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EDI Project No: 16Y0089

Assessment and Abandoned Mines
Department of Energy, Mines and Resources
Government of Yukon
Box 2703, K-419
Whitehorse, YT Y1A 2C6

Attention: Emilie Hamm, A/Project Manager

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

This monthly report provides a summary of site conditions and data collected during EDI's December 2016 trips 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). The December 2016 trip represents the second monitoring event of the winter season.

Trip dates:	December 5 and 6, 2016
EDI field staff:	Joel MacFabe, Gabriel Rivest and Danny Skookum
Weather during trip:	Air temperatures ranged from -33 to -22°C, with partly cloudy skies.

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 this month ⌋ Statement of QA/QC for the data collected this month
Water Quality	⌋ Summary of water quality results for December ⌋ 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 December 2016 trip were reflective of cold Yukon winter conditions. Air temperatures ranged from lows of -33°C, to daytime highs of -22°C; with partly cloudy skies during the two day sampling event. Seeps and small streams were frozen, and no further samples will be collected at these stations until spring melt. Stations and sites along Pony Creek and Back Creek were frozen to bed, as well as some sites and stations along Dome Creek (WQ -DC-DX, H/WQ-DC-B, H/WQ-DC-R, and H/WQ-DC-D1b).

METEOROLOGY

Meteorological data was collected at the ATM-ROAD station throughout December 2016. EDI conducted a preliminary QA/QC review of the December 2016 data and all sensors appear to be functioning properly until December 25, when there was a drop in battery voltage which appears to have affected the data by resulting in missing hourly data, as well as daily averages (Table 2). Upon discussion with YG AAM it was determined that Northern Avcom was aware this problem could happen and data collection is expected to improve with increased daylight supplying more power to the station.

There was snow on site during the December investigation. No unnatural disturbance to the snow under the snow depth sensor of the meteorological station was observed at the time of visit on December 5. Snow depths are no longer being manually measured at the metrological station. During the 2015/16 winter season, the snow depth sensor was determined to provide reliable and accurate snow depth measurements.

Table 2. Summary of meteorological data continuity issues.

Last record	Next record	Interruption	Suspected reason	Effects
12/25/2016 03:00	12/25/2016 12:00	9 hours	Battery voltage dropped below 10 volts. Daily minimum (recorded) of 9.58 volts.	Missing hourly data No Dec. 25th daily average. Erroneous atmospheric pressure value on 12/25/2016 at 02:00
12/25/2016 16:00	12/26/2016 12:00	20 hours	Battery voltage dropped below 10 volts. Daily minimum (recorded) of 9.45 volts.	Missing hourly data. Incomplete Dec. 26th daily average.
12/27/2016 07:00	12/27/2016 12:00	5 hours	Battery voltage dropped below 10 volts.	Missing hourly data.
12/27/2016 15:00	12/28/2016 12:00	21 hours	Battery voltage dropped below 10 volts.	Missing hourly data No Dec. 27th daily average.
12/29/2016 21:00	12/31/2016 13:00	40 hours	Battery voltage dropped below 10 volts. Daily minimum (recorded) of 10.68 volts on December 29, 2016 and no following records up to January 2, 2017.	Missing hourly data No Dec. 29th and Dec.30th daily average.
12/31/2016 13:00	01/02/2017 11:00	46 hours	Battery voltage dropped below 10 volts.	Missing hourly data No Dec. 31st and Jan.1st daily average. Hourly relative humidity abnormal drop down to an average of 39% on Jan. 2nd (December average of 78.9 %)
01/02/2017 23:00	01/03/2017 11:00	12 hours	Battery voltage dropped below 10 volts.	Missing hourly data No Jan.2nd daily average.

HYDROLOGY

Seven hydrometric stations provided suitable conditions for discharge measurements during the December 5-6, 2016 trip. A total of 10 discharge measurements were scheduled at the Mount Nansen site and three stations were either dry or did not provide suitable conditions to measure discharge. Dome Creek diversion channel at bridge (H-DC-B) and Back Creek (H-BC) site were dry. Dome Creek at road site (H-DC-R) conditions (extensive ice and main channel frozen to bed) were unsuitable for discharge measurements. Flow rates in Victoria Creek were lower at all stations in December compared to the November 2016 results. Continuous water level logger records are available for the following four stations: H-VC-U, H-VC-DBC, H-VC-UMN and H-VC-R+290. The review of the 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 December 2016 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 with a Sontek FlowTracker acoustic Doppler velocimeter (ADV) using the velocity-area mid-section method at two Victoria Creek stations, H-VC-DBC and H-VC-UMN, with respective discharge values of 0.096 and 0.105 m^3/s. These values were lower than the flows observed in November 2016. Salt dilution gauging was used to measure the discharge at the two other Victoria Creek stations, H-VC-U and H-VC-R+290, with respective discharge values of 0.069 and 0.078 m^3/s.
- Ice was relatively thin on the creeks throughout the Mount Nansen site. Ice thickness ranged from 0.05 m to 0.15 m at the Victoria Creek stations.
- Salt dilution gauging was also used to measure a discharge of 0.001 m^3/s at Upper Dome Creek station H-DC-DX+105. There was ice within the channels during the salt tracer measurements, which adds measurement uncertainty to the discharge value.
- A volumetric test was performed at H-DC-M WP; measured discharge was 0.003 m^3/s.
- The H-SEEP volumetric discharge measurement of 0.002 m^3/s was identical 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 December 2016 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 December 6, 2016. All samples were submitted for analysis through ALS Laboratories under chain of custody documentation,

except for the bacteriological sample which was submitted to Yukon Government – Health and Social Services for analysis.

Site conditions were noted and a record of the samples collected were compiled (Attachment 4). In-situ and laboratory results summary tables as well as the lab certificates of analysis are attached (Attachment 4 and Attachment 5). Parameters that exceeded the Canadian Council of Ministers of the Environment Freshwater Aquatic Life (CCME-AL) guidelines and/or the Mount Nansen Effluent Quality Standards (EQS) criteria are highlighted in Attachment 6 and discussed below.

Many results reflect typical early winter conditions at Mount Nansen when water levels have decreased and watercourses are covered in ice.

Water Quality Results Summary

Analysis of the December 5-6, 2016 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 and dissolved cadmium, total and dissolved 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 and for total and dissolved arsenic, cadmium, copper, and zinc.
- On Upper Dome Creek site WQ-DC-DX+105, CCME-AL guidelines were exceeded for fluoride, total and dissolved arsenic, cadmium, and zinc, and total iron. 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 aluminum and copper, total and dissolved arsenic, cadmium and 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.
- The bacteriological sample collected at WQ-PW on December 6, 2016 was absent of total coliforms and E. coli. All other sampling results for WQ-PW did not exceed CCME-AL guidelines.

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 2% with an average difference of 2% for total and 3% for dissolved metals. No parameters had an RPD >20%

PROGRAM RECOMMENDATIONS

- During each winter trip, collect photographs adjacent to the meteorological station compound to support snow sensor data interpretation.
- 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.

ADDITIONAL TRIP INFORMATION

Any changes to project scope (i.e. additional sites sampled):	None The next trip is scheduled for January 9-11, 2016. The next trip will be the eleventh of the 2016/2017 Water Resources Investigation, and the third of the winter season.
Any alterations to sample schedule/budget:	None
Additional Comments:	Sites that have now been determined to be dry or frozen to bed will not be visited until the beginning of spring melt.
Wildlife Sightings:	None
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

