

June 25, 2015

EDI Project No: 15Y0146

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

Attention: Erik Pit, Type II Project Manager

RE: Mount Nansen Water Resources Investigations – Monthly Report: April 2015 (Revised)

Trip dates:	April 20-21, 2015
EDI field staff:	Joel MacFabe, Brett Pagacz and Danny Skookum
Weather during trip:	Weather conditions were mostly cloudy, with light winds and temperatures above zero (up to 4°C).

The following monthly report includes a summary of site conditions and data collected during EDI's April 2015 trip to Mount Nansen as part of the 2015/16 Water Resources Investigations. See Table 1 for a summary of data included in this report.

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

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



SITE CONDITIONS

The April 2015 trip represents late-winter conditions transitioning to spring, however; many stations and sites are still frozen to substrate. Ice on upper Victoria Creek has melted and water levels are higher than the previous March 2015 trip. Snow around the Mount Nansen Site has also melted significantly from the previous trip. The Diversion Channel was flowing, while other sites on Dome Creek remain frozen to substrate and not suitable for sampling. The H/WQ-BC area is still covered in thick ice; however, some melt water from Back Creek upstream of the site/station is entering Victoria Creek, upstream of the regular confluence (upstream and downstream of the WQ-VC-U site). Water is flowing across the Mount Nansen Road crossing of Victoria Creek and through the secondary culvert, with water collecting in the parking area and entering the creek at the H-VC-R station.

METEOROLOGY

Meteorological data was collected at the ATM-ROAD station throughout the month of April. Northern Avcom informed AAM that the modem was deactivated on April 21, 2015 and that a new telemetry system will be installed likely mid-June. In the meantime, AAM is downloading the data manually when on site. No data gaps were identified. Meteorological data will be summarized and analyzed following the completion of the open-water season, in the October 2015 Monthly Report. This will include data from April 1, 2015 to October 15, 2015 with plots and tables.

HYDROLOGY

Discharge measurements were collected at all stations with suitable conditions. Continuous logger data is available for four stations: H-DC-M WP, H-VC-DBC, H-VC-UMN and H-VC-R. See attached data tables for a summary of conditions and hydrometric monitoring tasks completed at each station and for a summary of discharge measurement results for the April 20-21, 2015 period. Quality control and quality assurance for the hydrometric data was conducted on the instantaneous and continuous data. Noteworthy observations are included below.

Noteworthy Observations:

- Discharge measurements were collected with an ADV at H-VC-U, H-VC-DBC and H-VC-R with discharge values ranging from 0.130 0.192 m3/s, much higher than the previous discharge results for March 2015, ranging from 0.002 to 0.010 m3/s.
- A discharge measurement was collected with an ADV at H-VC-UMN, but the data was discarded due to backwater conditions associated with ice accumulation downstream at the Mount Nansen Road.
- A portion of Victoria Creek is flowing across the Mount Nansen Road and through the secondary culvert, with water collecting in the parking area near the H-VC-R station and entering the creek at the stations' stilling well.



- A salt tracer test was conducted at H-DC-B which was flowing for the first time since October 2014 (after which the channel froze to substrate).
- H-DC-DX+105 station remains frozen to substrate (since March 2015 trip).

WATER QUALITY

Water quality samples were collected at nine sites during the April 2015 trip, as many sites remain frozen to substrate from the winter period. See attached data tables for a summary of conditions at each site and a record of where samples were collected during the trip. In situ and laboratory results summary tables are also attached. Parameters that exceeded CCME-AL guidelines and/or the Mount Nansen EQS criteria are highlighted. The lab certificates of analysis are also attached. Many results are similar to previous results for the program - noteworthy observations and comments on sample QA/QC are included in the subsections below.

Noteworthy Observations:

- The tailings pond was not sampled this trip due to safety concerns relayed to crew by AAM and DES, as the ice surface had collapsed.
- Concentrations of total aluminum has increased at most sites across the study area and are likely related to spring melt and surface runoff; including all sites on Victoria Creek. The highest aluminum concentrations on Victoria Creek were at the WQ-VC-U and WQ-VC-DBC sites (which may be related to Back Creek).
- Iron was above CCME-AL and EQS at WQ-VC-U and WQ-VC-DBC (likely also related to spring runoff from Back Creek).
- Total zinc at WQ-SEEP continues to exceed the CCME-AL guideline, with a value of 0.0627 mg/L, which is slightly higher than during the March 2015 trip. Of note the dissolved zinc concentration has decreased from the previous trip (0.05 mg/L to 0.02 mg/L).
- WQ-MS-S-03 continues to have high metals concentrations that exceed guidelines and/or standards for many parameters (fluoride, aluminum, arsenic, cadmium, copper, iron, lead, manganese, silver and zinc). The sample did have high TSS that exceeded the Mount Nansen EQS, which could also contribute high metal concentrations.
- The WQ-SEEP 96-hour LC50 rainbow trout acute toxicity test result was greater than 100% (undiluted sample), with 100% survival. The LT50 result for comparison was >96 hours (test passed). These results indicate that conditions may have improved compared to results from January and March 2015, when the LT50 tests passed, but there were trout mortalities (only 70 and 60% survival).
- Field measured pH for two sites was outside of range and was flagged as erroneous data, therefore there is no pH field data reported for WQ-VC-UMN and WQ-VC-R+150.



QA/QC Samples

Travel Blank Sample – all parameters were below detection limits – no contamination suspected from travel or storage

Field Blank Sample – all parameters were below detection limits – no contamination suspected from sample handling or processing.

Replicate Sample(s) – the average relative percent difference (RPD) between the replicate sample (WQ-VC-UMN-r) and the regular set (WQ-VC-UMN) was 5%, which is considered 'adequately precise'. The average RPD for total metals was 8%, while the average RPD for dissolved metals was 3%. Two individual parameters were flagged for having RPD>20% (dissolved zinc) and RPD>50% (total chromium). RPD values greater than 20% indicate that there is some level of imprecision in the data reported or that there is intrinsically high variability within the sample. RPD values greater than 50% may indicate an error or problem with the results; however total chromium values are within the range of samples collected at sites up and downstream of WQ-VC-UMN, so it is likely still related to highly variable conditions at the site.

PROGRAM RECOMMENDATIONS

- Re-install continuous monitoring stations at H-VC-U, H-DC-R, H-DC-B, H-PC-DSP, and H-BC as conditions allow over the May 2015 freshet trips (2 scheduled). These continuous stations had been deactivated through the winter months.
- The ATM-VC5 barometric logger should be re-installed within a white PVC pipe for more accurate temperature readings.
- Prepare for freshet sampling in May 2015 (two trips) many sites will be flowing and sampling will include opportunistic seep sampling around the waste rock and mill areas.
- For water quality at the Victoria Creek at Road area, sampling should shift from the WQ-VC-R+150 (winter location) to the WQ-VC-R open-water location once conditions are suitable.
- Continue to monitor the WQ-SEEP (regular standard sampling package and LC50). Conditions may be improving.

