lightly turbid. Replicate sample collected.
WQ-DC-DX+105	Y	08/02/2017	Very low flow at site. Anchor ice along bed.
WQ-DC-B	N	08/02/2017	No sample collected. Stagnant water at site below alternating layers of ice and slush. Overflow ice throughout channel including under bridge which was dry on previous visit.
WQ-DC-U	Y	08/02/2017	Sample collected at usual sampling location. Ice chipped and water allowed to settle prior to sample collection.
WQ-VC-U	Y	08/02/2017	Water is clear, level is low, velocity is moderate. Conditions similar to January visit. Thin ice cover (0.03m).
WQ-BC	N	08/02/2017	Site frozen to bed and no sample collected. Hole augured through ice. Large amount of overflow ice in channel. Channel filled with ice upstream and downstream of site. Multiple continuous layers of ice.
WQ-VC-DBC	Y	08/02/2017	Low flow at site with clear water. Sections of thin ice (0.01 m) upstream and downstream of site.
WQ-VC-UMN	Y	08/02/2017	Water is clear, level is low, velocity is moderate.
WQ-VC-R+150	Y	07/02/2017	Sample collected immediately upstream of stilling well. Four holes chipped upstream at usual winter location, but frozen to bed including hole used last month. Multiple layers of shelf ice.
WQ-PW	Y	09/02/2017	Flow moderate. Pipe outflow under snow and ice, limited ice build-up.

Water quality results collected during the monthly surface water monitoring; February 2017