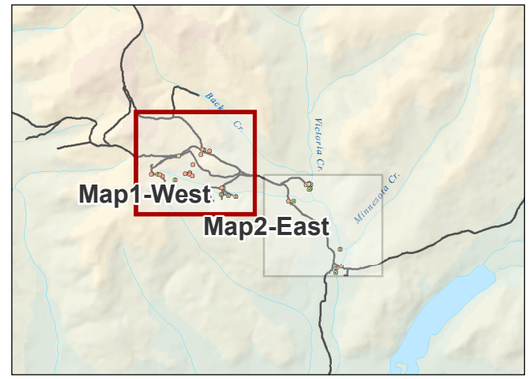
Tailings Facility

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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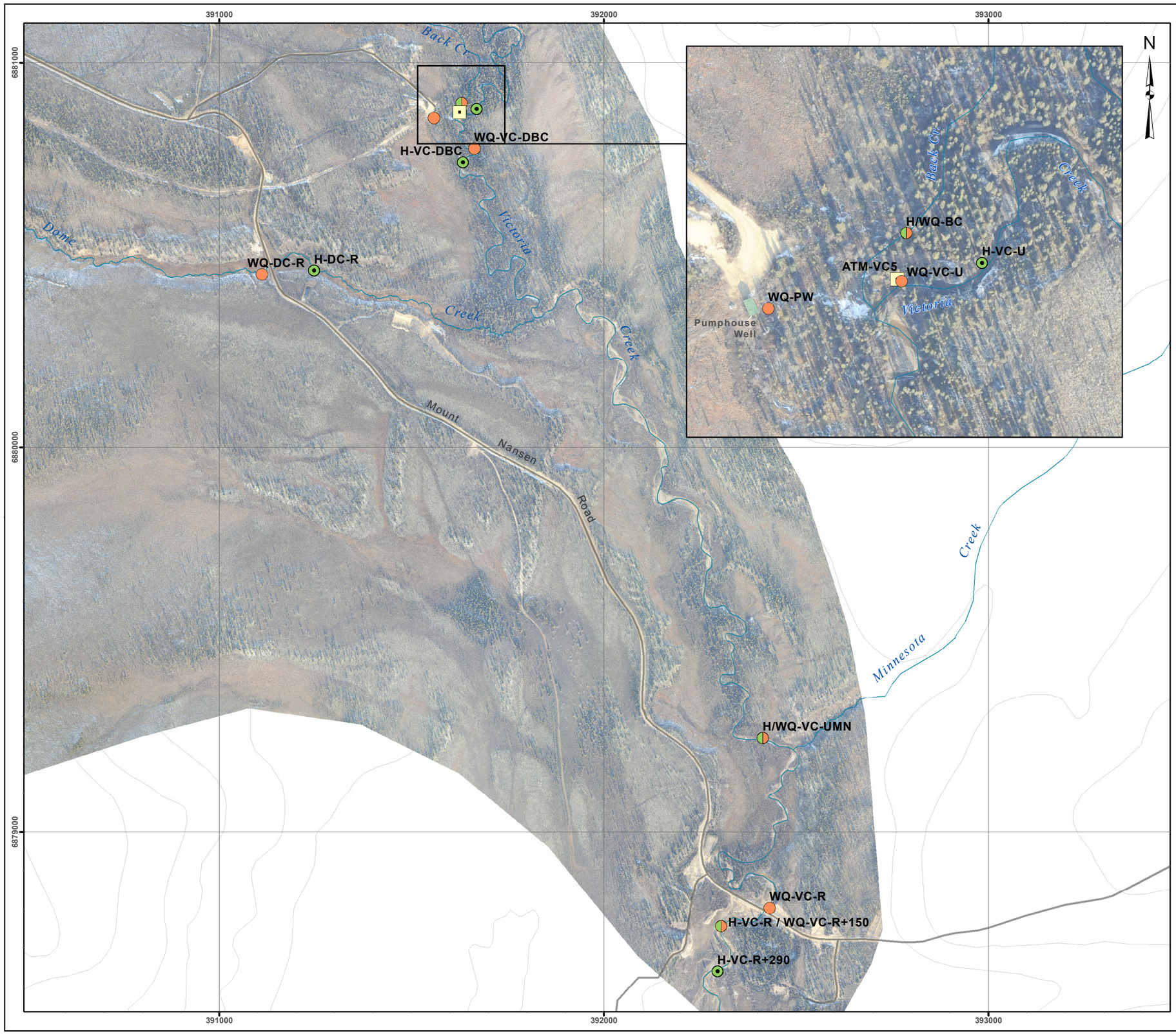

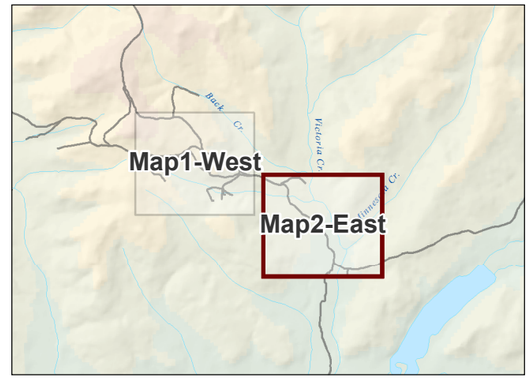

Legend

- 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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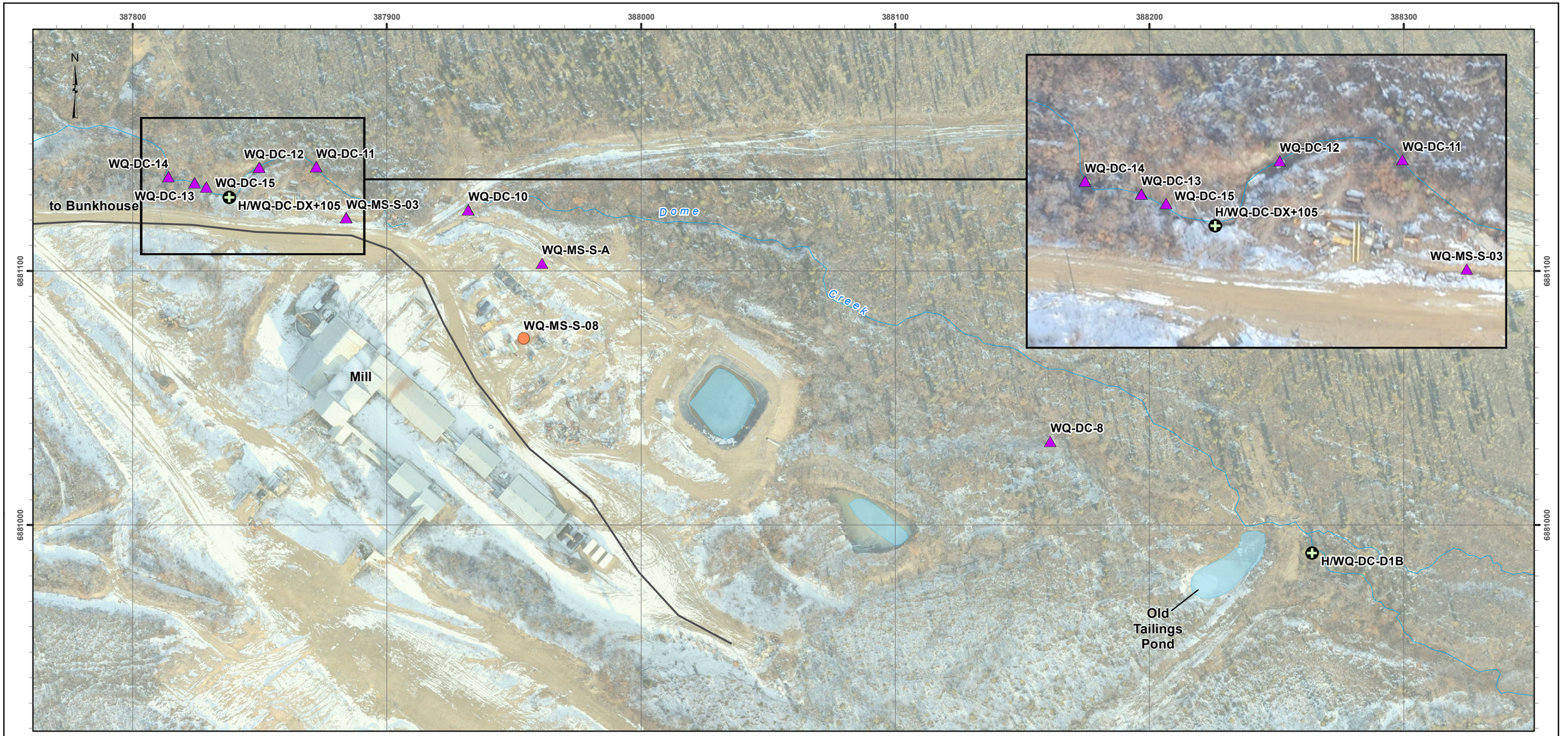


Dome Creek Investigation Sites

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.

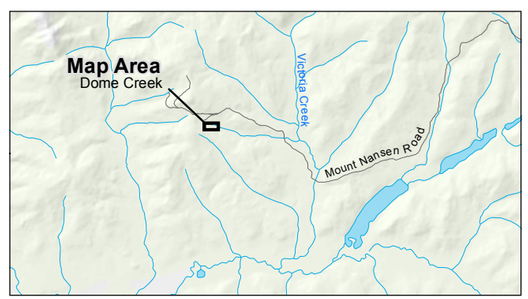
Watercourse, drainage areas and Mount Nansen Road layers digitized / modified by EDI (2011) using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).

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 (site dry).

Photo 4. H/WQ-DC-B – looking downstream (site dry).

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

Photo 6. H-TP – tailings pond 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 – overview.

Photo 11. H/WQ-DC-R – looking upstream (main channel frozen to bed, not sampled).

Photo 12. H/WQ-DC-R – looking downstream (main channel frozen to bed, not sampled).

Photo 13. H/WQ-BC – looking downstream (dry).

Photo 14. H-VC-U – looking upstream.

Photo 15. H-VC-U – looking downstream.

Photo 16. WQ-VC-U – looking upstream.

Photo 17. WQ-VC-U – looking downstream at confluence of Victoria Creek and Back Creek.

Photo 18. WQ-VC-DBC – looking downstream.

Photo 19. H-VC-DBC – looking upstream.

Photo 20. H/WQ-VC-UMN – looking downstream.

Photo 21. WQ-VC-R+150 – looking upstream.

Photo 22. H-VC-R+290 – looking upstream.

Photo 23. H-VC-R+290 – looking downstream.

Photo 24. WQ-PW – looking downstream of pipe.