ADDITIONAL TRIP INFORMATION

Any changes to project scope (i.e. additional sites sampled):	All sampling and monitoring was conducted within scope.
Any alterations to sample scheduling:	None.
Any events resulting in changes to budget:	None



Additional Comments:	Conditions were transitioning from winter to spring. Ice on upper Victoria Creek had melted and water levels were higher than the previous March 2015 trip. Snow around the Mount Nansen Site had also melted significantly from the previous trip. The Diversion Channel was flowing, while other sites on Dome Creek remained frozen to substrate and were not suitable for sampling. Water is flowing across the Mount Nansen Road crossing of Victoria Creek and through the second culvert, with water collecting in the parking area near the H-VC-R station. The Back Creek area was still covered in over 1 m of ice. Some of the ice was still extending towards
Wildlife Sightings:	Victoria Creek at the WQ-VC-U site. None
Site concerns (safety):	None

LIST OF ATTACHMENTS

The following information is attached to this monthly report:

- Site and Station Photos from the trip
- Data Tables
 - o Hydrology Site Conditions, Tasks Completed, Discharge Measurement Summaries
 - o Water Quality Site Conditions and Samples Collected
 - o Water Quality Summary Table of In Situ Parameters and Lab Results
- Water Quality Copies of Lab Certificate of Analysis (COA)
- Water Quality Copy of Yukon Environmental Health Services Bacteriological Results



Dome Creek Sites/Stations



Photo 1. WQ-DC-DX+105, looking upstream (April 21, 2015).



Photo 2. WQ-DC-R, looking upstream (April 20, 2015).



Photo 3. H-DC-R, looking upstream (April 20, 2015).

No Photo Taken

Photo 4. WQ-MS-S-03 – photo missing.





Photo 5. H-DC-B station location, looking downstream (April 21, 2015).



Photo 6. WQ-DC-B, looking upstream (April 21, 2015).



Photo 7. H-DC-M WP, looking upstream (April 20, 2015).



Photo 8. WQ-DC-U, looking upstream – thick overflow ice conditions (April 20, 2015).



Victoria Creek Sites/Stations



Photo 9. H-VC-U, looking upstream (April 20, 2015).

Photo 10. WQ-VC-U, looking downstream towards Back Creek confluence (April 20, 2015).



Photo 11. H-VC-DBC, looking upstream (April 20, 2015).

Photo 12. WQ-VC-DBC, looking upstream (April 20, 2015).





Photo 13. H-VC-UMN, looking downstream (April 20, 2015).

Photo 14. WQ-VC-UMN, looking upstream (April 20, 2015).



Photo 15. H-VC-R from road. Water flowing out of second culvert, ponding in parking area.



Photo 16: H-VC-R stilling well, with water from parking lot flowing into creek at location.





Photo 17. H-VC-R, winter ADV location (April 20, 2015).

Photo 18. WQ-VC-R+150, looking downstream (April 20, 2015).



Photo 19. Overview of Vicotira Creek at Road (WQ-VC-R in background) showing overflow ice conditions, and secondary culvert in foreground.



Back Creek Sites/Stations



Photo 20. H/WQ-BC, looking upstream, showing overflow conditions (April 20, 2015).



Photo 21. H/WQ-SEEP (April 20, 2015).



Photo 22. H/WQ-TP (April 20, 2015).

Pit Lake/Tailings Pond/Seepage Pond Discharge





Photo 23. WQ-PIT sampling location (April 21, 2015)



Photo 24. WQ-PIT sampling location, showing collapsed overflow ice (April 21, 2015).

Pump House Well



Photo 25. WQ-PW (April 21, 2015).



Measurement ID	Hydrometric Identifier (HID)	Measurement Date	Measurement Time	Discharge Measurement Method	Discharge (m³/s)	Discharge Data Flag	Surveyed Water Elevation (m)	Survey Data Flag	Comments
253	ATM-VC5	17/04/2015	13:59	Ν	-	-	-	N	Installed new Edge logger to replace Solinst Gold Unit (ATMDC4) that was located at a higher elevation.
258	ATM-VC5	20/04/2015	17:15	Ν	-	-	-	N	Data logger requires white pipe for more accurate temperature logging. Barometric units changed from mbar to Kpa.
263	H-BC	20/04/2015	17:51	Ν	-	х	-	N	Channel frozen to bed and overflow ice is exceeding bankfull elevation. The top of the stilling well is under ice.
278	H-DC-B	21/04/2015	9:45	SS	0.009	-	-	N	Salt tracer was performed downstream of bridge just after right bend in channel.
259	H-DC-B	21/04/2015	9:45	SS	-	В	-		Salt tracer was conducted downstream of bridge and around the meander bend. Mixing length was relatively short. Second trial was stopped after CF.T test completed, time-series may need to be shortened.
260	H-DC-M WP	20/04/2015	18:20	Ν	-	х	-	N	Unsuitable site for discharge measurement; no measurement obtained. Overflow ice is melting and the tops of vertical iron anchors from weir and stilling well are now visible.
266	H-PW	20/04/2015	17:50	V	0.003		-	N	Volumetric measurement at outlet pipe.
267	H-SEEP	20/04/2015	18:57	V	0.004		-		Site maintenance (DES) noted that the seepage pump rate fluctuated to accommodate seasonal flows. Flow rate measured at the pumphouse = 250.616 L/min
262	H-VC-DBC	20/04/2015	16:23	ADV-MID	0.192	В	-	N	Ice present in channel.
265	H-VC-R	20/04/2015	13:03	ADV-MID	0.145	В	-		Winter ice conditions associated with extensive icing at the road/culverts required discharge measurement to be obtained 150 m downstream of typical measurement location.
261	H-VC-U	20/04/2015	17:25	ADV-MID	0.130	В	-	N	Water temperature = -0.1 C (from ADV). No stilling well installed presently. Re-installation will occur in May 2015.
264	H-VC-UMN	20/04/2015	14:43	N	-	Х,В	-	Ν	Anchor ice present on right bank and backwater effects are present. Staff gauge and data logger readings do not reflect open water conditions. Backwater effects may be a result of extensive ice still present downstream at H-VC-R. Discharge measurement was collected using ADV-MID , but data was discarded due to backwater conditions.



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).
Ν	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-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
В	Backwater effects (ice related)
F	Instrument malfunction
М	Manual measurement
A	Automated measurement (logged)
ML	Missing length data
MD	Missing depth data
MW	Missing width data
0	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
0	Outside measurement Accuracy (+/-0.003 m)
N	No survey conducted