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	L1889357-4 WQ-SEEP 2/08/2017 12:35	L1889357-2 WQ-TP 2/07/2017 17:55	L1889357-3 WQ-TP-r 2/07/2017 18:10	QA/QC WQ-TP Replicate Analysis	L1889357-1 WQ-DC-DX+105 2/08/2017 09:30	L1889357-5 WQ-DC-U 2/08/2017 11:10	L1889357-7 WQ-VC-U 2/08/2017 09:30	L1889357-8 WQ-VC-DBC 2/08/2017 09:30	L1889357-9 WQ-VC-UMN 2/08/2017 09:30	L1889357-10 WQ-VC-R+150 2/07/2017 17:00	L1889357-12 WQ-PW 2/09/2017 11:30	L1889357-6 FIELD BLANK 2/08/2017 20:15	L1889357-11 TRAVEL BLANK 2/09/2017 00:00
Temperature (in-situ)	°C	-	-	-	0.5	0.1	0.1	-	0.0	-0.1	0.0	0.0	0.1	-0.1	0.4	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	1,674	2,520	2,506	-	1,150	1,518	215	219	285	261	359	-	-
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	6.99	7.38	7.38	-	7.19	7.04	7	7.05	6.97	7.53	7.42	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	2.62	0.68	0.68	-	2.77	-	7.27	7.96	6.23	7.75	2.88	-	-
Turbidity (In-situ)	NTU	-	-	-	25.00	8.70	9.63	-	2.74	16.68	0.68	0.39	0.17	0.99	0.13	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	<5.0	-	-
Conductivity	µS/cm	-	-	2	1600	2860	2860	0%	1110	1480	218	217	287	289	348	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	877	1880	1890	1%	653	797	103	106	139	139	178	<0.50	<0.50
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.48	7.89	7.9	0%	7.8	7.67	7.69	7.7	7.75	7.75	8.08	***5.44***	***5.4***
Total Suspended Solids	mg/L	-	50	3	33.8	5.6	***60.7***	**166%**	<3.0	34.9	<3.0	<3.0	<3.0	<3.0	-	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	1	1240	2690	2490	8%	792	1110	115	118	162	160	202	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	282	322	320	1%	269	280	93.5	95.5	111	111	-	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<DL	<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	<DL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	282	322	320	1%	269	280	93.5	95.5	111	111	165	<1.0	<1.0
Ammonia, Total (as N) [A]	mg/L	19.0	-	0.005	4.26	0.985	0.996	1%	0.0221	3.9	0.0068	0.0054	0.0051	<0.0050	-	<0.0050	0.0112
Bromide (Br)	mg/L	-	-	0.05	<0.25	<1.0	<1.0	<DL	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050
Chloride (Cl)	mg/L	120	-	0.5	<2.5	<10	<10	<DL	<2.5	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.10	***0.41***	<0.40	<DL	***0.17***	0.11	0.045	0.045	0.045	0.053	0.097	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.816	<0.10	<0.10	<DL	<0.025	0.366	0.104	0.1	0.0965	0.133	0.122	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	0.028	<0.020	<0.020	<DL	<0.0050	0.0172	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	687	1730	1530	12%	397	610	19.1	19.9	42.2	40.2	31.1	<0.30	<0.30
Anion Sum	meq/L	-	-	-	20	42.5	38.3	<DL	13.6	18.3	2.28	2.33	3.1	3.06	-	<0.10	<0.10
Cation Sum	meq/L	-	-	-	20.5	40.6	40.8	<DL	13.4	18	2.2	2.26	2.98	2.99	-	<0.10	<0.10
Cation - Anion Balance	%	-	-	-	1.3	-2.3	3.1	<DL	-0.7	-0.8	-1.8	-1.5	-2	-1.2	-	0	0
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<DL	<0.0050	0.0112	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	0.0176	<0.0050	<0.0050	<DL	<0.0050	0.0305	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<DL	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	4.91	<2.5	<0.50	<DL	<0.50	2.62	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0187	0.0129	0.0187	37%	0.0042	0.0577	0.0172	0.0151	0.0105	0.0133	<0.010	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00063	0.0203	0.0212	4%	0.00745	0.0004	<0.00010	<0.00010	0.00068	0.00065	<0.00050	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	***0.08250***	***0.39400***	***0.39900***	1%	***0.02740***	***0.05800***	0.00028	0.00027	0.00144	0.00155	0.00039	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1.0	0.00005	0.0673	0.0509	0.0522	3%	0.0125	0.0741	0.0937	0.0903	0.0909	0.0986	0.0830	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.00002	<0.000020	<0.000040	<0.000040	<DL	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-	<0.000020	<0.000020
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.000050	<0.00010	0.00013	<DL	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	-	0.01	0.051	0.155	0.153	1%	<0.010	0.036	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
Cadmium (Cd)-Total *(Lab Result)*	mg/L	HD	0.02	0.00001	***0.000565***	***0.00616***	***0.00722***	16%	***0.00101***	0.000187	0.0000307	0.0000188	0.0000237	0.0000209	<0.00020	<0.0000050	<0.0000050
Cadmium (Cd)-Total (Hardness Adjusted Guideline)	*mg/L*	*0.00004*	-	*0.00001*	*0.00037*	*0.00037*	*0.00037*	-	*0.00037*	*0.00037*	*0.00016*	*0.00017*	*0.00021*	*0.00021*	*0.00026*	*0.00037*	*0.00037*
Calcium (Ca)-Total	mg/L	-	-	0.05	255	586	584	0%	167	212	27	27.5	35.4	34.9	40.7	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.0007	<0.00020	0.00033	<DL	<0.00010	0.00048	0.00011	<0.00010	0.00015	0.00078	<0.0020	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00747	0.0027	0.00273	1%	0.00076	0.00543	<0.00010	<0.00010	0.00012	<0.00010	-	<0.00010	<0.00010
Copper (Cu)-Total *(Lab Result)*	mg/L	HD	0.2	0.0005	***0.00409***	***0.0452***	***0.0467***	3%	<0.00050	0.0022	0.00155	0.00147	0.00164	0.00204	<0.0010	<0.00050	<0.00050
Copper (Cu)-Total (Hardness Adjusted Guideline)	*mg/L*	*0.002*	-	*0.0005*	*0.0040*	*0.0040*	*0.0040*	-	*0.0040*	*0.0040*	*0.0024*	*0.0025*	*0.0031*	*0.0031*	*0.0039*	*0.0040*	*0.0040*
Iron (Fe)-Total	mg/L	0.3	1	0.01	***17.6***	***1.55***	***1.57***	1%	0.298	***8.13***	0.024	0.018	0.057	0.014	<0.030	<0.010	<0.010
Lead (Pb)-Total *(Lab Result)*	mg/L	HD	0.1	0.00005	0.000111	0.00523	***0.00914***	**54%**	0.000082	0.000211	<0.000050	<0.000050	<0.000050	<0.000050	0.00055	<0.000050	<0.000050
Lead (Pb)-Total (Hardness Adjusted Guideline)	*mg/L*	*0.001*	-	*0.00005*	*0.00700*	*0.00700*	*0.00700*	-	*0.00700*	*0.00700*	*0.00330*	*0.00343*	*0.00484*	*0.00484*	*0.00663*	*0.00700*	*0.00700*
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.0010	0.0209	0.0203	3%	0.0087	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Magnesium (Mg)-Total	mg/L	-	-	0.1	62.3	115	114	1%	59.3	57.6	9.29	9.04	12.9	13.3	18.7	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***6.62***	***11.2***	***11.2***	0%	***1.19***	***5.01***	0.15	0.154	0.0584	0.00511	<0.0020	<0.00010	<0.00010
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.0000050	0.0000091	<0.0000050	<DL	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.00020	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.0011	0.00447	0.00457	2%	0.000398	0.000923	0.000368	0.000371	0.000282	0.000415	-	<0.000050	<0.000050
Nickel (Ni)-Total *(Lab Result)*	mg/L	HD	0.3	0.0005	0.00325	0.0052	0.0054	4%	0.00139	0.00273	0.00052	0.00058	<0.00050	0.00173	-	<0.00050	<0.00050
Nickel (Ni)-Total (Hardness Adjusted Guideline)	*mg/L*	*0.025*	-	*0.0005*	*0.1500*	*0.1500*	*0.1500*	-	*0.1500*	*0.1500*	*0.0977*	*0.0999*	*0.1228*	*0.1228*	*0.1481*	*0.1500*	*0.1500*
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.10	<0.10	<DL	<0.050	0.053	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	6.69	36.1	36.2	0%	3.62	5.23	0.71	0.72	1.01	1.15	0.91	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.000266	0.00012	0.00013	<2xDL	<0.000050	0.000207	<0.000050	<0.000050	0.000059	0.000057	<0.0010	<0.000050	<0.000050
Silicon (Si)-Total	mg/L	-	-	0.05	8.53	8.43	8.52	1%	7.08	7.74	6.61	6.58	7.27	7.29	-	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.00025	0.1	0.00001	0.000039	0.000161	0.000233	**37%**	<0.000010	0.000249	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	36.9	38.1	37.9	1%	5.5	26.6	2.77	2.78	3.98	4.24	4.7	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.762	1.58	1.59	1%	0.408	0.666	0.297	0.304	0.336	0.337	-	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	266	661	660	0%	146	231	6.4	6.89	15	14.4	-	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	0.000251	0.000249	1%	0.000084	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00020	<0.00020	<DL	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.0003	0.00147	<0.00060	<0.00060	<DL	<0.00030	0.00293	0.0004	0.00032	<0.00030	<0.00030	-	<0.00030	<0.00030
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00204	0.00319	0.0031	3%	0.00435	0.00156	0.000536	0.000567	0.000572	0.000769	0.00167	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.0005	0.0032	<0.0010	<0.0010	<DL	<0.00050	0.00187	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.0512***	***0.6030***	***0.6070***	1%	***0.5870***	0.0245	<0.0030	<0.0030	0.0035	0.0035	<0.050	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	0.0003	0.00079	<0.00060	<0.00060	<DL	<0.00030	0.00046	<0.00030	<0.00030	<0.00030	<0.00030	-	<0.00030	<0.00030