Photo 25. Meteorological Station Overview

Photo 26. 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
1522	ATM-VC5	12/06/2016	16:06	N					Baro logger downloaded at 16:06.
1523	ATM-ROAD AAM	12/05/2016	12:30	N					No unnatural disturbance to snow at location. Site visited at 12:30pm Dec 05, 2016.
1524	H-DC-DX+105	12/05/2016	16:50	SS	0.001	B			Site is ice covered. Reasonable flow for salt tracer measurement. Ice is 0.01m thick.
1525	H-DC-B	12/05/2016		N		X			Channel dry. Recent dredging work has no sign of flowing water returning to channel. No discharge measurement taken as site is dry.
1526	H-DC-M WP	12/05/2016	14:55	V	0.003	B			Channel ice covered. Volumetric measurement at V-notch weir. Ice thickness > 0.02m.
1527	H-DC-R	12/05/2016		N		X			Extensive over ice in channel. Ice flowing through vegetation. Crew augered test hole in main channel. Frozen to bed. Upstream and downstream of site has ares of ice level approaching top of vegetation. Site unsuitable for measurement.
1528	H-VC-U	12/06/2016	11:30	SS	0.069	B	2.031	B	Open water lead upstream of well. Ice thickness 0.02m or greater. Logger downloaded. One survey circuit completed and checked against previous visit.
1529	H-VC-DBC	12/06/2016	11:16	ADV-MID	0.096	B			Site is snow and ice covered. Ice thickness ranges from 0.03 to 0.15m thick. Left downstream bank is frozen to bed for half of channel. Logger downloaded.
1530	H-BC	12/06/2016		N		X			Site remains dry. No WQ or Hydro collected at time of visit.
1531	H-VC-UMN	12/06/2016	13:14	ADV-MID	0.105	B			Open water leads upstream of well location. Ice thickness ranges from 0.03 to 0.1m. Logger downloaded.
1532	H-VC-R+290	12/06/2016	13:30	SS	0.078	B			Ice thickness >0.3m. Flow level low. Chanel completely ice covered. Snow depth in area ~ 0.2m. Turbidity clear. Salt tracer site ~39m downstream from well/injection site. Injection site hole covered up to maintain open hole. Logger downloaded.
1533	H-SEEP	12/05/2016	15:27	V	0.002				Minimal ice near seepage. Ice thickness <0.01m. Reading of 143.261 litres per second (0.0024 m3/s) at pump house. Volumetric measurement taken. Seepage pond is ice covered.
1534	H-TP	12/05/2016		N					Pond is ice covered. Staff gauges frozen in. Ice is ~0.3m thick.

ATTACHMENT 4: WATER QUALITY SUMMARY DATA TABLES

Water Quality Site	Sample Collected? (Y/N)	Measurement Date	Comments
WQ-SEEP	Yes	12/05/2016	Site has some shore ice and ice build up in defuser as per normal for time of year.
WQ-TP	Yes	12/05/2016	TP is ice covered; ice thickness was approximately 0.30 m.
WQ-DC-DX+105	Yes	12/05/2016	No open water present, ice was approximately 0.01m thick.
WQ-DC-B	No	12/05/2016	Recent dredging activity has no sign of flowing water filling in. No water found at site. Sample not collected.
WQ-DC-U	Yes	12/05/2016	Channel ice covered. Ice 0.04m thick.
WQ-DC-R	No	12/05/2016	Regular site unsuitable for sampling due to over ice conditions; Winter sampling location has extensive overflow ice in channel. Ice flowing through vegetation. Crew augured test hole in main channel. Frozen to bed. U/s and d/s of site has areas of ice level approaching top of vegetation. Site unable to sample. Ice level greater then bank full. No sign of flowing water in channel.
WQ-VC-U	Yes	12/06/2016	Site has 0.03m thick ice or greater up to 0.2m. Pockets of open water around sampling location.
WQ-VC-R+150	Yes	12/05/2016	Channel completely ice covered. Ice thickness >0.15m. Air space between ice and water ~0.08m. Sampled in centre of channel.
WQ-VC-DBC	Yes	12/06/2016	Channel ice covered. 0.1m or greater in thickness. Small open water lead 3m u/s of sampling site.
WQ-VC-UMN	Yes	12/06/2016	Open water leads u/s of well. Ice thickness varies 0.02-0.10m thick. Areas of channel frozen to bed along banks.
WQ-PW	Yes	12/06/2016	Ice accumulation at outlet minimal. Water clear.

Water quality results collected during the monthly surface water monitoring; December 2016