Water Quality Site	Sample Collected? (Y/N)	Measurement Date	Comments
WQ-PIT-1	Y	2015.04.21	Total depth at sampling location 4.3 m, ice 1.11 m thick. Took top sample from below bottom of ice surface using Kemmerer sampler (0.30 m).
WQ-PIT-2	Y	2015.04.21	Took middle sample from 2.0 m below bottom of ice surface using Kemmerer sampler.
WQ-PIT-3	Y	2015.04.21	Took bottom sample from 4.0 m below bottom of ice surface using Kemmerer sampler.
WQ-SEEP	Y	2015.04.20	Conditions normal, water free flowing from pipe outlet. Water also collected for LC50 and LT50 tests.
WQ-TP	Ν	-	The pond is covered in ice with some melt water on the surface. AAM requested that EDI remain off the pond due to safety concerns.
WQ-DC-DX	Ν	-	Frozen to substrate (typical of the winter season).
WQ-DX-DX+105	Ν	-	Creek frozen to substrate.
WQ-MS-S-03	Y	2015.04.21	Open water at site. Ice 2-10 cm thick. Some turbidity.
WQ-DC-D1b	Ν	-	Frozen to substrate with overflow ice (typical of the winter season).
WQ-DC-B	Y	2015.04.21	A stream channel was flowing on top of ice surface. Conditions were suitable for sample collection.
WQ-DC-U	N	-	The water sampling site is completely under ice (old stilling well just barely showing). There is some water from the diversion channel and seepage discharge is flowing on top of ice, but in multiple braided channels and through various ice layers. Not suitable for measurement.
WQ-DC-R	N	-	Frozen to substrate (typical of the winter season).
WQ-BC	N	-	Significant overflow still covering the entire channel (stilling well completely under ice, actual stream channel undefined) and extending laterally into the surrounding forest towards both parking area and Victoria Creek. No flow heard or observed – no sampling.
WQ-VC-U	Y	2015.04.20	Sample collected from regular location. Flow levels have increased from the previous trip. Ice on banks is approximately 5 cm. Water light grey in colour.
WQ-VC-DBC	Y	2015.04.20	Sample collected from regular location. More open water and higher water levels than March 2015 trip. Water light grey in colour.
WQ-VC-UMN	Y	2015.04.20	Sample collected from regular location. Water flowing over top of ice. Water more clear than upstream sites.
WQ-VC-R	Ν	-	Winter samples are collected from the WQ-VC-R+150 site due to thick overflow ice at the WQ-VC-R site during the winter.
WQ-VC-R+150	Y	2015.04.20	Samples were collected from the regular winter sampling location - WQ-VC-R+150 (downstream of road crossing ~150 m). Flow levels had increased from the previous trip. Ice was 3-5 cm thick at sampling location. Water clear.
WQ-PW	Y	2015.04.21	Drinking water samples and bacteriological samples collected.
WQ-PC-U	Ν	-	Frozen to substrate (typical of the winter season).



Water Quality Site	Sample Collected? (Y/N)	Measurement Date	Comments
WQ-PC-D	Ν	-	Frozen to substrate (typical of the winter season).
Field Replicate 1	Y	2015.04.20	Sample collected from WQ-VC-UMN (called WQ-VC-UMN-r)
Field Blank	Y	2015.04.21	Sample bottles filled with deionized water supplied by ALS. Filtered and preserved as instructed.
Travel Blank	Y	-	Samples provided by lab and were transported to and from site.



Summary of Water Quality Results for the April 20-21, 2015 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0146-150420-002 WQ-VC-U 20-Apr-15	0146-150420-001 WQ-VC-DBC 20-Apr-15	0146-150420-011 WQ-VC-UMN ** 20-Apr-15	0146-150420-010 WQ-VC-UMN-r 20-Apr-15	QA/QC WQ-VC-UMN Replicate Analysis RPD	0146-150420-009 WQ-VC-R+150 ** 20-Apr-15	
Temperature (in-situ)	°C	-	-	-	-0.2	-0.2	-0.2	-	-	0.1	
Specific Conductivity (in-situ)	μS/cm	-	-	-	219.1	220.9	461.6	-	-	467	
pH (in-situ) Turbidity (In-situ)	pH NTU	6.5 - 9.0	6.0 - 8.5	-	7.68 24.70	7.45 24.60	n/a 4.64	-	-	n/a 4.13	
Dissolved Oxygen (in-situ - Pit only)	mg/L	-	-	-	-	-	-	-	-	-	
Colour, True	CU	15	-	5	-	-	-	-	-	-	-
Conductivity	μS/cm	-	-	2	219	201	454	444	2%	461	
Hardness (as CaCO3)	mg/L	-	-	0.5	115	117	242	242	0%	251	_
pH (lab) Total Suspended Solids	pH mg/L	6.5 - 9.0	6.0 - 8.5 50	0.1	8.07	8.12	8.17 <3.0	8.17 <3.0	0% <dl< td=""><td>8.15</td><td>_</td></dl<>	8.15	_
Total Dissolved Solids	mg/L	-	-	1	120	125	284	284	0%	295	_
Alkalinity, Bicarbonate (as CaCO3)		-	-	1	84	92.1	103	108	5%	118	-
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<dl< td=""><td><1.0</td><td></td></dl<>	<1.0	
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<dl< td=""><td><1.0</td><td></td></dl<>	<1.0	
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	84	92.1	103	108	5%	118	_
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	<0.0050	0.033	0.0365	10% <dl< td=""><td>0.0148</td><td>-</td></dl<>	0.0148	-
Chloride (Cl) Fluoride (F)	mg/L mg/L	0.12	-	0.02	0.055	0.056	0.064	0.054	<2xDL	0.063	_
Nitrate (as N)	mg/L	13	-	0.005	0.0315	0.034	0.0327	0.0314	4%	0.0336	
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	0.0014	0.0015	<2xDL	0.0014	
Sulfate (SO4)	mg/L	-	-	0.5	25.4	25.3	132	128	3%	130	
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<dl< td=""><td><0.0050</td><td></td></dl<>	<0.0050	
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<dl< td=""><td><0.0050</td><td>_</td></dl<>	<0.0050	_
Cyanate Thiocyanate (SCN)	mg/L mg/L	-	-	0.2	<0.20 <0.50	<0.20 <0.50	<0.20 <0.50	<0.20 <0.50	<dl <dl< td=""><td><0.20 <0.50</td><td>+</td></dl<></dl 	<0.20 <0.50	+
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.50 0.876	0.802	0.182	0.172	<dl 6%</dl 	0.134	
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0003	0.00029	0.00037	0.00035	<2xDL	0.00038	T
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0045	0.00419	0.00419	0.00421	0%	0.00357	
Barium (Ba)-Total	mg/L	-	1.0	0.00005	0.0804	0.0802	0.0798	0.0782	2%	0.0918	
Beryllium (Be)-Total	mg/L	-	-	0.0001	0.000027	0.000027	<0.000020	<0.000020	<dl< td=""><td><0.000020</td><td></td></dl<>	<0.000020	
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.000050	<0.000050	<0.000050	<0.00050	<dl< td=""><td><0.000050</td><td>_</td></dl<>	<0.000050	_
Boron (B)-Total Cadmium (Cd)-Total <i>(Lab Result)</i>	mg/L mg/L	- 0.00009	- 0.02	0.01	<0.010 0.000112	<0.010 0.000104	<0.010 0.000117	<0.010 0.000108	<dl 8%</dl 	<0.010 0.000111	_
Cadmium (Cd) -Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00001	0.000178	0.000181	0.00033	0.00033	-	0.00034	
Calcium (Ca)-Total	mg/L	-	-	0.05	28.5	28.6	59.3	59.2	0%	57.6	-
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.0011	0.001	0.00088	0.00037	82%	0.00037	
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00036	0.00033	0.00039	0.00039	<2xDL	0.00047	
Copper (Cu)-Total (Lab Result)	mg/L	0.002	0.2	0.0005	0.00216	0.00226	0.0013	0.00109	<2xDL	0.00124	_
Copper (Cu)-Total (Hardness Adjusted Guideline) Iron (Fe)-Total	mg/L mg/L	0.3	- 1.0	0.0005	0.00266 1.07	0.00270 1.02	0.00400	0.00400	- 8%	0.00400	_
Lead (Pb)-Total (Lab Result)	mg/L	0.001	0.1	0.00005	0.00303	0.00297	0.000604	0.000543	11%	0.000331	_
Lead (Pb)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00005	0.00380	0.00389	0.00700	0.00700	-	0.00700	
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.0010	<0.0010	<0.0010	0.001	<dl< td=""><td>0.0011</td><td></td></dl<>	0.0011	
Magnesium (Mg)-Total	mg/L	-	-	0.1	9.25	9.23	21.2	21.1	0%	20.5	
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.172	0.162	0.26	0.26	0%	0.231	_
Mercury (Hg)-Total Molybdenum (Mo)-Total	mg/L mg/L	0.000026	0.005	0.00001 0.00005	0.00001 0.000504	0.0000115	0.0000068	<0.000050 0.000412	<dl 2%</dl 	<0.000050 0.000369	_
Nickel (Ni)-Total (Lab Result)	mg/L	0.025	0.3	0.0005	0.00092	0.00092	0.000402	0.000412	<2xDL	0.00084	-
Nickel (Ni)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.10629	0.10769	0.15000	0.15000	-	0.15000	-
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<dl< td=""><td><0.050</td><td></td></dl<>	<0.050	
Potassium (K)-Total	mg/L	-	-	0.1	1.22	1.23	1.99	2.04	2%	2.21	
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.000050	0.000053	<0.000050	<0.000050	<dl< td=""><td>0.000067</td><td>+</td></dl<>	0.000067	+
Silicon (Si)-Total	mg/L	-	-	0.05	6.89	6.95	6.57	6.59	0%	6.4	_
Silver (Ag)-Total Sodium (Na)-Total	mg/L mg/L	0.0001	0.1	0.00001	0.000061	0.000054	0.000015	0.000013	<2xDL 4%	<0.000010 5.87	-
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.27	0.269	0.373	0.368	1%	0.369	_
Sulfur (S)-Total	mg/L	-	-	0.5	8.78	8.6	46.5	45	3%	43.2	-
Thallium (TI)-Total	mg/L	0.0008	-	0.00001	0.000015	0.000016	<0.000010	<0.000010	<dl< td=""><td><0.000010</td><td></td></dl<>	<0.000010	
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<dl< td=""><td><0.00010</td><td></td></dl<>	<0.00010	
Titanium (Ti)-Total	mg/L	-	-	0.01	0.022	0.0209	0.00582	0.00491	<2xDL	0.00564	
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000699	0.000716	0.00085	0.000807	5%	0.000794	_
Vanadium (V)-Total Zinc (Zn)-Total	mg/L mg/L	- 0.03	- 0.3	0.001	0.00212	0.00198	0.00072	0.00064	<2xDL <2xDL	0.00072	_
Dissolved Metals Filtration Location	ilig/L	-	-	n/a	FIELD	FIELD	FIELD	FIELD	-	FIELD	_
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.001	0.0066	0.007	0.0039	0.0038	<2xDL	0.0045	
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	0.0003	0.00031	<2xDL	0.00032	1
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00059	0.00058	0.00331	0.00336	1%	0.00282	
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0709	0.0726	0.0772	0.0766	1%	0.0926	\perp
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.000020	<0.000020	<0.000020	<0.000020	<dl< td=""><td><0.000020</td><td>+</td></dl<>	<0.000020	+
Bismuth (Bi)-Dissolved Boron (B)-Dissolved	mg/L mg/L	-	-	0.0005	<0.00050 <0.010	<0.000050 <0.010	<0.000050 <0.010	<0.00050 <0.010	<dl <dl< td=""><td><0.000050 <0.010</td><td>+</td></dl<></dl 	<0.000050 <0.010	+
Cadmium (Cd)-Dissolved (Lab Result)	mg/L mg/L	0.00009	-	0.00001	0.0000468	0.0000606	0.000103	0.000105	2%	0.0000998	_
Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.00001	0.000178	0.000181	0.00033	0.00033	-	0.000340	+
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	30.2	30.7	61.1	61.3	0%	63.5	+
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<dl< td=""><td>0.0001</td><td></td></dl<>	0.0001	
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	0.00032	0.00033	<2xDL	0.0004	\perp
Copper (Cu)-Dissolved (Lab Result)	mg/L	0.002	-	0.0002	0.00083	0.00092	0.00083	0.0008	<2xDL	0.00099	