Water quality results collected during the monthly surface water monitoring; February 2017

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	L1889357-4 WQ-SEEP 2/08/2017 12:35	L1889357-2 WQ-TP 2/07/2017 17:55	L1889357-3 WQ-TP-r 2/07/2017 18:10	QA/QC WQ-TP Replicate Analysis	L1889357-1 WQ-DC-DX+105 2/08/2017 09:30	L1889357-5 WQ-DC-U 2/08/2017 11:10	L1889357-7 WQ-VC-U 2/08/2017 09:30	L1889357-8 WQ-VC-DBC 2/08/2017 09:30	L1889357-9 WQ-VC-UMN 2/08/2017 09:30	L1889357-10 WQ-VC-R+150 2/07/2017 17:00	L1889357-12 WQ-PW 2/09/2017 11:30	L1889357-6 FIELD BLANK 2/08/2017 20:15	L1889357-11 TRAVEL BLANK 2/09/2017 00:00
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.001	0.0094	0.0036	<0.0020	<DL	<0.0010	0.0074	0.0064	0.0065	0.0075	0.0059	-	<0.0010	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.0005	0.0145	0.0143	1%	0.00729	0.00035	<0.00010	<0.00010	0.00067	0.00061	-	<0.00010	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.03070***	***0.24400***	***0.23900***	2%	***0.00628***	***0.03920***	0.00022	0.00023	0.00137	0.00142	-	<0.00010	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0608	0.0495	0.0499	1%	0.0124	0.0731	0.0907	0.0941	0.0908	0.097	-	<0.000050	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.00002	<0.000020	<0.000040	<0.000040	<DL	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-	<0.000020	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.000050	<0.00010	<0.00010	<DL	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	0.047	0.149	0.149	0%	<0.010	0.035	<0.010	<0.010	<0.010	<0.010	-	<0.010	-
Cadmium (Cd)-Dissolved *(Lab Result)*	mg/L	HD	-	0.00001	0.000326	***0.00665***	***0.00626***	6%	0.000257	0.000125	0.0000261	0.0000281	0.0000255	0.0000068	-	<0.0000050	-
Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)	*mg/L*	*0.0004*	-	*0.00001*	*0.00037*	*0.00037*	*0.00037*	-	*0.00037*	*0.00037*	*0.00016*	*0.00017*	*0.00021*	*0.00021*	-	*0.00037*	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	252	567	572	1%	163	221	26.3	27	34.8	34.5	-	<0.050	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00042	<0.00020	<0.00020	<DL	<0.00010	0.0003	<0.00010	<0.00010	<0.00010	0.00013	-	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00695	0.00262	0.00261	0%	0.00077	0.00531	<0.00010	<0.00010	0.00012	<0.00010	-	<0.00010	-
Copper (Cu)-Dissolved *(Lab Result)*	mg/L	HD	-	0.0002	0.00173	***0.0373***	***0.0361***	3%	<0.00020	0.00081	0.00118	0.00121	0.00159	0.00126	-	0.00027	-
Copper (Cu)-Diss. (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.002*	*0.004*	*0.004*	*0.004*	-	*0.004*	*0.004*	*0.002*	*0.002*	*0.003*	*0.003*	-	*0.004*	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	***14.500***	***0.620***	***0.592***	5%	0.048	***5.860***	<0.010	<0.010	0.048	<0.010	-	<0.010	-
Lead (Pb)-Dissolved *(Lab Result)*	mg/L	HD	-	0.00005	<0.000050	0.00098	0.00095	3%	0.000077	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	-
Lead (Pb)-Diss. (Hardness Adjusted Guideline)	*mg/L*	*0.001*	-	*0.00005*	*0.00700*	*0.00700*	*0.00700*	-	*0.00700*	*0.00700*	*0.00330*	*0.00343*	*0.00484*	*0.00484*	-	*0.00700*	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.0010	0.0201	0.0201	0%	0.0086	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	60.1	112	112	0%	59.7	59.7	9.01	9.38	12.7	12.9	-	<0.10	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	6.38	11	10.9	1%	1.2	5.07	0.145	0.158	0.0569	0.00424	-	<0.00010	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.0000050	0.0000052	<0.0000050	<DL	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000995	0.0043	0.00432	0%	0.00036	0.000877	0.00032	0.000319	0.000246	0.000362	-	<0.000050	-
Nickel (Ni)-Dissolved *(Lab Result)*	mg/L	HD	-	0.0005	0.00309	0.0048	0.0048	0%	0.00133	0.00241	<0.00050	0.00054	<0.00050	<0.00050	-	<0.00050	-
Nickel (Ni)-Diss. (Hardness Adjusted Guideline)	*mg/L*	*0.025*	-	*0.0005*	*0.1500*	*0.1500*	*0.1500*	-	*0.1500*	*0.1500*	*0.0977*	*0.0999*	*0.1228*	*0.1228*	-	*0.1500*	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.10	<0.10	<DL	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	6.56	35.3	35.7	1%	3.65	5.38	0.69	0.71	0.99	1.1	-	<0.10	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.000262	0.00012	0.00014	<2xDL	<0.000050	0.000188	<0.000050	<0.000050	0.000071	0.000051	-	<0.000050	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	8.18	8.16	8.12	0%	6.93	7.42	6.34	6.5	7.14	7.16	-	<0.050	-
Silver (Ag)-Dissolved	mg/L	0.00025	-	0.00001	<0.000010	0.000054	0.000057	5%	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	35.5	37.3	37	1%	5.52	27.5	2.69	2.81	3.93	4.1	-	<0.050	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.734	1.54	1.55	1%	0.399	0.69	0.288	0.293	0.326	0.328	-	<0.00020	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	255	642	635	1%	143	219	6.33	6.66	14.3	13.8	-	<0.50	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000241	0.000243	1%	0.000074	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00020	<0.00020	<DL	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.0003	0.00085	<0.00060	<0.00060	<DL	<0.00030	0.00047	<0.00030	<0.00030	<0.00030	<0.00030	-	<0.00030	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00197	0.00301	0.00307	2%	0.00411	0.00159	0.000499	0.000514	0.000536	0.000724	-	<0.000010	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.00157	<0.0010	<0.0010	<DL	<0.00050	0.00092	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	***0.0485***	***0.5820***	***0.5760***	1%	***0.5910***	0.0238	0.0012	0.0019	0.0030	0.0061	-	<0.0010	-
Zirconium (Zr)-Dissolved	mg/L	-	-	0.0003	0.00067	<0.00060	<0.00060	<DL	<0.00030	0.00042	<0.00030	<0.00030	<0.00030	<0.00030	-	<0.00030	-