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	L1867796-13 WQ-TP 05/12/2016 15:50	L1867796-6 WQ-TP-r 05/12/2016 16:00	QA/QC WQ-TP Replicate Analysis	L1867796-3 WQ-DC-DX+105 05/12/2016 16:40	L1867796-4 WQ-SEEP 05/12/2016 15:15	L1867796-5 WQ-DC-U 05/12/2016 14:50	L1867796-11 WQ-VC-U 06/12/2016 10:45	L1867796-2 WQ-VC-UMN 06/12/2016 12:45	L1867796-8 WQ-VC-DBC 06/12/2016 10:25	L1867796-12 WQ-VC-R+150 05/12/2016 13:05	L1867796-9 WQ-FIELD BLANK 06/12/2016 15:30	L1867796-10 WQ-TRAVEL BLANK 06/12/2016 00:00	L1867796-7 WQ-PW 06/12/2016 15:55
Temperature (in-situ)	°C	-	-	-	0.3	-	-	0.2	0.7	0.1	0.0	0.0	0.0	0.1	-	-	1.8
Specific Conductivity (in-situ)	µS/cm	-	-	-	1,880	-	-	1,076	1,568	1,456	224	253	225	247	-	-	360
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.49	-	-	7.22	6.95	7.08	7.08	7.23	6.92	7.03	-	-	7.44
Dissolved Oxygen (in-situ)	mg/L	-	-	-	7.91	-	-	5.75	1.38	6.18	9.17	9.97	9.36	9.38	-	-	3.66
Turbidity (In-situ)	NTU	-	-	-	3.08	-	-	2.70	11.66	14.36	0.18	0.70	0.20	0.08	-	-	0.22
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	<5.0
Conductivity	µS/cm	-	-	2	1970	1980	1%	1110	1540	1470	224	253	230	255	<2.0	<2.0	352
Hardness (as CaCO3)	mg/L	-	-	0.5	1260	1240	2%	672	849	832	113	127	116	129	<0.50	<0.50	173
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.14	8.12	0%	8.12	8	8.01	8.04	7.89	8.05	8.04	***5.46***	***5.46***	8.27
Total Suspended Solids	mg/L	-	50	3	<3.0	3.1	<DL	<3.0	44.8	46.2	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	-
Total Dissolved Solids	mg/L	-	-	1	1700	1710	1%	795	1210	1120	125	143	127	145	<1.0	<1.0	238
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	195	195	0%	271	281	279	105	106	105	104	<1.0	<1.0	<0.10
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<DL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<DL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	195	195	0%	271	281	279	105	106	105	104	<1.0	<1.0	164
Ammonia, Total (as N)	mg/L	6.0 [A]	-	0.005	0.157	0.153	3%	0.0175	5.98	4.65	<0.0050	<0.0050	<0.0050	0.0091	<0.0050	<0.0050	-
Bromide (Br)	mg/L	-	-	0.05	<0.50	<0.50	<DL	<0.25	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Chloride (Cl)	mg/L	120	-	0.5	<5.0	<5.0	<DL	<2.5	<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	***0.31***	***0.30***	3%	***0.17***	<0.10	0.11	0.046	0.047	0.046	0.047	<0.020	<0.020	0.101
Nitrate (as N)	mg/L	13	-	0.005	0.093	0.085	9%	<0.025	1.02	0.289	0.117	0.111	0.115	0.106	<0.0050	<0.0050	0.124
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.010	<DL	<0.0050	0.0168	0.0117	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	1080	1090	1%	390	660	605	19.2	31.8	19.8	33.4	<0.30	<0.30	30.7
Anion Sum	meq/L	-	-	-	26.4	26.6	<DL	13.5	19.4	18.2	2.5	2.78	2.53	2.79	<0.10	<0.10	-
Cation Sum	meq/L	-	-	-	26.8	26.4	<DL	13.8	20.1	18.7	2.41	2.69	2.45	2.74	<0.10	<0.10	-
Cation - Anion Balance	%	-	-	-	0.7	-0.4	<DL	0.9	1.5	1.4	-1.9	-1.6	-1.5	-0.8	0	0	-
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<DL	<0.0050	0.011	0.0092	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<DL	<0.0050	0.019	0.0149	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Cyanate	mg/L	-	-	0.2	<0.20	1.4	<DL	<0.20	<0.20	<0.20	<0.20	<2.0	<0.20	<0.20	<0.20	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<DL	<0.50	5.04	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.015	0.0157	5%	0.0207	0.0177	***0.101***	0.0143	0.0255	0.0132	0.0167	<0.0030	<0.0030	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0391	0.0394	1%	0.00878	0.00049	0.00038	0.00012	0.00042	0.00014	0.0005	<0.00010	<0.00010	<0.00050
Arsenic (As)-Total	mg/L	0.005	-	0.0001	***0.1380***	***0.1290***	7%	***0.0650***	***0.0736***	***0.0713***	0.0002	0.0020	0.0002	0.0017	<0.00010	<0.00010	0.0004
Barium (Ba)-Total	mg/L	-	1.0	0.00005	0.0240	0.0210	13%	0.0126	0.0633	0.0781	0.0814	0.0770	0.0817	0.0792	<0.000050	<0.000050	0.0780
Beryllium (Be)-Total	mg/L	-	-	0.00002	<0.000040	<0.000040	<DL	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00010	<0.00010	<DL	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Boron (B)-Total	mg/L	-	-	0.01	0.105	0.107	2%	<0.010	0.051	0.041	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.10
Cadmium (Cd)-Total *(Lab Result)*	mg/L	0.00009	0.02	0.00001	***0.000895***	***0.000909***	2%	***0.00216***	***0.000418***	***0.000136***	0.0000193	0.0000292	0.0000243	0.0000243	<0.0000050	<0.0000050	<0.00020
Cadmium (Cd)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00001*	*0.00037*	*0.00037*	-	*0.00037*	*0.00037*	*0.00037*	*0.00018*	*0.00019*	*0.00018*	*0.00020*	*0.00037*	*0.00037*	*0.00025*
Calcium (Ca)-Total	mg/L	-	-	0.05	363	368	1%	170	247	228	27.8	29	28.3	31.5	<0.050	<0.050	40
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00020	<0.00020	<DL	<0.00010	0.00062	0.00056	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.0020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00055	0.00055	0%	0.00094	0.00734	0.00519	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Copper (Cu)-Total *(Lab Result)*	mg/L	0.002	0.2	0.0005	***0.02950***	***0.02980***	1%	<0.00050	***0.00348***	***0.00265***	0.00137	0.00125	0.00148	0.00119	<0.00050	<0.00050	<0.0010
Copper (Cu)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.0005*	*0.0040*	*0.0040*	-	*0.0040*	*0.0040*	*0.0040*	*0.0026*	*0.0029*	*0.0027*	*0.0029*	*0.0040*	*0.0040*	*0.0038*
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.259	0.257	1%	***0.649***	***17***	***8.07***	0.029	0.058	0.029	0.029	<0.010	<0.010	<0.030
Lead (Pb)-Total *(Lab Result)*	mg/L	0.001	0.1	0.00005	***0.004920***	***0.004920***	0%	0.000254	0.000068	0.000275	<0.000050	0.000214	<0.000050	0.000076	<0.000050	<0.000050	0.000610
Lead (Pb)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00005*	*0.00700*	*0.00700*	-	*0.00700*	*0.00700*	*0.00700*	*0.00372*	*0.00431*	*0.00384*	*0.00440*	*0.00700*	*0.00700*	*0.00639*
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0138	0.014	1%	0.009	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	67.2	67	0%	56.1	53.7	57.7	9.56	10.5	9.74	10.8	<0.10	<0.10	17.7
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.275	0.284	3%	***1.22***	***5.81***	***4.79***	0.0819	0.0511	0.0865	0.015	<0.00010	<0.00010	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.0000059	0.0000062	<2xDL	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00155	0.00154	1%	0.000382	0.00106	0.000804	0.000401	0.000351	0.000401	0.000374	<0.000050	<0.000050	-
Nickel (Ni)-Total *(Lab Result)*	mg/L	0.025	0.3	0.0005	0.00120	0.00110	<2xDL	0.00160	0.00304	0.00216	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Nickel (Ni)-Total (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.0005*	*0.1500*	*0.1500*	-	*0.1500*	*0.1500*	*0.1500*	*0.1049*	*0.1146*	*0.1070*	*0.1160*	*0.1500*	*0.1500*	*0.1450*
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.10	<0.10	<DL	<0.050	<0.050	0.064	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	21.1	21.6	2%	3.37	5.68	4.92	0.67	0.73	0.69	0.81	<0.10	<0.10	0.81
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<DL	<0.000050	0.000287	0.0002	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	5.56	5.54	0%	6.88	8	7.73	6.69	6.56	6.53	6.63	<0.050	<0.050	-
Silver (Ag)-Total	mg/L	0.00025	0.1	0.00001	0.000158	0.000166	5%	<0.000010	0.000026	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Sodium (Na)-Total	mg/L	-	-	0.05	23	23.1	0%	5.18	36.1	29.8	2.73	3.28	2.84	3.42	<0.050	<0.050	4.4
Strontium (Sr)-Total	mg/L	-	-	0.0002	1.01	1.02	1%	0.428	0.741	0.746	0.327	0.297	0.326	0.313	<0.00020	<0.00020	-
Sulfur (S)-Total	mg/L	-	-	0.5	377	377	0%	138	235	218	6.43	10.7	6.78	11.4	<0.50	<0.50	-
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000167	0.000169	1%	0.000091	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00020	<0.00020	<DL	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.0003	0.00262	<0.00060	<DL	0.00089	0.00101	0.00548	<0.00030	0.00066	<0.00030	0.00045	<0.00030	<0.00030	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00181	0.00181	0%	0.00442	0.00219	0.00153	0.000714	0.000688	0.0007	0.00064	<0.000010	<0.000010	0.00167
Vanadium (V)-Total	mg/L	-	-	0.0005	<0.0010	<0.0010	<DL	<0.00050	0.00271	0.00175	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.1330***	***0.1300***	2%	***0.7350***	***0.0375***	0.0118	<0.0030	0.0032	<0.0030	<0.0030	<0.0030	<0.0030	<0.050
Zirconium (Zr)-Total	mg/L	-	-	0.0003	<0.00060	<0.00060	<DL	<0.00030	0.00078	0.00041	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	-

Water quality results collected during the monthly surface water monitoring; December 2016

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	L1867796-13 WQ-TP 05/12/2016 15:50	L1867796-6 WQ-TP-r 05/12/2016 16:00	QA/QC WQ-TP Replicate Analysis	L1867796-3 WQ-DC-DX+105 05/12/2016 16:40	L1867796-4 WQ-SEEP 05/12/2016 15:15	L1867796-5 WQ-DC-U 05/12/2016 14:50	L1867796-11 WQ-VC-U 06/12/2016 10:45	L1867796-2 WQ-VC-UMN 06/12/2016 12:45	L1867796-8 WQ-VC-DBC 06/12/2016 10:25	L1867796-12 WQ-VC-R+150 05/12/2016 13:05	L1867796-9 WQ-FIELD BLANK 06/12/2016 15:30	L1867796-10 WQ-TRAVEL BLANK 06/12/2016 00:00	L1867796-7 WQ-PW 06/12/2016 15:55
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.001	0.0021	<0.0020	<DL	<0.0010	0.01	0.007	0.007	0.0073	0.0068	0.0062	<0.0010	-	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.0408	0.0405	1%	0.0084	0.00043	0.00029	<0.00010	0.0004	<0.00010	0.0005	<0.00010	-	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.10900***	***0.10700***	2%	***0.01580***	***0.05820***	***0.04180***	0.00025	0.00185	0.00028	0.00176	<0.00010	-	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0229	0.022	4%	0.0111	0.0615	0.0725	0.086	0.076	0.0856	0.0825	<0.000050	-	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.00002	<0.000040	<0.000040	<DL	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00010	<0.00010	<DL	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-
Boron (B)-Dissolved	mg/L	-	-	0.01	0.102	0.102	0%	<0.010	0.048	0.035	<0.010	<0.010	<0.010	<0.010	<0.010	-	-
Cadmium (Cd)-Dissolved *(Lab Result)*	mg/L	0.00009	-	0.00001	***0.000925***	***0.000924***	0%	***0.000481***	***0.000340***	***0.000107***	0.000023	0.000028	0.000028	0.000022	<0.0000050	-	-
Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00001*	*0.00037*	*0.00037*	-	*0.00037*	*0.00037*	*0.00037*	*0.00018*	*0.00019*	*0.00018*	*0.00020*	*0.00037*	-	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	388	381	2%	174	251	233	29.1	32.4	29.7	33.1	<0.050	-	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00020	<0.00020	<DL	<0.00010	0.00048	0.00032	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00055	0.0006	9%	0.00091	0.00762	0.00517	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Copper (Cu)-Dissolved *(Lab Result)*	mg/L	0.002	-	0.0002	***0.02780***	***0.02820***	1%	<0.00020	***0.00206***	0.00161	0.00106	0.00170	0.00107	0.00122	<0.00020	-	-
Copper (Cu)-Diss. (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.002*	*0.004*	*0.004*	-	*0.004*	*0.004*	*0.004*	*0.003*	*0.003*	*0.003*	*0.003*	*0.004*	-	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.042	0.041	<2xDL	0.154	***15.900***	***3.920***	0.017	0.022	0.016	0.012	<0.010	-	-
Lead (Pb)-Dissolved *(Lab Result)*	mg/L	0.001	-	0.00005	0.00080	0.00079	1%	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-
Lead (Pb)-Diss. (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.00005*	*0.00700*	*0.00700*	-	*0.00700*	*0.00700*	*0.00700*	*0.00372*	*0.00431*	*0.00384*	*0.00440*	*0.00700*	-	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.0145	0.0139	4%	0.0085	0.0013	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	70.5	70.1	1%	57.8	54.2	60.8	9.92	11.1	10.1	11.2	<0.10	-	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.297	0.292	2%	1.24	6.35	5.28	0.0839	0.0501	0.0889	0.0158	<0.00010	-	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.0000050	<0.0000050	<DL	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.00151	0.00155	3%	0.000365	0.000993	0.000739	0.000397	0.000366	0.000379	0.000351	<0.000050	-	-
Nickel (Ni)-Dissolved *(Lab Result)*	mg/L	0.025	-	0.0005	0.00100	0.00110	<2xDL	0.00153	0.00320	0.00207	<0.00050	<0.00050	0.00123	<0.00050	<0.00050	-	-
Nickel (Ni)-Diss. (Hardness Adjusted Guideline)	*mg/L*	-	-	*0.0005*	*0.1500*	*0.1500*	-	*0.1500*	*0.1500*	*0.1500*	*0.1049*	*0.1146*	*0.1070*	*0.1160*	*0.1500*	-	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.10	<0.10	<DL	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	24.5	24.5	0%	3.52	6.14	5.6	0.75	0.82	0.76	0.91	<0.10	-	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<DL	<0.000050	0.000288	0.000201	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.6	5.27	6%	6.76	7.75	7.37	6.5	6.54	6.45	6.58	<0.050	-	-
Silver (Ag)-Dissolved	mg/L	0.00025	-	0.00001	0.000056	0.000062	10%	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	22.1	22	0%	4.89	32.9	27.9	2.68	3.24	2.71	3.25	<0.050	-	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	1.04	1.03	1%	0.428	0.75	0.745	0.328	0.329	0.333	0.316	<0.00020	-	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	398	369	8%	135	225	213	6.63	10.3	6.77	11.6	<0.50	-	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000171	0.000172	1%	0.000082	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00020	<0.00020	<DL	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.0003	<0.00060	<0.00060	<DL	<0.00030	0.00101	0.00041	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	-	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00178	0.0018	1%	0.00438	0.00207	0.00154	0.00065	0.000708	0.000676	0.0006	<0.000010	-	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<DL	<0.00050	0.00221	0.0008	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	***0.1310***	***0.1300***	1%	***0.7290***	***0.0401***	0.0107	0.0012	0.0022	0.0011	0.0029	<0.0010	-	-
Zirconium (Zr)-Dissolved	mg/L	-	-	0.0003	<0.00060	<0.00060	<DL	<0.00030	0.00076	0.00037	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	-	-