Client: Assessment and Abandoned Mines Branch, Yukon Government Project: 15Y0146

0146 150431 005	0146 150421 008	0146 150430 003
0146-150421-005 WQ-MS-S-03	0146-150421-008 WQ-DC-B	0146-150420-003 WQ-SEEP
21-Apr-15	21-Apr-15	20-Apr-15
0.4	-0.3	1.7
1164	1608	1330
7.20	7.87	7.41
37.40	19.03	- 124.00
-	-	-
995	1410	1200
708	1030	726
8.06	8.18	7.89
78.7 837	21.3 1270	96 998
265	234	155
<1.0	<1.0	<1.0
<1.0	<1.0	<1.0
265	234	155 3.2
0.0303	0.0667 <2.5	1.6
0.152	0.1	0.058
0.013	<0.025	0.414
<0.0020	<0.0050	0.0154
421	769	588
<0.0050	<0.0050 <0.0050	0.0107 0.0696
<0.0050	<0.0050	<0.20
<0.50	<0.50	2.72
0.393	0.293	1.85
0.0231	0.00344	0.00764
0.137	0.0169 0.0518	0.0948 0.0935
0.000022	<0.00020	0.000089
0.000129	<0.000050	0.000559
<0.010	0.014	0.052
0.00466	0.000164	0.00116
0.00037	0.00037	0.00037 203
0.00063	0.00071	0.00455
0.00134	0.00062	0.00785
0.00571	0.00145	0.0186
0.00400	0.00400	0.00400
2.74 0.0436	4.07 0.000624	16.2 0.0339
0.00700	0.00700	0.00700
0.0097	0.0064	0.0018
59.2	98.8	44.1
1.45 0.0000139	1.46 0.0000057	5.25 0.0000116
0.000389	0.000288	0.00117
0.00258	0.00108	0.00618
0.15000	0.15000	0.15000
<0.050	<0.050	0.096
3.38	5.2	5.66 0.000227
<0.000050 7.21	0.000075	10.4
0.000505	0.000016	0.00068
4.68	9.74	25.3
0.407	0.77	0.592
145 0.000127	249 0.000013	196 0.000059
<0.000127	<0.00013	<0.00010
0.018	0.0154	0.0768
0.00383	0.00321	0.00135
0.00216	0.00186	0.0089
1.26 FIELD	0.0229 FIELD	0.0627 FIELD
0.0027	0.0048	0.0135
0.0174	0.00342	0.00127
0.0695	0.0119	0.0285
0.016	0.0467	0.0632
<0.000020	<0.000020 <0.000050	<0.000020 <0.000050
<0.000	0.014	0.052
0.00125	0.0000712	0.000543
0.00037	0.00037	0.00037
185	241	215
<0.00010 0.00104	<0.00010 0.00049	0.00031 0.00664
0.0003	0.00043	0.0015