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

HD = Hardeness Dependent guideline for CCME-WATER-FAL

[A] Ammonia guideline is temperature dependent and the February value is based on a water temperature of 0°C and a pH of 7.0

COLOUR KEY:
Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
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-VC-R+150-r was 7% with an average difference of 7% for total and 2% for dissolved metals.
Total suspended solids, total aluminum, total lead, total silver had RPD>20%.

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: 09-FEB-17
Report Date: 24-FEB-17 15:00 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1889357

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

Comments: Fish toxicity analysis was subcontracted to Nautilus Environmental located in Burnaby, BC. Refer to their report attached for detail.

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1889357-1	L1889357-2	L1889357-3	L1889357-4	L1889357-5
Description	Water	Water	Water	Water	Water
Sampled Date	08-FEB-17	07-FEB-17	07-FEB-17	08-FEB-17	08-FEB-17
Sampled Time	09:30	17:55	18:10	12:35	11:10
Client ID	WQ-DC-DX + 105	WQ-TP	WQ-TP-R	WQ-SEEP	WQ-DC-U
Grouping / **Analyte**					
WATER					
Physical Tests Colour, True (CU)					
Conductivity (uS/cm)	1110	2860	2860	1600	1480
Hardness (as CaCO3) (mg/L)	653	1880	1890	877	797
pH (pH)	7.80	7.89	7.90	7.48	7.67
Total Suspended Solids (mg/L)	<3.0	5.6	60.7	33.8	34.9
Total Dissolved Solids (mg/L)					
TDS (Calculated) (mg/L)	792	2690	2490	1240	1110
Turbidity (NTU)					
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	269	322	320	282	280
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)	269	322	320	282	280
Ammonia, Total (as N) (mg/L)	0.0221	0.985	0.996	4.26	3.90
Bromide (Br) (mg/L)	<0.25 DLDS	<1.0 DLDS	<1.0 DLDS	<0.25 DLDS	<0.25 DLDS
Chloride (Cl) (mg/L)	<2.5 DLDS	<10 DLDS	<10 DLDS	<2.5 DLDS	<2.5 DLDS
Fluoride (F) (mg/L)	0.17	0.41	<0.40 DLDS	<0.10 DLDS	0.11
Nitrate (as N) (mg/L)	<0.025 DLDS	<0.10 DLDS	<0.10 DLDS	0.816	0.366
Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.020 DLDS	<0.020 DLDS	0.0280	0.0172
Sulfate (SO4) (mg/L)	397	1730	1530	687	610
Anion Sum (meq/L)	13.6	42.5	38.3	20.0	18.3
Cation Sum (meq/L)	13.4	40.6	40.8	20.5	18.0
Cation - Anion Balance (%)	-0.7	-2.3	3.1	1.3	-0.8
Cyanides Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	0.0112
Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	0.0176	0.0305
Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN) (mg/L)	<0.50	<2.5 DLM	<0.50	4.91	2.62
Bacteriological Tests E. coli (MPN/100mL)					
Coliform Bacteria - Total (MPN/100mL)					
Total Metals Aluminum (Al)-Total (mg/L)	0.0042	0.0129	0.0187	0.0187	0.0577
Antimony (Sb)-Total (mg/L)	0.00745	0.0203	0.0212	0.00063	0.00040
Arsenic (As)-Total (mg/L)	0.0274	0.394	0.399	0.0825	0.0580
Barium (Ba)-Total (mg/L)	0.0125	0.0509	0.0522	0.0673	0.0741
Beryllium (Be)-Total (mg/L)	<0.000020	<0.000040 DLA	<0.000040 DLA	<0.000020	<0.000020
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.00010 DLA	0.00013	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	0.155	0.153	0.051	0.036
Cadmium (Cd)-Total (mg/L)	0.00101	0.00616	0.00722	0.000565	0.000187

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1889357-6	L1889357-7	L1889357-8	L1889357-9	L1889357-10
Description	Water	Water	Water	Water	Water
Sampled Date	08-FEB-17	08-FEB-17	08-FEB-17	08-FEB-17	07-FEB-17
Sampled Time	20:15	09:30	09:30	09:30	17:00
Client ID	FIELD BLANK	WQ-VC-U	WQ-VC-DBC	WQ-VC-UMN	WQ-VC-R +150
Grouping / **Analyte**					
WATER					
Physical Tests Colour, True (CU)					
Conductivity (uS/cm)	<2.0	218	217	287	289
Hardness (as CaCO3) (mg/L)	<0.50	103	106	139	139
pH (pH)	5.44	7.69	7.70	7.75	7.75
Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids (mg/L)					
TDS (Calculated) (mg/L)	<1.0	115	118	162	160
Turbidity (NTU)					
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	93.5	95.5	111	111
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	<1.0	93.5	95.5	111	111
Ammonia, Total (as N) (mg/L)	<0.0050	0.0068	0.0054	0.0051	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F) (mg/L)	<0.020	0.045	0.045	0.045	0.053
Nitrate (as N) (mg/L)	<0.0050	0.104	0.100	0.0965	0.133
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4) (mg/L)	<0.30	19.1	19.9	42.2	40.2
Anion Sum (meq/L)	<0.10	2.28	2.33	3.10	3.06
Cation Sum (meq/L)	<0.10	2.20	2.26	2.98	2.99
Cation - Anion Balance (%)	0.0	-1.8	-1.5	-2.0	-1.2
Cyanides Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Bacteriological Tests E. coli (MPN/100mL)					
Coliform Bacteria - Total (MPN/100mL)					
Total Metals Aluminum (Al)-Total (mg/L)	<0.0030	0.0172	0.0151	0.0105	0.0133
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00068	0.00065
Arsenic (As)-Total (mg/L)	<0.00010	0.00028	0.00027	0.00144	0.00155
Barium (Ba)-Total (mg/L)	<0.000050	0.0937	0.0903	0.0909	0.0986
Beryllium (Be)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	0.0000307	0.0000188	0.0000237	0.0000209