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

[A] Ammonia guideline is temperature dependent and the December value is based on a water temperature of 0°C and a pH of 7.5

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-TP-r was 3% with an average difference of 2% for total and 2% for dissolved metals.

No parameter 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: 07-DEC-16
Report Date: 22-DEC-16 14:10 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1867796

Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 16Y0089
C of C Numbers:
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1867796-2 WATER 06-DEC-16 12:45 WQ-VC-UMN	L1867796-3 WATER 05-DEC-16 16:40 WQ-DC-DX+105	L1867796-4 WATER 05-DEC-16 15:15 WQ-SEEP	L1867796-5 WATER 05-DEC-16 14:50 WQ-DC-U	L1867796-6 WATER 05-DEC-16 16:00 WQ-TP-R
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	253	1110	1540	1470	1980
	Hardness (as CaCO3) (mg/L)	127	672	849	832	1240
	pH (pH)	7.89	8.12	8.00	8.01	8.12
	Total Suspended Solids (mg/L)	<3.0	<3.0	44.8	46.2	3.1
	Total Dissolved Solids (mg/L)					
	TDS (Calculated) (mg/L)	143	795	1210	1120	1710
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	106	271	281	279	195
	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)	106	271	281	279	195
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0175	5.98 DLDS	4.65 DLDS	0.153
	Bromide (Br) (mg/L)	<0.050	<0.25 DLDS	<0.25 DLDS	<0.25 DLDS	<0.50 DLDS
	Chloride (Cl) (mg/L)	<0.50	<2.5 DLDS	<2.5 DLDS	<2.5 DLDS	<5.0 DLDS
	Fluoride (F) (mg/L)	0.047	0.17	<0.10 DLDS	0.11	0.30
	Nitrate (as N) (mg/L)	0.111	<0.025 DLDS	1.02	0.289	0.085
	Nitrite (as N) (mg/L)	<0.0010	<0.0050 DLDS	0.0168	0.0117	<0.010 DLDS
	Sulfate (SO4) (mg/L)	31.8	390	660	605	1090
	Anion Sum (meq/L)	2.78	13.5	19.4	18.2	26.6
	Cation Sum (meq/L)	2.69	13.8	20.1	18.7	26.4
	Cation - Anion Balance (%)	-1.6	0.9	1.5	1.4	-0.4
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	0.0110	0.0092	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	0.0190	0.0149	<0.0050
	Cyanate (mg/L)	<2.0 DLIS	<0.20	<0.20	<0.20	1.40
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	5.04	2.40	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0255	0.0207	0.0177	0.101	0.0157
	Antimony (Sb)-Total (mg/L)	0.00042	0.00878	0.00049	0.00038	0.0394
	Arsenic (As)-Total (mg/L)	0.00204	0.0650	0.0736	0.0713	0.129
	Barium (Ba)-Total (mg/L)	0.0770	0.0126	0.0633	0.0781	0.0210
	Beryllium (Be)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000040 DLA
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010 DLA
	Boron (B)-Total (mg/L)	<0.010	<0.010	0.051	0.041	0.107
	Cadmium (Cd)-Total (mg/L)	0.0000292	0.00216	0.000418	0.000136	0.000909
	Calcium (Ca)-Total (mg/L)	29.0	170	247	228	368
	Chromium (Cr)-Total (mg/L)	0.00011	<0.00010	0.00062	0.00056	<0.00020 DLA
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00094	0.00734	0.00519	0.00055