Summary of Water Quality Results for the April 20-21, 2015 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0146-150420-002 WQ-VC-U 20-Apr-15	0146-150420-001 WQ-VC-DBC 20-Apr-15	0146-150420-011 WQ-VC-UMN ** 20-Apr-15	0146-150420-010 WQ-VC-UMN-r 20-Apr-15	QA/QC WQ-VC-UMN Replicate Analysis RPD	0146-150420-009 WQ-VC-R+150 ** 20-Apr-15
Copper (Cu)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.00200	0.00266	0.00270	0.00400	0.00400	-	0.00400
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.018	0.019	0.021	0.022	<2xDL	0.043
Lead (Pb)-Dissolved (Lab Result)	mg/L	0.001	-	0.00005	<0.000050	0.000056	<0.000050	<0.000050	<dl< td=""><td><0.000050</td></dl<>	<0.000050
Lead (Pb)-Diss. (Hardness Adjusted Guideline)	mg/L			0.00005	0.00380	0.00389	0.00700	0.00700	-	0.00700
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.0010	<0.0010	<0.0010	<0.0010	<dl< td=""><td>0.0011</td></dl<>	0.0011
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	9.69	9.68	21.7	21.6	0%	22.5
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.148	0.147	0.249	0.255	2%	0.232
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	0.0000059	<0.0000050	0.0000062	<0.0000050	<dl< td=""><td><0.000050</td></dl<>	<0.000050
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000441	0.000448	0.000377	0.000372	1%	0.000359
Nickel (Ni)-Dissolved (Lab Result)	mg/L	0.025	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<dl< td=""><td>0.00075</td></dl<>	0.00075
Nickel (Ni)-Diss. (Hardness Adjusted Guideline)	mg/L			0.0005	0.10629	0.10769	0.15000	0.15000	-	0.15000
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<dl< td=""><td><0.050</td></dl<>	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	1.08	1.08	2.01	2.03	1%	2.39
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.000050	<0.000050	<0.000050	<0.000050	<dl< td=""><td>0.000069</td></dl<>	0.000069
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.28	5.41	6.11	6.12	0%	6.53
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<dl< td=""><td><0.000010</td></dl<>	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.65	2.59	5.43	5.41	0%	6.03
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.271	0.272	0.366	0.361	1%	0.379
Sulfur (S)-Dissolved	mg/L	-	-	0.5	8.84	8.89	45.6	44.1	3%	45.2
Thallium (TI)-Dissolved	mg/L	0.0008	-	0.00001	<0.00010	<0.000010	<0.000010	<0.000010	<dl< td=""><td><0.000010</td></dl<>	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<dl< td=""><td><0.00010</td></dl<>	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.00030	<0.00030	<0.00030	<0.00030	<dl< td=""><td><0.00030</td></dl<>	<0.00030
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000671	0.000685	0.000816	0.000798	2%	0.000789
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.00050	<0.00050	<0.00050	<0.00050	<dl< td=""><td><0.00050</td></dl<>	<0.00050
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0026	0.0023	0.0084	0.0109	26%	0.0089

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

COLOUR KEY:

Exceeds CCME Guideline

Exceeds MN Effluent Discharge Standards

Exceeds both CCME and MN Standards

Exceeds Hardness Dependent Calculated Guideline (CCME)

Data flag for Detection Limit Adjustment --> Please refer to the lab COA report and lab excel report for more info

QA/QC Codes: RPD - Relative Percent Difference, <DL - below detection limit, and <2XDL - less than two times the detection limit.

Notes:

* WQ-PW is a drinking water sample and the analysis package has different detection limits than all other samples. The results are also compared to the Guidelines for Canadian Drinking Water Quality (Health Canada, October 2014) versus the CCME or MN Effluent Quality Standards.

** Field measured pH for WQ-VC-UMN and WQ-VC-R+150 was outside of QA/QC bounds and flagged as erroneous.

QA/QC - the average RPD of the replicate sample (WQ-VC-UMN-r) was 5% with a difference 3% difference for dissolved and a 8% difference for total metals. Total chromium and dissolved zinc had RPD greater than >50 % and >20%, respectively, indicating error or problems and imprecise/intrinsically high variability). See methodology document for details on QA/QC methods.

0146-150421-005 WQ-MS-S-03 21-Apr-15	0146-150421-008 WQ-DC-B 21-Apr-15	0146-150420-003 WQ-SEEP 20-Apr-15
0.00400	0.00400	0.00400
1.39	2.45	11.1
0.000639	<0.000050	0.00011
0.00700	0.00700	0.00700
0.0092	0.0064	<0.0010
59.8	105	45.8
1.41	1.48	5.29
<0.000050	<0.0000050	0.0000068
0.000366	0.000278	0.000926
0.00214	0.00069	0.00254
0.15000	0.15000	0.15000
<0.050	<0.050	<0.050
3.48	5.52	5.44
<0.000050	<0.000050	0.000195
6.49	6.91	6.02
<0.000010	<0.000010	<0.00010
4.57	10	25.8
0.414	0.785	0.593
143	255	196
0.000088	<0.000010	<0.000010
<0.00010	<0.00010	<0.00010
<0.00030	<0.00030	0.00053
0.00379	0.00328	0.00126
<0.00050	<0.00050	0.00101
1.15	0.0176	0.02



Summary of Water Quality Results for the April 20-21, 2015 Trip.