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1889357-11	L1889357-12			
	Description	Water	Water			
	Sampled Date	09-FEB-17	09-FEB-17			
	Sampled Time		11:30			
	Client ID	TRAVEL BLANK	WQ-PW			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)		<5.0			
	Conductivity (uS/cm)	<2.0	348			
	Hardness (as CaCO3) (mg/L)	<0.50 HTC	178 HTC			
	pH (pH)	5.40	8.08			
	Total Suspended Solids (mg/L)	<3.0				
	Total Dissolved Solids (mg/L)		202			
	TDS (Calculated) (mg/L)	<1.0				
	Turbidity (NTU)		0.15			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	165			
	Ammonia, Total (as N) (mg/L)	0.0112 RRV				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	<0.50	<0.50			
	Fluoride (F) (mg/L)	<0.020	0.097			
	Nitrate (as N) (mg/L)	<0.0050	0.122			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Sulfate (SO4) (mg/L)	<0.30	31.1			
	Anion Sum (meq/L)	<0.10				
	Cation Sum (meq/L)	<0.10				
	Cation - Anion Balance (%)	0.0				
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050				
	Cyanide, Total (mg/L)	<0.0050				
	Cyanate (mg/L)	<0.20				
	Thiocyanate (SCN) (mg/L)	<0.50				
Bacteriological Tests	E. coli (MPN/100mL)		<1			
	Coliform Bacteria - Total (MPN/100mL)		<1			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.010			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00050			
	Arsenic (As)-Total (mg/L)	<0.00010	0.00039			
	Barium (Ba)-Total (mg/L)	<0.000050	0.083			
	Beryllium (Be)-Total (mg/L)	<0.000020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010	<0.10			
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.00020			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1889357-1	L1889357-2	L1889357-3	L1889357-4	L1889357-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	08-FEB-17	07-FEB-17	07-FEB-17	08-FEB-17	08-FEB-17
	Sampled Time	09:30	17:55	18:10	12:35	11:10
	Client ID	WQ-DC-DX + 105	WQ-TP	WQ-TP-R	WQ-SEEP	WQ-DC-U
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	167	586	584	255	212
	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00020 DLA	0.00033	0.00070	0.00048
	Cobalt (Co)-Total (mg/L)	0.00076	0.00270	0.00273	0.00747	0.00543
	Copper (Cu)-Total (mg/L)	<0.00050	0.0452	0.0467	0.00409	0.00220
	Iron (Fe)-Total (mg/L)	0.298	1.55	1.57	17.6	8.13
	Lead (Pb)-Total (mg/L)	0.000082	0.00523	0.00914	0.000111	0.000211
	Lithium (Li)-Total (mg/L)	0.0087	0.0209	0.0203	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	59.3	115	114	62.3	57.6
	Manganese (Mn)-Total (mg/L)	1.19	11.2	11.2	6.62	5.01
	Mercury (Hg)-Total (mg/L)	<0.0000050	0.0000091	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000398	0.00447	0.00457	0.00110	0.000923
	Nickel (Ni)-Total (mg/L)	0.00139	0.0052	0.0054	0.00325	0.00273
	Phosphorus (P)-Total (mg/L)	<0.050	<0.10 DLA	<0.10 DLA	<0.050	0.053
	Potassium (K)-Total (mg/L)	3.62	36.1	36.2	6.69	5.23
	Selenium (Se)-Total (mg/L)	<0.000050	0.00012	0.00013	0.000266	0.000207
	Silicon (Si)-Total (mg/L)	7.08	8.43	8.52	8.53	7.74
	Silver (Ag)-Total (mg/L)	<0.000010	0.000161	0.000233	0.000039	0.000249
	Sodium (Na)-Total (mg/L)	5.50	38.1	37.9	36.9	26.6
	Strontium (Sr)-Total (mg/L)	0.408	1.58	1.59	0.762	0.666
	Sulfur (S)-Total (mg/L)	146	661	660	266	231
	Thallium (Tl)-Total (mg/L)	0.000084	0.000251	0.000249	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00020 DLA	<0.00020 DLA	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00060 DLA	<0.00060 DLA	0.00147	0.00293
	Uranium (U)-Total (mg/L)	0.00435	0.00319	0.00310	0.00204	0.00156
	Vanadium (V)-Total (mg/L)	<0.00050	<0.0010 DLA	<0.0010 DLA	0.00320	0.00187
	Zinc (Zn)-Total (mg/L)	0.587	0.603	0.607	0.0512	0.0245
	Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00060 DLA	<0.00060 DLA	0.00079	0.00046
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)	<0.0010	0.0036	<0.0020 DLA	0.0094	0.0074
	Antimony (Sb)-Dissolved (mg/L)	0.00729	0.0145	0.0143	0.00050	0.00035
	Arsenic (As)-Dissolved (mg/L)	0.00628	0.244	0.239	0.0307	0.0392
	Barium (Ba)-Dissolved (mg/L)	0.0124	0.0495	0.0499	0.0608	0.0731
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000040 DLA	<0.000040 DLA	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.00010 DLA	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	0.149	0.149	0.047	0.035
	Cadmium (Cd)-Dissolved (mg/L)	0.000257	0.00665	0.00626	0.000326	0.000125