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1867796-7	L1867796-8	L1867796-9	L1867796-10	L1867796-11
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	06-DEC-16	06-DEC-16	06-DEC-16	06-DEC-16	06-DEC-16
Sampled Time	15:55	10:25	15:30		10:45
Client ID	WQ-PW	WQ-VC-DBC	WQ-FIELD BLANK	WQ-TRAVEL BLANK	WQ-VC-U
Grouping / **Analyte**					
WATER					
Physical Tests					
Colour, True (CU)	<5.0				
Conductivity (uS/cm)	352	230	<2.0	<2.0	224
Hardness (as CaCO3) (mg/L)	173 HTC	116	<0.50	<0.50 HTC	113
pH (pH)	8.27	8.05	5.46	5.46	8.04
Total Suspended Solids (mg/L)		<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids (mg/L)	238				
TDS (Calculated) (mg/L)		127	<1.0	<1.0	125
Turbidity (NTU)	<0.10				
Anions and Nutrients					
Alkalinity, Bicarbonate (as CaCO3) (mg/L)		105	<1.0	<1.0	105
Alkalinity, Carbonate (as CaCO3) (mg/L)		<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	164	105	<1.0	<1.0	105
Ammonia, Total (as N) (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br) (mg/L)		<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)	0.101	0.046	<0.020	<0.020	0.046
Nitrate (as N) (mg/L)	0.124	0.115	<0.0050	<0.0050	0.117
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4) (mg/L)	30.7	19.8	<0.30	<0.30	19.2
Anion Sum (meq/L)		2.53	<0.10	<0.10	2.50
Cation Sum (meq/L)		2.45	<0.10	<0.10	2.41
Cation - Anion Balance (%)		-1.5	0.0	0.0	-1.9
Cyanides					
Cyanide, Weak Acid Diss (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050
Cyanate (mg/L)		<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN) (mg/L)		<0.50	<0.50	<0.50	<0.50
Total Metals					
Aluminum (Al)-Total (mg/L)	<0.010	0.0132	<0.0030	<0.0030	0.0143
Antimony (Sb)-Total (mg/L)	<0.00050	0.00014	<0.00010	<0.00010	0.00012
Arsenic (As)-Total (mg/L)	0.00035	0.00024	<0.00010	<0.00010	0.00024
Barium (Ba)-Total (mg/L)	0.078	0.0817	<0.000050	<0.000050	0.0814
Beryllium (Be)-Total (mg/L)		<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Total (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.10	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.00020	0.0000243	<0.0000050	<0.0000050	0.0000193
Calcium (Ca)-Total (mg/L)	40.0	28.3	<0.050	<0.050	27.8
Chromium (Cr)-Total (mg/L)	<0.0020	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1867796-12	L1867796-13			
	Description	WATER	WATER			
	Sampled Date	05-DEC-16	05-DEC-16			
	Sampled Time	13:05	15:50			
	Client ID	WQ-VC-R+150	WQ-TP			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)					
	Conductivity (uS/cm)	255	1970			
	Hardness (as CaCO3) (mg/L)	129	1260			
	pH (pH)	8.04	8.14			
	Total Suspended Solids (mg/L)	<3.0	<3.0			
	Total Dissolved Solids (mg/L)					
	TDS (Calculated) (mg/L)	145	1700			
	Turbidity (NTU)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	104	195			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	104	195			
	Ammonia, Total (as N) (mg/L)	0.0091	0.157			
	Bromide (Br) (mg/L)	<0.050	<0.50 DLDS			
	Chloride (Cl) (mg/L)	<0.50	<5.0 DLDS			
	Fluoride (F) (mg/L)	0.047	0.31			
	Nitrate (as N) (mg/L)	0.106	0.093			
	Nitrite (as N) (mg/L)	<0.0010	<0.010 DLDS			
	Sulfate (SO4) (mg/L)	33.4	1080			
	Anion Sum (meq/L)	2.79	26.4			
	Cation Sum (meq/L)	2.74	26.8			
	Cation - Anion Balance (%)	-0.8	0.7			
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050			
	Cyanide, Total (mg/L)	<0.0050	<0.0050			
	Cyanate (mg/L)	<0.20	<0.20			
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0167	0.0150			
	Antimony (Sb)-Total (mg/L)	0.00050	0.0391			
	Arsenic (As)-Total (mg/L)	0.00171	0.138			
	Barium (Ba)-Total (mg/L)	0.0792	0.0240			
	Beryllium (Be)-Total (mg/L)	<0.000020	<0.000040 DLA			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.00010 DLA			
	Boron (B)-Total (mg/L)	<0.010	0.105			
	Cadmium (Cd)-Total (mg/L)	0.0000243	0.000895			
	Calcium (Ca)-Total (mg/L)	31.5	363			
	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00020 DLA			
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00055			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1867796-2	L1867796-3	L1867796-4	L1867796-5	L1867796-6
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	06-DEC-16	05-DEC-16	05-DEC-16	05-DEC-16	05-DEC-16
Sampled Time	12:45	16:40	15:15	14:50	16:00
Client ID	WQ-VC-UMN	WQ-DC-DX+105	WQ-SEEP	WQ-DC-U	WQ-TP-R
Grouping / **Analyte**					
WATER					
Total Metals Copper (Cu)-Total (mg/L)	0.00125	<0.00050	0.00348	0.00265	0.0298
Iron (Fe)-Total (mg/L)	0.058	0.649	17.0	8.07	0.257
Lead (Pb)-Total (mg/L)	0.000214	0.000254	0.000068	0.000275	0.00492
Lithium (Li)-Total (mg/L)	<0.0010	0.0090	<0.0010	<0.0010	0.0140
Magnesium (Mg)-Total (mg/L)	10.5	56.1	53.7	57.7	67.0
Manganese (Mn)-Total (mg/L)	0.0511	1.22	5.81	4.79	0.284
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000062
Molybdenum (Mo)-Total (mg/L)	0.000351	0.000382	0.00106	0.000804	0.00154
Nickel (Ni)-Total (mg/L)	<0.00050	0.00160	0.00304	0.00216	0.0011
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	0.064	<0.10 DLA
Potassium (K)-Total (mg/L)	0.73	3.37	5.68	4.92	21.6
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	0.000287	0.000200	<0.00010 DLA
Silicon (Si)-Total (mg/L)	6.56	6.88	8.00	7.73	5.54
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	0.000026	0.000016	0.000166
Sodium (Na)-Total (mg/L)	3.28	5.18	36.1	29.8	23.1
Strontium (Sr)-Total (mg/L)	0.297	0.428	0.741	0.746	1.02
Sulfur (S)-Total (mg/L)	10.7	138	235	218	377
Thallium (Tl)-Total (mg/L)	<0.000010	0.000091	<0.000010	<0.000010	0.000169
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020 DLA
Titanium (Ti)-Total (mg/L)	0.00066	0.00089	0.00101	0.00548	<0.00060 DLA
Uranium (U)-Total (mg/L)	0.000688	0.00442	0.00219	0.00153	0.00181
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	0.00271	0.00175	<0.0010 DLA
Zinc (Zn)-Total (mg/L)	0.0032	0.735	0.0375	0.0118	0.130
Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030	0.00078	0.00041	<0.00060 DLA
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)	0.0073	<0.0010	0.0100	0.0070	<0.0020 DLA
Antimony (Sb)-Dissolved (mg/L)	0.00040	0.00840	0.00043	0.00029	0.0405
Arsenic (As)-Dissolved (mg/L)	0.00185	0.0158	0.0582	0.0418	0.107
Barium (Ba)-Dissolved (mg/L)	0.0760	0.0111	0.0615	0.0725	0.0220
Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000040 DLA
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010 DLA
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.048	0.035	0.102
Cadmium (Cd)-Dissolved (mg/L)	0.0000284	0.000481	0.000340	0.000107	0.000924
Calcium (Ca)-Dissolved (mg/L)	32.4	174	251	233	381
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	0.00048	0.00032	<0.00020 DLA
Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00091	0.00762	0.00517	0.00060

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1867796-7 WATER 06-DEC-16 15:55 WQ-PW	L1867796-8 WATER 06-DEC-16 10:25 WQ-VC-DBC	L1867796-9 WATER 06-DEC-16 15:30 WQ-FIELD BLANK	L1867796-10 WATER 06-DEC-16 WQ-TRAVEL BLANK	L1867796-11 WATER 06-DEC-16 10:45 WQ-VC-U
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	<0.0010	0.00148	<0.00050	<0.00050	0.00137
	Iron (Fe)-Total (mg/L)	<0.030	0.029	<0.010	<0.010	0.029
	Lead (Pb)-Total (mg/L)	0.00061	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	17.7	9.74	<0.10	<0.10	9.56
	Manganese (Mn)-Total (mg/L)	<0.0020	0.0865	<0.00010	<0.00010	0.0819
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000401	<0.000050	<0.000050	0.000401
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.81	0.69	<0.10	<0.10	0.67
	Selenium (Se)-Total (mg/L)	<0.0010	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)		6.53	<0.050	<0.050	6.69
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	4.4	2.84	<0.050	<0.050	2.73
	Strontium (Sr)-Total (mg/L)		0.326	<0.00020	<0.00020	0.327
	Sulfur (S)-Total (mg/L)		6.78	<0.50	<0.50	6.43
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.00030	<0.00030	<0.00030	<0.00030
	Uranium (U)-Total (mg/L)	0.00167	0.000700	<0.000010	<0.000010	0.000714
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.050	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)		<0.00030	<0.00030	<0.00030	<0.00030
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD		FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0068	<0.0010		0.0070
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00028	<0.00010		0.00025
	Barium (Ba)-Dissolved (mg/L)		0.0856	<0.000050		0.0860
	Beryllium (Be)-Dissolved (mg/L)		<0.000020	<0.000020		<0.000020
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010		<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000284	<0.0000050		0.0000229
	Calcium (Ca)-Dissolved (mg/L)		29.7	<0.050		29.1
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010		<0.00010
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010		<0.00010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1867796-12	L1867796-13			
	Description	WATER	WATER			
	Sampled Date	05-DEC-16	05-DEC-16			
	Sampled Time	13:05	15:50			
	Client ID	WQ-VC-R+150	WQ-TP			
Grouping	**Analyte**					
WATER						
Total Metals	Copper (Cu)-Total (mg/L)	0.00119	0.0295			
	Iron (Fe)-Total (mg/L)	0.029	0.259			
	Lead (Pb)-Total (mg/L)	0.000076	0.00492			
	Lithium (Li)-Total (mg/L)	<0.0010	0.0138			
	Magnesium (Mg)-Total (mg/L)	10.8	67.2			
	Manganese (Mn)-Total (mg/L)	0.0150	0.275			
	Mercury (Hg)-Total (mg/L)	<0.0000050	0.0000059			
	Molybdenum (Mo)-Total (mg/L)	0.000374	0.00155			
	Nickel (Ni)-Total (mg/L)	<0.00050	0.0012			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.10 DLA			
	Potassium (K)-Total (mg/L)	0.81	21.1			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.00010 DLA			
	Silicon (Si)-Total (mg/L)	6.63	5.56			
	Silver (Ag)-Total (mg/L)	<0.000010	0.000158			
	Sodium (Na)-Total (mg/L)	3.42	23.0			
	Strontium (Sr)-Total (mg/L)	0.313	1.01			
	Sulfur (S)-Total (mg/L)	11.4	377			
	Thallium (Tl)-Total (mg/L)	<0.000010	0.000167			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00020 DLA			
	Titanium (Ti)-Total (mg/L)	0.00045	0.00262			
	Uranium (U)-Total (mg/L)	0.000640	0.00181			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.0010 DLA			
	Zinc (Zn)-Total (mg/L)	<0.0030	0.133			
	Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00060 DLA			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0062	0.0021			
	Antimony (Sb)-Dissolved (mg/L)	0.00050	0.0408			
	Arsenic (As)-Dissolved (mg/L)	0.00176	0.109			
	Barium (Ba)-Dissolved (mg/L)	0.0825	0.0229			
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000040 DLA			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA			
	Boron (B)-Dissolved (mg/L)	<0.010	0.102			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000217	0.000925			
	Calcium (Ca)-Dissolved (mg/L)	33.1	388			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00020 DLA			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00055			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1867796-2 WATER 06-DEC-16 12:45 WQ-VC-UMN	L1867796-3 WATER 05-DEC-16 16:40 WQ-DC-DX+105	L1867796-4 WATER 05-DEC-16 15:15 WQ-SEEP	L1867796-5 WATER 05-DEC-16 14:50 WQ-DC-U	L1867796-6 WATER 05-DEC-16 16:00 WQ-TP-R
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00170	<0.00020	0.00206	0.00161	0.0282
	Iron (Fe)-Dissolved (mg/L)	0.022	0.154	15.9	3.92	0.041
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.00079
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0085	0.0013	0.0011	0.0139
	Magnesium (Mg)-Dissolved (mg/L)	11.1	57.8	54.2	60.8	70.1
	Manganese (Mn)-Dissolved (mg/L)	0.0501	1.24	6.35	5.28	0.292
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000366	0.000365	0.000993	0.000739	0.00155
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00153	0.00320	0.00207	0.0011
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.10 DLA
	Potassium (K)-Dissolved (mg/L)	0.82	3.52	6.14	5.60	24.5
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	0.000288	0.000201	<0.00010 DLA
	Silicon (Si)-Dissolved (mg/L)	6.54	6.76	7.75	7.37	5.27
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	0.000011	<0.000010	0.000062
	Sodium (Na)-Dissolved (mg/L)	3.24	4.89	32.9	27.9	22.0
	Strontium (Sr)-Dissolved (mg/L)	0.329	0.428	0.750	0.745	1.03
	Sulfur (S)-Dissolved (mg/L)	10.3	135	225	213	369
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000082	<0.000010	<0.000010	0.000172
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020 DLA
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	0.00101	0.00041	<0.00060 DLA
	Uranium (U)-Dissolved (mg/L)	0.000708	0.00438	0.00207	0.00154	0.00180
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	0.00221	0.00080	<0.0010 DLA
	Zinc (Zn)-Dissolved (mg/L)	0.0022	0.729	0.0401	0.0107	0.130
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	0.00076	0.00037	<0.00060 DLA