Summary of Water Quality Results for the April 20-21, 2015 Trip Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled	0146-150421-016 WQ-PIT-1 (Top) 21-Apr-15	0146-150421-018 WQ-PIT-2 (Middle) 21-Apr-15	0146-150421-017 WQ-PIT-3 (Bottom) 21-Apr-15	0146-150421-019 WQ-PW * 20-Apr-15	0146-150420-007 FIELD BLANK 20-Apr-15	0146-150420-TRAVEL BLANK TRAVEL BLANK n/a
				Detection Limit	Depth: 0.3 m	Depth: 2.0 m	Depth: 4.0 m			
Temperature (in-situ)	°C	-	-	-	-0.3	-0.4	2.4	0.8	-	-
Specific Conductivity (in-situ) pH (in-situ)	μS/cm	- 6.5 - 9.0	- 6.0 - 8.5	-	2022 7.41	1997 7.35	2053 6.75	405.2 8.02	-	-
Turbidity (In-situ)	pH NTU	-	- 0.0	-	0.86	0.75	2.44	109.00	-	-
Dissolved Oxygen (in-situ - Pit only)	mg/L	-	-	-	6.02	4.91	1.77	-	-	-
Colour, True	CU	15	-	5	-	-	-	<5.0	-	-
Conductivity	μS/cm	-	-	2	2000	1770	1910	372	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	1350	1310	1300	198	<0.50	-
pH (lab)	рН	6.5 - 9.0	6.0 - 8.5	0.1	8.12	8.13	8.09	7.66	5.78	5.37
Total Suspended Solids	mg/L	-	50	3	<3.0	<3.0	3.3	-	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	1	1720	1680	1700	218	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3) Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	218 <1.0	237 <1.0	235 <1.0	-	<1.0 <1.0	<1.0 <1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L mg/L	-	-	1	<1.0	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-		1	218	237	235	181	<1.0	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<2.5	<2.5	<2.5	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.3	0.26	0.24	0.092	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.106	0.096	0.079	0.135	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	1090	1060	1080	37	<0.30	<0.30
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	-	-	-	-	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	-	-	-	-	<0.0050	<0.0050
Cyanate Thiographic (SCN)	mg/L	-	-	0.2	-	-	-	-	<0.20 <0.50	<0.20 <0.50
Thiocyanate (SCN) Aluminum (Al)-Total	mg/L mg/L	- 0.1	-	0.5	- 0.0109	- <0.0060	- 0.0112	- <0.010	<0.0030	<0.50
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00338	0.00319	0.00297	<0.00050	<0.0030	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0101	0.00768	0.0117	0.00043	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1.0	0.00005	0.0154	0.0153	0.014	0.089	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.000040	<0.000040	<0.000040	-	<0.000020	<0.000020
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00010	<0.00010	<0.00010	-	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	-	0.01	<0.020	<0.020	<0.020	<0.10	<0.010	<0.010
Cadmium (Cd)-Total (Lab Result)	mg/L	0.00009	0.02	0.00001	0.00402	0.00362	0.00424	<0.00020	<0.000050	<0.000050
Cadmium (Cd)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00001	0.00037	0.00037	0.00037	0.00028	0.00037	0.00037
Calcium (Ca)-Total	mg/L	-	-	0.05	373	347	352	46.3	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00020	<0.00020	<0.00020	<0.0020	<0.00010	<0.00010
Cobalt (Co)-Total Copper (Cu)-Total <i>(Lab Result)</i>	mg/L mg/L	0.002	- 0.2	0.0001	<0.00020 0.0036	<0.00020 0.0028	0.00029	- <0.0010	<0.00010 <0.00050	<0.00010 <0.00050
Copper (Cu)-Total (Lab Result) Copper (Cu)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.0038	0.0028	0.0033	0.00400	0.00400	0.00400
Iron (Fe)-Total	mg/L	0.3	1.0	0.01	0.03	0.029	0.05	<0.030	<0.010	<0.010
Lead (Pb)-Total (Lab Result)	mg/L	0.001	0.1	0.00005	0.00025	<0.00010	0.00032	0.00061	<0.00050	<0.000050
Lead (Pb)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00005	0.00700	0.00700	0.00700	0.00700	0.00700	0.00700
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0112	0.0104	0.0105	-	<0.0010	<0.0010
Magnesium (Mg)-Total	mg/L	-	-	0.1	97.6	95.4	95.1	20	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.133	0.107	0.328	<0.0020	<0.00010	<0.00010
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000050	<0.000050	<0.000050	<0.00020	<0.000050	<0.000050
Molybdenum (Mo)-Total	mg/L	0.0073		0.00005	0.00014	0.00013	0.00015	-	<0.000050	<0.000050
Nickel (Ni)-Total (Lab Result)	mg/L	0.025	0.3	0.0005	<0.0010	<0.0010	<0.0010	-	<0.00050	<0.00050
Nickel (Ni)-Total (Hardness Adjusted Guideline) Phosphorus (P)-Total	mg/L mg/L	-	-	0.0005	0.15000 <0.050	0.15000 <0.050	0.15000 <0.050	-	0.15000 <0.050	0.15000 <0.050
Potassium (K)-Total	mg/L	-		0.1	4.35	4.12	3.96	0.92	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.0010	<0.000050	<0.000050
Silicon (Si)-Total	mg/L	-	-	0.05	4.61	4.3	4.17	-	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000020	<0.000020	<0.000020	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	15.6	14.4	14.5	4.8	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	1.32	1.28	1.3	-	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	370	353	355	-	<0.50	<0.50
Thallium (TI)-Total	mg/L	0.0008	-	0.00001	0.000073	0.000067	0.000069	-	<0.00010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00020	<0.00020	<0.00020	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	< 0.00060	<0.00060	<0.00060	-	<0.00030	<0.00030
Uranium (U)-Total Vanadium (V)-Total	mg/L	0.015	-	0.00001	0.0051 <0.0010	0.00495	0.00488	0.00192	<0.00010 <0.00050	<0.000010 <0.00050
Zinc (Zn)-Total	mg/L mg/L	0.03	0.3	0.001	<0.0010 0.646	0.595	0.608	<0.050	<0.0030	<0.0030
Dissolved Metals Filtration Location	6/ -	-	-	n/a	FIELD	FIELD	FIELD	-	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.001	<0.0020	0.0028	0.0027	-	<0.0010	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00313	0.00321	0.00289	-	<0.00010	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00771	0.00769	0.00833	-	<0.00010	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0148	0.0149	0.0138	-	<0.000050	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.000040	<0.000040	<0.000040	-	<0.000020	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00010	<0.00010	<0.00010	-	<0.000050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.020	<0.020	<0.020	-	<0.010	-
Cadmium (Cd)-Dissolved (Lab Result)	mg/L	0.00009	-	0.00001	0.00357	0.00364	0.00416	-	<0.000050	-
Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.00001	0.00037	0.00037	0.00037	-	0.00037	-
Calcium (Ca)-Dissolved	mg/L	- 0.0089	-	0.05	378	361	354	-	<0.050	-
Chromium (Cr) Discolud		0.0089	-	0.0001	<0.00020	< 0.00020	<0.00020	-	< 0.00010	-
Chromium (Cr)-Dissolved Cobalt (Co)-Dissolved	mg/L mg/L	-	-	0.0001	<0.00020	<0.00020	0.00022	-	<0.00010	-

Monthly Report Data Tables



Summary of Water Quality Results for the April 20-21, 2015 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0146-150421-016 WQ-PIT-1 (Top) 21-Apr-15 Depth: 0.3 m	0146-150421-018 WQ-PIT-2 (Middle) 21-Apr-15 Depth: 2.0 m	0146-150421-017 WQ-PIT-3 (Bottom) 21-Apr-15 Depth: 4.0 m	0146-150421-019 WQ-PW * 20-Apr-15	0146-150420-007 FIELD BLANK 20-Apr-15	0146-150420-TRAVEL BLANK TRAVEL BLANK n/a
Copper (Cu)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.00200	0.00400	0.00400	0.00400	-	0.00400	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	<0.010	<0.010	<0.010	-	<0.010	-
Lead (Pb)-Dissolved (Lab Result)	mg/L	0.001	-	0.00005	<0.00010	<0.00010	<0.00010	-	<0.000050	-
Lead (Pb)-Diss. (Hardness Adjusted Guideline)	mg/L			0.00005	0.00700	0.00700	0.00700	-	0.00700	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.0105	0.0111	0.0102	-	<0.0010	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	99.5	98.5	101	-	<0.10	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.112	0.107	0.282	-	<0.00010	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000050	<0.000050	<0.0000050	-	<0.000050	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.00014	0.00014	0.00013	-	<0.000050	-
Nickel (Ni)-Dissolved (Lab Result)	mg/L	0.025	-	0.0005	<0.0010	<0.0010	<0.0010	-	<0.00050	-
Nickel (Ni)-Diss. (Hardness Adjusted Guideline)	mg/L			0.0005	0.15000	0.15000	0.15000	-	0.15000	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	-	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	4.43	4.17	4.03	-	<0.10	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	-	<0.000050	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.66	4.47	4.22	-	<0.050	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000020	<0.000020	<0.000020	-	<0.00010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	15.1	14.3	14.1	-	<0.050	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	1.21	1.29	1.24	-	<0.00020	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	358	343	358	-	<0.50	-
Thallium (TI)-Dissolved	mg/L	0.0008	-	0.00001	0.000066	0.000065	0.000072	-	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00020	<0.00020	<0.00020	-	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.00060	<0.00060	<0.00060	-	<0.00030	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00491	0.00495	0.00498	-	<0.000010	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	-	<0.00050	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.592	0.597	0.593	-	<0.0010	-