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1889357-6	L1889357-7	L1889357-8	L1889357-9	L1889357-10
	Description	Water	Water	Water	Water	Water
	Sampled Date	08-FEB-17	08-FEB-17	08-FEB-17	08-FEB-17	07-FEB-17
	Sampled Time	20:15	09:30	09:30	09:30	17:00
	Client ID	FIELD BLANK	WQ-VC-U	WQ-VC-DBC	WQ-VC-UMN	WQ-VC-R +150
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	<0.050	27.0	27.5	35.4	34.9
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00011	<0.00010	0.00015	0.00078
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	0.00155	0.00147	0.00164	0.00204
	Iron (Fe)-Total (mg/L)	<0.010	0.024	0.018	0.057	0.014
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	<0.10	9.29	9.04	12.9	13.3
	Manganese (Mn)-Total (mg/L)	<0.00010	0.150	0.154	0.0584	0.00511
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.000050	0.000368	0.000371	0.000282	0.000415
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00052	0.00058	<0.00050	0.00173
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	<0.10	0.71	0.72	1.01	1.15
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000059	0.000057
	Silicon (Si)-Total (mg/L)	<0.050	6.61	6.58	7.27	7.29
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	<0.050	2.77	2.78	3.98	4.24
	Strontium (Sr)-Total (mg/L)	<0.00020	0.297	0.304	0.336	0.337
	Sulfur (S)-Total (mg/L)	<0.50	6.40	6.89	15.0	14.4
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	0.00040	0.00032	<0.00030	<0.00030
	Uranium (U)-Total (mg/L)	<0.000010	0.000536	0.000567	0.000572	0.000769
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	0.0035	0.0035
	Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030	<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)	<0.0010	0.0064	0.0065	0.0075	0.0059
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00067	0.00061
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00022	0.00023	0.00137	0.00142
	Barium (Ba)-Dissolved (mg/L)	<0.000050	0.0907	0.0941	0.0908	0.0970
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<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	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	0.0000261	0.0000281	0.0000255	0.0000068

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1889357-11	L1889357-12			
	Description	Water	Water			
	Sampled Date	09-FEB-17	09-FEB-17			
	Sampled Time		11:30			
	Client ID	TRAVEL BLANK	WQ-PW			
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	<0.050	40.7			
	Chromium (Cr)-Total (mg/L)	<0.00010	<0.0020			
	Cobalt (Co)-Total (mg/L)	<0.00010				
	Copper (Cu)-Total (mg/L)	<0.00050	<0.0010			
	Iron (Fe)-Total (mg/L)	<0.010	<0.030			
	Lead (Pb)-Total (mg/L)	<0.000050	0.00055			
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	<0.10	18.7			
	Manganese (Mn)-Total (mg/L)	<0.00010	<0.0020			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.00020			
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	<0.10	0.91			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.0010			
	Silicon (Si)-Total (mg/L)	<0.050				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	<0.050	4.7			
	Strontium (Sr)-Total (mg/L)	<0.00020				
	Sulfur (S)-Total (mg/L)	<0.50				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Uranium (U)-Total (mg/L)	<0.000010	0.00167			
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.050			
	Zirconium (Zr)-Total (mg/L)	<0.00030				
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1889357-1 Water 08-FEB-17 09:30 WQ-DC-DX + 105	L1889357-2 Water 07-FEB-17 17:55 WQ-TP	L1889357-3 Water 07-FEB-17 18:10 WQ-TP-R	L1889357-4 Water 08-FEB-17 12:35 WQ-SEEP	L1889357-5 Water 08-FEB-17 11:10 WQ-DC-U
WATER						
Dissolved Metals	Calcium (Ca)-Dissolved (mg/L)	163	567	572	252	221
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00020 DLA	0.00042	0.00030
	Cobalt (Co)-Dissolved (mg/L)	0.00077	0.00262	0.00261	0.00695	0.00531
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.0373	0.0361	0.00173	0.00081
	Iron (Fe)-Dissolved (mg/L)	0.048	0.620	0.592	14.5	5.86
	Lead (Pb)-Dissolved (mg/L)	0.000077	0.00098	0.00095	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0086	0.0201	0.0201	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	59.7	112	112	60.1	59.7
	Manganese (Mn)-Dissolved (mg/L)	1.20	11.0	10.9	6.38	5.07
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	0.0000052	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000360	0.00430	0.00432	0.000995	0.000877
	Nickel (Ni)-Dissolved (mg/L)	0.00133	0.0048 DLA	0.0048 DLA	0.00309	0.00241
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.10	<0.10	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	3.65	35.3	35.7	6.56	5.38
	Selenium (Se)-Dissolved (mg/L)	<0.000050	0.00012	0.00014	0.000262	0.000188
	Silicon (Si)-Dissolved (mg/L)	6.93	8.16	8.12	8.18	7.42
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000054	0.000057	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	5.52	37.3	37.0	35.5	27.5
	Strontium (Sr)-Dissolved (mg/L)	0.399	1.54	1.55	0.734	0.690
	Sulfur (S)-Dissolved (mg/L)	143	642	635	255	219
	Thallium (Tl)-Dissolved (mg/L)	0.000074	0.000241 DLA	0.000243 DLA	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00020 DLA	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00060 DLA	<0.00060 DLA	0.00085	0.00047
	Uranium (U)-Dissolved (mg/L)	0.00411	0.00301 DLA	0.00307 DLA	0.00197	0.00159
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.0010	<0.0010	0.00157	0.00092
	Zinc (Zn)-Dissolved (mg/L)	0.591	0.582	0.576	0.0485	0.0238
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00060 DLA	<0.00060 DLA	0.00067	0.00042