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1867796-7	L1867796-8	L1867796-9	L1867796-10	L1867796-11
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	06-DEC-16	06-DEC-16	06-DEC-16	06-DEC-16	06-DEC-16
Sampled Time	15:55	10:25	15:30		10:45
Client ID	WQ-PW	WQ-VC-DBC	WQ-FIELD BLANK	WQ-TRAVEL BLANK	WQ-VC-U
Grouping / **Analyte**					
WATER					
Dissolved Metals Copper (Cu)-Dissolved (mg/L)		0.00107	<0.00020		0.00106
Iron (Fe)-Dissolved (mg/L)		0.016	<0.010		0.017
Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050		<0.000050
Lithium (Li)-Dissolved (mg/L)		<0.0010	<0.0010		<0.0010
Magnesium (Mg)-Dissolved (mg/L)		10.1	<0.10		9.92
Manganese (Mn)-Dissolved (mg/L)		0.0889	<0.00010		0.0839
Mercury (Hg)-Dissolved (mg/L)		<0.0000050	<0.0000050		<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)		0.000379	<0.000050		0.000397
Nickel (Ni)-Dissolved (mg/L)		0.00123	<0.00050		<0.00050
Phosphorus (P)-Dissolved (mg/L)		<0.050	<0.050		<0.050
Potassium (K)-Dissolved (mg/L)		0.76	<0.10		0.75
Selenium (Se)-Dissolved (mg/L)		<0.000050	<0.000050		<0.000050
Silicon (Si)-Dissolved (mg/L)		6.45	<0.050		6.50
Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000010		<0.000010
Sodium (Na)-Dissolved (mg/L)		2.71	<0.050		2.68
Strontium (Sr)-Dissolved (mg/L)		0.333	<0.00020		0.328
Sulfur (S)-Dissolved (mg/L)		6.77	<0.50		6.63
Thallium (Tl)-Dissolved (mg/L)		<0.000010	<0.000010		<0.000010
Tin (Sn)-Dissolved (mg/L)		<0.00010	<0.00010		<0.00010
Titanium (Ti)-Dissolved (mg/L)		<0.00030	<0.00030		<0.00030
Uranium (U)-Dissolved (mg/L)		0.000676	<0.000010		0.000650
Vanadium (V)-Dissolved (mg/L)		<0.00050	<0.00050		<0.00050
Zinc (Zn)-Dissolved (mg/L)		0.0011	<0.0010		0.0012
Zirconium (Zr)-Dissolved (mg/L)		<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	L1867796-12	L1867796-13			
	Description	WATER	WATER			
	Sampled Date	05-DEC-16	05-DEC-16			
	Sampled Time	13:05	15:50			
	Client ID	WQ-VC-R+150	WQ-TP			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00122	0.0278			
	Iron (Fe)-Dissolved (mg/L)	0.012	0.042			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00080			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0145			
	Magnesium (Mg)-Dissolved (mg/L)	11.2	70.5			
	Manganese (Mn)-Dissolved (mg/L)	0.0158	0.297			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000351	0.00151			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.0010			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.10 DLA			
	Potassium (K)-Dissolved (mg/L)	0.91	24.5			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.00010 DLA			
	Silicon (Si)-Dissolved (mg/L)	6.58	5.60			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000056			
	Sodium (Na)-Dissolved (mg/L)	3.25	22.1			
	Strontium (Sr)-Dissolved (mg/L)	0.316	1.04			
	Sulfur (S)-Dissolved (mg/L)	11.6	398			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000171			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00060 DLA			
	Uranium (U)-Dissolved (mg/L)	0.000600	0.00178			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.0010 DLA			
	Zinc (Zn)-Dissolved (mg/L)	0.0029	0.131			
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00060 DLA			

* 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)
Method Blank	Alkalinity, Total (as CaCO3)	B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Potassium (K)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1867796-11, -12, -13, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Total	MS-B	L1867796-10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.
DLA	Detection Limit adjusted for required dilution
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLIS	Detection Limit Adjusted: Insufficient Sample
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.

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.

Reference Information

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.

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

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

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

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

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

This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

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

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

F-IC-N-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.

Reference Information

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.

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.

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 L1867796-1 WQ-SEEP,
collected December 5, 2016

Final Report

December 20, 2016

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	
L1867796-1 WQ-SEEP	05-Dec-16 at N/A	08-Dec-16 at 1320h	09-Dec-16 at 0800h	5.8°C

N/A = Not available

TESTS

- Rainbow trout 96-h LC50 test

RESULTS

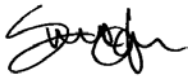
Toxicity test results

Sample ID	96-h LC50 (% v/v)
L1867796-1 WQ-SEEP	>100

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CI)	39.4 (32.2 – 48.4) µg/L Zn[1]
Reference toxicant historical mean (2 SD range)	58.3 (21.0 – 161.7) µg/L Zn
Reference toxicant CV	66%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date: December 2, 2016



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: Dec 9 /16 @ 0800h

Work Order No.: 161336

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: L1867796-1-WQ-SEEP
Sample Date: Dec 5 /16
Date Received: Dec 8 /16
Sample Volume: 2 X 20 L
Other: /

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 35 ~~38~~ ± 2 Range: 33 - 39
Mean Weight ± SD (g): 0.38 ± 0.05 Range: 0.30 - 0.46

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2/16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) mg/L Zn
Reference Toxicant CV (%): 66%

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

Reviewed by: [signature]

Date reviewed: Dec 21, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: ALS
Sample I.D. L1867796-1-WQ-SEEP
W.O. # 16,336
RBT Batch #: 110916B
Date Collected/Time: Dec 5/16 @ Not available
Date Setup/Time: Dec 9/16 @ 0900h
Sample Setup By: EC

Number Fish/Volume: 10/12 L
7-d % Mortality: 1.6
Total Pre-aeration Time (mins): 30
Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

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)	8.7		7.0
pH	6.7		6.8
Cond. (µS/cm)	1569		1568
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
Ctl				10	10	10	10	14.0	15.0	15.0	15.0	14.5	9.9	9.8	9.7	9.9	9.7	6.8	6.8	6.8	7.1	7.0	25	31
6.25				10	10	9	9	14.0	15.0	15.0	15.0	14.5	9.9	9.9	9.8	9.8	9.8	6.8	6.9	7.1	7.1	7.3	151	155
12.5				10	10	10	10	14.0	15.0	15.0	15.0	14.5	9.8	9.8	9.7	9.8	9.8	6.7	7.1	7.3	7.3	7.5	299	307
25				10	10	10	10	14.0	15.0	15.0	15.0	14.5	9.9	9.9	9.7	9.9	9.8	6.7	7.2	7.5	7.6	7.8	489	491
50				10	10	10	9	14.0	15.0	15.0	15.0	14.5	9.9	9.9	9.8	9.9	9.9	6.8	7.5	7.7	7.9	8.1	863	862
100				10	10	8	7	14.0	15.0	15.0	15.0	14.5	9.0	9.8	9.8	9.8	9.8	6.8	7.7	8.1	8.2	8.3	1569	1537
Initials				AS	AS	YW	YW	EC	AS	AS	YW	YW	EC	AS	AS	YW	YW	EC	AS	AS	YW	YW	EC	YW

Sample Description/Comments: Orange, turbid, No particulates, No odour

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: Dec. 21, 2016

APPENDIX C – Chain-of-custody form

ALS Environmental

L1867796

VANCOUVER

Subcontract Request Form

Subcontract To:

NAUTILUS ENVIRONMENTAL
8664 COMMERCE COURT
BURNABY,BC V5A 4N7

NOTES: Please reference on final report and invoice: PO# *L1867796*
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
L1867796-1 WQ-SEEP		**12/5/2016**	
	Trout Bioassay LC50 (96 Hour) - Nautilus (TROUT-LC50-96HR-NL 1)	12/16/2016	

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: PAUL. Date Shipped: DEC 8/2016

Received By: Nautilus Date Received: Dec 08/16 @ 13:20

Verified By: MY - Nair Yamamoto Date Verified:

Temperature: 5.8°C

Sample Integrity Issues: 2x20L

WO # 161336 - Rbt LC50

END OF REPORT

Whitehorse Receive

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1867796-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
		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 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): [redacted]

ALS Contact: ~~Sean Sluggett~~ B. Makedki Sampler: JM/GR.