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

COLOUR KEY:

Exceeds CCME Guideline

Exceeds MN Effluent Discharge Standards

Exceeds both CCME and MN Standards

Exceeds Hardness Dependent Calculated Guideline (CCME)

Data flag for Detection Limit Adjustment --> Please refer to the lab COA report and lab excel report for more info

QA/QC Codes: RPD - Relative Percent Difference, <DL - below detection limit, and <2XDL - less than two times the detection limit.

Monthly Report Data Tables



ENVIRONMENTAL DYNAMICS INC. ATTN: Meghan Marjanovic 2195 - 2nd Ave Whitehorse YT Y1A 3T8 Date Received:21-APR-15Report Date:30-APR-15 17:41 (MT)Version:FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: L1601887 NOT SUBMITTED MOUNT NANSEN 15-Y-0146 1, 2

Can Dang Senior Account Manager

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L1601887 CONTD.... PAGE 2 of 11 30-APR-15 17:41 (MT) Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

		1			Version: FINAL		
	Sample ID Description Sampled Date Sampled Time Client ID	L1601887-1 Water 20-APR-15 16:35 0146-150420-001	L1601887-2 Water 20-APR-15 18:40 0146-150420-003	L1601887-3 Water 20-APR-15 08:00 0146-150420-007	L1601887-4 Water 20-APR-15 14:55 0146-150420-010	L1601887-5 Water 21-APR-15 13:10 0146-150421-008	
Grouping	Analyte						
WATER	-						
Physical Tests	Conductivity (uS/cm)	201	1200	<2.0	444	1410	
-	Hardness (as CaCO3) (mg/L)	117	726	<0.50	242	1030	
	рН (рН)	8.12	7.89	5.78	8.17	8.18	
	Total Suspended Solids (mg/L)	<3.0	96.0	<3.0	<3.0	21.3	
	Total Dissolved Solids (mg/L)	125	998	<1.0	284	1270	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	92.1	155	<1.0	108	234	
	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)	92.1	155	<1.0	108	234	
	Ammonia, Total (as N) (mg/L)	<0.0050	3.20	<0.0050	0.0365	0.0667	
	Chloride (Cl) (mg/L)	<0.50	1.6	<0.50	<0.50	<2.5	
	Fluoride (F) (mg/L)	0.056	0.058	<0.020	0.054	0.10	
	Nitrate (as N) (mg/L)	0.0340	0.414	<0.0050	0.0314	DLA <0.025	
	Nitrite (as N) (mg/L)	<0.0010	0.0154	<0.0010	0.0015	DLA <0.0050	
	Sulfate (SO4) (mg/L)	25.3	588	<0.30	128	769	
	Anion Sum (meq/L)	2.37	15.4	<0.10	4.84	20.7	
	Cation Sum (meq/L)	2.48	16.8	<0.10	5.14	21.4	
	Cation - Anion Balance (%)	2.1	4.2	0.0	3.0	1.7	
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	0.0107	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	0.0696	<0.0050	<0.0050	<0.0050	
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20	
	Thiocyanate (SCN) (mg/L)	<0.50	2.72	<0.50	<0.50	<0.50	
Total Metals	Aluminum (AI)-Total (mg/L)	0.802	1.85	<0.0030	0.172	0.293	
	Antimony (Sb)-Total (mg/L)	0.00029	0.00764	<0.00010	0.00035	0.00344	
	Arsenic (As)-Total (mg/L)	0.00419	0.0948	<0.00010	0.00421	0.0169	
	Barium (Ba)-Total (mg/L)	0.0802	0.0935	<0.000050	0.0782	0.0518	
	Beryllium (Be)-Total (mg/L)	0.000027	0.000089	<0.000020	<0.000020	<0.000020	
	Bismuth (Bi)-Total (mg/L)	<0.000050	0.000559	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	0.052	<0.010	<0.010	0.014	
	Cadmium (Cd)-Total (mg/L)	0.000104	0.00116	<0.0000050	0.000108	0.000164	
	Calcium (Ca)-Total (mg/L)	28.6	203	<0.050	59.2	227	
	Chromium (Cr)-Total (mg/L)	0.00100	0.00455	<0.00010	0.00037	0.00071	
	Cobalt (Co)-Total (mg/L)	0.00033	0.00785	<0.00010	0.00039	0.00062	
	Copper (Cu)-Total (mg/L)	0.00226	0.0186	<0.00050	0.00109	0.00145	
	Iron (Fe)-Total (mg/L)	1.02	16.2	<0.010	0.228	4.07	
	Lead (Pb)-Total (mg/L)	0.00297	0.0339	<0.000050	0.000543	0.000624	
	Lithium (Li)-Total (mg/L)	<0.0010	0.0018	<0.0010	0.0010	0.0064	