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1889357-6	L1889357-7	L1889357-8	L1889357-9	L1889357-10
	Description	Water	Water	Water	Water	Water
	Sampled Date	08-FEB-17	08-FEB-17	08-FEB-17	08-FEB-17	07-FEB-17
	Sampled Time	20:15	09:30	09:30	09:30	17:00
	Client ID	FIELD BLANK	WQ-VC-U	WQ-VC-DBC	WQ-VC-UMN	WQ-VC-R +150
Grouping	**Analyte**					
WATER						
Dissolved Metals	Calcium (Ca)-Dissolved (mg/L)	<0.050	26.3	27.0	34.8	34.5
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00013
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00027 RRV	0.00118	0.00121	0.00159	0.00126
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.048	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	<0.10	9.01	9.38	12.7	12.9
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	0.145	0.158	0.0569	0.00424
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000320	0.000319	0.000246	0.000362
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00054	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	<0.10	0.69	0.71	0.99	1.10
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000071	0.000051
	Silicon (Si)-Dissolved (mg/L)	<0.050	6.34	6.50	7.14	7.16
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<0.050	2.69	2.81	3.93	4.10
	Strontium (Sr)-Dissolved (mg/L)	<0.00020	0.288	0.293	0.326	0.328
	Sulfur (S)-Dissolved (mg/L)	<0.50	6.33	6.66	14.3	13.8
	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)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Uranium (U)-Dissolved (mg/L)	<0.000010	0.000499	0.000514	0.000536	0.000724
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0012	0.0019	0.0030	0.0061
	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	L1889357-11	L1889357-12			
	Description	Water	Water			
	Sampled Date	09-FEB-17	09-FEB-17			
	Sampled Time		11:30			
	Client ID	TRAVEL BLANK	WQ-PW			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Phosphorus (P)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Sulfur (S)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					
	Zirconium (Zr)-Dissolved (mg/L)					

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1889357-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1889357-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1889357-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1889357-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1889357-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1889357-1, -2, -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.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

ALK-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.

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

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

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

CL-IC-N-VA	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.
Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method. Contact ALS for additional information if required.

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

Reference Information

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

COLOUR-TRUE-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.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

ECOLI-COLI-BCDW-VA Water E.coli by Colilert APHA METHOD 9223

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

F-IC-N-VA 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.

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-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-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.

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.

Reference Information

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-VA	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-VA	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-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

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

TCOLI-COLI-BCDW-VA	Water	Total coliform by Colilert	APHA METHOD 9223

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is quantified by a statistical estimation of bacteria density (most probable number).

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".
The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.

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

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

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

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

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

Chain of Custody Numbers:

Reference Information

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.

Acute Toxicity Test Results

Sample L1889357-13 WQ-SEEP,
collected February 8, 2017

Final Report

February 22, 2017

Submitted to: **ALS Environmental**
Burnaby, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

SAMPLE INFORMATION

Sample ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
L1889357-13 WQ-SEEP	08-Feb-17 at N/A	11-Feb-17 at 1325h	12-Feb-17 at 1100h	4.5°C

N/A = Not Available.

TESTS

- Rainbow trout 96-h LC50 test

RESULTS

Toxicity test results

Sample ID	LC50 (% v/v)
L1889357-13 WQ-SEEP	>100

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	46.6 (37.6 – 57.8) µg/L Zn[1]
Reference toxicant historical mean (2 SD range)	55.9 (22.6 – 138.4) µg/L Zn
Reference toxicant CV	57%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date: February 3, 2017, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation

Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) LC50 test.

Test species	*Oncorhynchus mykiss*
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival (96-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as $ZnCl_2$)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: ALS

Start Date/Time: Feb 12/17 @ 1100h

Work Order No.: 170072

Test Species: *Oncorhynchus mykiss*

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Information:

Sample ID: L1889357-13WQ-SEEP
Sample Date: Feb 8/17
Date Received: Feb 11/17
Sample Volume: 2 X 20 L
Other: —

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L $CaCO_3$): 7
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 011917
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/2
Loading Density (g/L): 0.30
Mean Length ± SD (mm): 31 ± 1 Range: 29 - 34
Mean Weight ± SD (g): 0.37 ± 0.06 Range: 0.31 - 0.49

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn63
Stock Solution ID: 16Zn02
Date Initiated: Feb 3/17
96-h LC50 (95% CL): 46.6 (37.6 - 57.8) mg/L Zn

Reference Toxicant Mean and Historical Range: 55.9 (22.6 - 138.4) mg/L Zn
Reference Toxicant CV (%): 57

Test Results: The 96 hours LC50 is estimated to be >100% (v/v).

Reviewed by: [signature]

Date reviewed: Feb. 21, 2017

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: ALS
Sample I.D. L1889357-13 WQ-SEEP
W.O. # 170078
RBT Batch #: 011917
Date Collected/Time: Feb. 8/17 @ (not available)
Date Setup/Time: Feb 12/17 @ 1100h
Sample Setup By: AS

Number Fish/Volume: 10 / 12 L
7-d % Mortality: 0.5
Total Pre-aeration Time (mins): 30
Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Yes

Thermometer: CER #2 **D.O. meter:** 2
Cond./Salinity: 2 **pH meter:** 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0		14.0
D.O. (mg/L)	9.4		9.6
pH	6.8		7.0
Cond. (µS/cm)	1610		1612
Salinity (ppt)	0.8		0.8