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
[redacted]	WQ-SEEP	05-Dec-16	15:15	Water	R	2
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						

RUSH

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

SAMPLE CONDITION AS RECEIVED (lab use only)

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

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
3.6	[redacted]	[redacted]	6	18	[redacted]

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Joel MacFabe	Date: 07 Dec	Time: 10:40	Received by: [redacted]	Date: Dec-07-16	Time: 10:51AM	Received by: JC	Date: 8 Dec 16	Time: 12:05 PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Short Holding Time

Rush Processing

ody (COC) / Analytical quest Form

ll Free: 1 800 668 9878

L1867796-COFC

COC Number:

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

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

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

ALS Contact: ~~Craig Fleherty~~ B. Makelki **Sampler:** JM/GR

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	P CN-WAD-CFA-VA,CN-T-CFA-VA	P CN-CNO-WT	P CN-SCN-VA	P NH3-F-VA	P MET-T-BCMDG-VA	F/P MET-D-BCMDG-VA	IONBALANC-VA, TDS-CALC-VA					Number of Containers
[redacted]	WQ-VC-UMN	06-Dec-16	12:45	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-DC-DX+105	05-Dec-16	16:40	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-SEEP	05-Dec-16	15:15	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-DC-U	05-Dec-16	14:50	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-TP-C	05-Dec-16	16:00	Water	R	R	R	R	R	R	R	R	R					9
[redacted]		~~-Dec-16~~		~~Water~~	R	R	R	R	R	R	R	R	R					9
[redacted]		~~-Dec-16~~		~~Water~~	R	R	R	R	R	R	R	R	R					9
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		

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

SAMPLE CONDITION AS RECEIVED (lab use only)

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

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
11.9			4	3	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Jed Mackie	Date: 07 Dec.	Time: 10:40	Received by: Jeremy Dunn	Date: Dec-07-16	Time: 10:51AM	Received by: JC	Date: 8 Dec 16	Time: 12:05 pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-03268 vs# Front04 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.

Drinking Water

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1867796-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		Invoice Distribution	
	Same as Report To ☑ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☑ Yes ☐ No	Email 1 or Fax	sjenner@edynamics.com
Company:	EDI	Email 2	ldoetzel@edynamics.com
Contact:	S Jenner		

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

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

ALS Contact: ~~Craig Elaberty~~ R. MacLeod

Sampler: JM/GR

Analysis Request

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	FULL-TOT-DW-WR	Number of Containers
[redacted]	WQ-PW	06 - Dec-16	15:55	Water	R	3
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						

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

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

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

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

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

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

INITIAL COOLER TEMPERATURES °C: 3.0 [redacted]

FINAL COOLER TEMPERATURES °C: 4 3

SHIPMENT RELEASE (client use)

Released by: Joel MacFabe | Date: 07 Dec | Time: 10:40

[redacted] INITIAL SHIPMENT RECEPTION (lab use only) [redacted]

Received by: [redacted] | Date: [redacted] | Time: [redacted]

[redacted] FINAL SHIPMENT RECEPTION (lab use only) [redacted]

Received by: [redacted] | Date: [redacted] | Time: [redacted]

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS Fm 0328e V09 Front04 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.

Short Holding Time

Rush Processing

dy (COC) / Analytical uest Form

Free: 1 800 668 9878

L1867796-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)
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	☐ 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
	Whitehorse, YT Y1A 3T8	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-393-4882	Email 1 or Fax	ldoetzel@edynamics.com	Specify Date Required for E2,E or P:
		Email 2	Emilie.Hamm@gov.yk.ca	
		Email 3	erik.pit@gov.yk.ca	

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

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

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

ALS Contact: ~~Craig Flaherty~~ F. Makelki **Sampler:** JM/GR

Analysis Request

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA,EC-PCT-VA,PH-PCT-VA	ANIONS-ALL-IC-WR,TSS-MAN-WR	CN-WAD-CFA-VA,CN-T-CFA-VA	CN-CNO-WT	CN-SCN-VA	NH3-F-VA	MET-T-BCMDG-VA	MET-D-BCMDG-VA	IONBALANC-VA, TDS-CALC-VA	Number of Containers
							P	P	P	P	P	F/P		
[redacted]	WQ-VC-DBC	06-Dec-16	10:25	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ-Field blank	06-Dec-16	15:36	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ-TRAVEL BLANK	06-Dec-16	-	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ-VC-U	06-Dec-16	10:45	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ-VC-R+150	05-Dec-16	13:05	Water	R	R	R	R	R	R	R	R	R	9
[redacted]	WQ-TP	05-Dec-16	15:50	Water	R	R	R	R	R	R	R	R	R	9
[redacted]		~~7-Dec-16~~		Water	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~9~~
[redacted]														
[redacted]														
[redacted]														
[redacted]														
[redacted]														

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

SAMPLE CONDITION AS RECEIVED (lab use only)

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

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
3.0			4	3	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Joel MacFabe	Date: 07 Dec.	Time: 10:46	Received by: [redacted]	Date: Dec 07-16	Time: 16:51 hr	Received by: JC	Date: 8 Dec 16	Time: 12:05

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

ALS FM-03076e-409 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**.

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

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

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

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

Contact Information · *Coordonnées de la personne ressource*

Contact Person / *Personne ressource*: Lyndsay Doetzel
Phone / *Téléphone*: 867 363 4882
Mailing address / *Adresse postale*: 2195 Second Ave
Fax / *Télécopieur*:
Whitehorse YT Y1A 6L3
Postal code / *Code postal*:
First Nation, Municipal or Business Name / *Nom de la Première nation, de la municipalité ou de l'entreprise*: Environmental Dynamics Inc
Agent / *Agent*: Joel MacKay
Fax / *Télécopieur*:

Sampling Location · *Lieu de la prise d'échantillon*

Municipal Address / *Adresse municipale*: MT NANSEN MINE
Subdivision / *Lotissement*:
Legal Description Lot / *Désignation officielle Lot*:
Quad / *Quadrilatère*:
Plan no. / *Plan n°*:
Other Information (e.g., Location, Business / Building Name) / *Autres renseignements (ex. : emplacement, nom de l'entreprise, nom de l'édifice)*: WQ-PW

Sample Collection / *Prélèvement de l'échantillon*

Sample Collected By / *Échantillon prélevé par*: JM GR DS
Date / *Date*: 16·12·06 (YY/MM/DD · *AA/MM/JJ*)
Time / *Heure*: 15:55 am pm
Sampling Site (e.g., kitchen tap) / *Point d'échantillonnage (ex. : robinet de cuisine)*: Pumphouse outlet
Is this a Resample from a Previous Test? / *Est-ce un deuxième échantillon d'un test antérieur?*: ☐ Yes / *Oui* ☑ No / *Non*
Previous Sample Number / *Numéro de l'échantillon précédent*:

Sample Supply / *Source d'approvisionnement en eau*

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

Sample Source / *Provenance de l'échantillon*

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

Water Treatment / *Traitement de l'eau*

Is the Water Chlorinated? / *L'eau contient-elle du chlore?*: ☐ Yes / *Oui* ☑ No / *Non*
Free Available Chlorine / *Chlore libre disponible*: ppm / *mg/L*
Other Treatment Systems (e.g., UV, softener, filter) / *Autre dispositif de traitement (ex. : désinfection aux rayons UV, adoucisseur d'eau, filtre)*:

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

Receipt of Sample / ***Réception de l'échantillon***
Date / *Date*: 16/12/07 (YY/MM/DD · *AA/MM/JJ*)
Time / *Heure*: 10:20 am pm
By / *Par*: SH

Condition of Sample / ***État de l'échantillon***
☑ Satisfactory / *Satisfaisant* ☐ Unsatisfactory / *Non satisfaisant*
Details / *Précisez*: 8.4°C

Incubation / ***Incubation***
Date / *Date*: 161207 (YY/MM/DD · *AA/MM/JJ*)
Time / *Heure*: 4:00 am pm
By / *Par*:
Incubator / *Incubateur*: 1

Analysis Completed / ***Analyse terminée***
Date / *Date*: 161208 (YY/MM/DD · *AA/MM/JJ*)
Time / *Heure*: 4:00 am pm
By / *Par*:

Results (See Reverse Side for Interpretation) per 100 ml
Résultats (Voir au verso l'interprétation des résultats)

Total Coliforms/*Coliformes totaux*	**E. coli**/*E. coli*
☐ Present / *Présence* ☑ Absent / *Absence*	☐ Present / *Présence* ☑ Absent / *Absence*

Comments / *Commentaires*

Report Authorized By / *Rapport autorisé par*:
Position / *Poste*: WQT
Date / *Date*: 161208 (YY/MM/DD · *AA/MM/JJ*)

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

YG(4649)NC3 Rev.03/2013

Sample Number / ***Numéro de l'échantillon*** : 67349