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
Control				10	10	10	10	14.0	14.5	14.5	14.5	14.5	10.1	9.8	10.0	9.6	9.6	7.1	7.1	7.1	7.0	6.9	28	33
6.25				10	10	10	10	14.0	14.5	14.5	14.5	14.5	10.1	9.8	10.0	9.7	9.6	7.0	7.4	7.3	7.1	7.1	201	206
12.5				10	10	10	10	14.0	14.5	14.5	14.5	14.5	10.2	9.9	10.0	9.7	9.6	7.0	7.7	7.6	7.4	7.3	312	313
25				10	10	10	10	14.0	14.5	14.5	14.5	14.5	10.0	9.8	10.0	9.8	9.7	6.9	7.9	7.8	7.7	7.7	529	534
50				10	10	10	10	14.0	14.5	14.5	14.5	14.5	9.9	9.8	10.0	9.8	9.6	6.9	8.2	8.2	7.9	8.0	869	894
100				9	9	9	9	14.0	14.5	14.5	14.5	14.5	9.7	9.8	10.1	9.8	9.6	7.0	8.3	8.4	8.2	8.2	1612	1560
Initials				MW	EC	EC	EC	A	MW	EC	EC	EC	A	MW	EC	EC	EC	A	MW	EC	EC	EC	A	EC

Sample Description/Comments: dark orange - turbid - odourless - ~~ppt~~ some ppt present

Fish Description at 96 h: All surviving fish appear normal Number of Stressed Fish at 96 h: Ø

Other Observations:

Reviewed by: [signature] Date Reviewed: Feb. 21, 2017

APPENDIX C – Chain-of-custody form

L1889357

VANCOUVER

ALS Environmental

Subcontract Request Form

Subcontract To:

NAUTILUS ENVIRONMENTAL
8664 COMMERCE COURT
BURNABY,BC V5A 4N7

NOTES: Please reference on final report and invoice: PO# *L1889357*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L1889357-13 WQ-SEEP	Trout Bioassay LC50 (96 Hour) - Nautilus (TROUT-LC50-96HR-NL 1)	**2/8/2017** 2/15/2017	

Subcontract Info Contact: Walter Lin (604) 253-4188

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

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

Shipped By: AB Date Shipped: Feb 11, 2017

Received By: Mimi Tran Date Received: Feb 11/17 @ 1325h

Verified By: Mimi Tran Date Verified: Feb 11/17

Temperature: 4.5°C

Sample Integrity Issues: ok

2x 20L

WO ~~170071~~ NY
170072

iday, February 10, 2017 2:35 PM

END OF REPORT

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1889357-COFC

COC Number:

Page 1 of 4

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
Phone:	867-393-4882	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		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)		ALS Contact: V. Dykshoorn	Sampler:

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	P	P	F/P		
	WQ - DC - DX + 105	08-FEB-17	09 30	Water	R	R	R	R	R	R	R	R	R	9
	WQ - TP	07-FEB-17	1755	Water	R	R	R	R	R	R	R	R	R	9
	WQ - TP - R	07-FEB-17	1810	Water	R	R	R	R	R	R	R	R	R	9
	WQ - SEEP	08-FEB-17	12 35	Water	R	R	R	R	R	R	R	R	R	9
	WQ - DC - U	08-FEB-17	1110	Water	R	R	R	R	R	R	R	R	R	9
	FIELD BLANK	08-FEB-17	2015	Water	R	R	R	R	R	R	R	R	R	9
		-FEB-17		Water	R	R	R	R	R	R	R	R	R	9
		-FEB-17		Water	R	R	R	R	R	R	R	R	R	

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		
-2.0					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: A. MISCHLER	Date: 09 FEB 17	Time: 17:50	Received by: LHF	Date: 9Feb17	Time: 17:50	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0326e 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.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1889357-COFC

COC Number:

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
Phone:	867-393-4882	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		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):

ALS Contact: V. Dykshoorn **Sampler:**

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	P	P	F/P		
	WQ - VC - U	08 -FEB-17	1740	Water	R	R	R	R	R	R	R	R	R	9
	WQ - VC - DBC	08 -FEB-17	1720	Water	R	R	R	R	R	R	R	R	R	9
	WQ - VC - UMN	08 -FEB-17	1450	Water	R	R	R	R	R	R	R	R	R	9
	WQ - VC - R + 150	07 -FEB-17	1700	Water	R	R	R	R	R	R	R	R	R	9
	TRAVEL BLANK	09 -FEB-17	Ø	Water	R	R	R	R	R	R	R	R	R	9
		-FEB-17		Water	R	R	R	R	R	R	R	R	R	9
		-FEB-17		Water	R	R	R	R	R	R	R	R	R	9
		-FEB-17		Water	R	R	R	R	R	R	R	R	R	

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		
-2.0					

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:
A. MISCHLER	09 FEB 17	17:50	ENF	9Feb2017	1750			

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

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1889357-COFC

COC Number:

Page 3 of 4

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 #:	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)		ALS Contact: V. Dykshoorn	Sampler:

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 + BACT.	Number of Containers
	WQ-PW	09-FEB-17	11:30	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		

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:
A. MISCHLER	09-FEB-17	17:50	[illegible]	9 Feb 2017	17:50			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

NAFM-0326e v09 Front/04 January 2014

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

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1889357-COFC

COC Number:

Page 4 of 4

Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
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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 Select Distribution:	☐ EMAIL ☐ MAIL ☐ FAX	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
Phone:	867-393-4882	Email 1 or Fax	ldoetzel@edynamics.com	Specify Date Required for E2,E or P:
		Email 2	erik.pit@gov.yk.ca	
		Email 3	Emilie.Hamm@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 16Y0089	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: V. Dykshoorn	Sampler:

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	Rainbow Trout LC50	Number of Containers
	WQ-SEEP	08-FEB-16	12:35	Water	R	2

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		
-2.0					

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:
A. MISCHLER	09 FEB 17	17:50	EAE	9 Feb 17	17:50			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0356 v09 Front/04 January 2014

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