L1601887 CONTD.... PAGE 3 of 11 30-APR-15 17:41 (MT) Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Version:						
	Sample ID Description Sampled Date Sampled Time Client ID	L1601887-6 Water 21-APR-15 11:40 0146-150421-005	L1601887-7 Water 0146-1504 - TRAVEL BLANK	L1601887-8 Water 20-APR-15 13:07 0146-150420-009	L1601887-9 Water 20-APR-15 14:25 0146-150420-011	L1601887-10 Water 20-APR-15 16:55 0146-150420-00	
Grouping	Analyte						
WATER	•						
Physical Tests	Conductivity (uS/cm)	995	<2.0	461	454	219	
-	Hardness (as CaCO3) (mg/L)	708	~2.0	251	242	115	
	рН (рН)	8.06	5.37	8.15	8.17	8.07	
	Total Suspended Solids (mg/L)	78.7	<3.0	6.0	<3.0	4.0	
	Total Dissolved Solids (mg/L)	837	<1.0	295	284	120	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	265	<1.0	118	103	84.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	265	<1.0	118	103	84.0	
	Ammonia, Total (as N) (mg/L)	0.0303	<0.0050	0.0148	0.0330	<0.0050	
	Chloride (Cl) (mg/L)	<1.0	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	0.152	<0.020	0.063	0.064	0.055	
	Nitrate (as N) (mg/L)	0.013	<0.0050	0.0336	0.0327	0.0315	
	Nitrite (as N) (mg/L)	DLA <0.0020	<0.0010	0.0014	0.0014	<0.0010	
	Sulfate (SO4) (mg/L)	421	<0.30	130	132	25.4	
	Anion Sum (meq/L)	14.1	<0.10	5.06	4.79	2.21	
	Cation Sum (meq/L)	14.6	<0.10	5.35	5.13	2.45	
	Cation - Anion Balance (%)	1.8	0.0	2.8	3.4	5.1	
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20	
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.393	<0.0030	0.134	0.182	0.876	
	Antimony (Sb)-Total (mg/L)	0.0231	<0.00010	0.00038	0.00037	0.00030	
	Arsenic (As)-Total (mg/L)	0.137	<0.00010	0.00357	0.00419	0.00450	
	Barium (Ba)-Total (mg/L)	0.0236	<0.000050	0.0918	0.0798	0.0804	
	Beryllium (Be)-Total (mg/L)	0.000022	<0.000020	<0.000020	<0.000020	0.000027	
	Bismuth (Bi)-Total (mg/L)	0.000129	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.00466	<0.0000050	0.000111	0.000117	0.000112	
	Calcium (Ca)-Total (mg/L)	176	<0.050	57.6	59.3	28.5	
	Chromium (Cr)-Total (mg/L)	0.00063	<0.00010	0.00037	0.00088	0.00110	
	Cobalt (Co)-Total (mg/L)	0.00134	<0.00010	0.00047	0.00039	0.00036	
	Copper (Cu)-Total (mg/L)	0.00571	<0.00050	0.00124	0.00130	0.00216	
	Iron (Fe)-Total (mg/L)	2.74	<0.010	0.267	0.247	1.07	
	Lead (Pb)-Total (mg/L)	0.0436	<0.000050	0.000331	0.000604	0.00303	
	Lithium (Li)-Total (mg/L)	0.0097	<0.0010	0.0011	<0.0010	<0.0010	

L1601887 CONTD.... PAGE 4 of 11 30-APR-15 17:41 (MT) Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

					Version: FINAL		
	Sample ID Description Sampled Date Sampled Time Client ID	L1601887-1 Water 20-APR-15 16:35 0146-150420-001	L1601887-2 Water 20-APR-15 18:40 0146-150420-003	L1601887-3 Water 20-APR-15 08:00 0146-150420-007	L1601887-4 Water 20-APR-15 14:55 0146-150420-010	L1601887-5 Water 21-APR-15 13:10 0146-150421-008	
Grouping	Analyte						
WATER	-						
Total Metals	Magnesium (Mg)-Total (mg/L)	9.23	44.1	<0.10	21.1	98.8	
	Manganese (Mn)-Total (mg/L)	0.162	5.25	<0.00010	0.260	1.46	
	Mercury (Hg)-Total (mg/L)	0.0000115	0.0000116	<0.0000050	<0.0000050	0.0000057	
	Molybdenum (Mo)-Total (mg/L)	0.000477	0.00117	<0.000050	0.000412	0.000288	
	Nickel (Ni)-Total (mg/L)	0.00092	0.00618	<0.00050	0.000412	0.000200	
	Phosphorus (P)-Total (mg/L)	< 0.050	0.096	<0.050	< 0.050	<0.050	
	Potassium (K)-Total (mg/L)	1.23	5.66	<0.000	2.04	5.20	
	Rubidium (Rb)-Total (mg/L)	0.00183	0.00411	<0.00020	0.00136	0.00391	
	Selenium (Se)-Total (mg/L)	0.000053	0.00411	<0.00020	<0.00050	0.000075	
	Silicon (Si)-Total (mg/L)	6.95	10.4	<0.00050	<0.000050	7.25	
	Silver (Ag)-Total (mg/L)	0.000054	0.000680	<0.00010	0.00013	0.000016	
	Sodium (Na)-Total (mg/L)	2.53	25.3	<0.00010	5.45	9.74	
	Strontium (Sr)-Total (mg/L)	0.269	0.592	<0.00020	0.368	0.770	
	Sulfur (S)-Total (mg/L)	8.60	196	<0.00020	45.0	249	
	Thallium (TI)-Total (mg/L)						
	Tin (Sn)-Total (mg/L)	0.000016	0.000059	<0.000010	<0.000010	0.000013	
	Titanium (Ti)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Total (mg/L)	0.0209	0.0768	<0.00030	0.00491	0.0154	
	Vanadium (V)-Total (mg/L)	0.000716	0.00135	<0.000010	0.000807	0.00321	
	Zinc (Zn)-Total (mg/L)	0.00198	0.00890	<0.00050	0.00064	0.00186	
Dissolved Metals	Dissolved Mercury Filtration Location	0.0099	0.0627	<0.0030	0.0096	0.0229	
Dissolved metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	FIELD	FIELD	FIELD	FIELD	FIELD	
	Antimony (Sb)-Dissolved (mg/L)	0.0070	0.0135	<0.0010	0.0038	0.0048	
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00127	<0.00010	0.00031	0.00342	
	Barium (Ba)-Dissolved (mg/L)	0.00058	0.0285	<0.00010	0.00336	0.0119	
	Beryllium (Be)-Dissolved (mg/L)	0.0726	0.0632	<0.000050	0.0766	0.0467	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Boron (B)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Cadmium (Cd)-Dissolved (mg/L)	<0.010	0.052	<0.010	<0.010	0.014	
	Calcium (Ca)-Dissolved (mg/L)	0.0000606	0.000543	<0.0000050	0.000105	0.0000712	
	Chromium (Cr)-Dissolved (mg/L)	30.7	215	<0.050	61.3	241	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00031	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	<0.00010	0.00664	<0.00010	0.00033	0.00049	
		0.00092	0.00150	<0.00020	0.00080	0.00041	
	Iron (Fe)-Dissolved (mg/L)	0.019	11.1	<0.010	0.022	2.45	
	Lead (Pb)-Dissolved (mg/L)	0.000056	0.000110	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0064	

L1601887 CONTD.... PAGE 5 of 11 30-APR-15 17:41 (MT) Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINA							
	Sample ID Description Sampled Date Sampled Time Client ID	L1601887-6 Water 21-APR-15 11:40 0146-150421-005	L1601887-7 Water 0146-1504 - TRAVEL BLANK	L1601887-8 Water 20-APR-15 13:07 0146-150420-009	L1601887-9 Water 20-APR-15 14:25 0146-150420-011	L1601887-10 Water 20-APR-15 16:55 0146-150420-002	
Grouping	Analyte						
WATER	, unary co						
Total Metals	Magnesium (Mg)-Total (mg/L)	50.0	0.40	00.5	01.0	0.05	
	Manganese (Mn)-Total (mg/L)	59.2	<0.10	20.5	21.2	9.25	
	Mercury (Hg)-Total (mg/L)	1.45	<0.00010	0.231	0.260	0.172	
	Molybdenum (Mo)-Total (mg/L)	0.0000139	<0.0000050	<0.0000050	0.0000068	0.0000100	
	Nickel (Ni)-Total (mg/L)	0.000389	<0.000050	0.000369	0.000402	0.000504	
	Phosphorus (P)-Total (mg/L)	0.00258	<0.00050	0.00084	0.00072	0.00092	
	Potassium (K)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Rubidium (Rb)-Total (mg/L)	3.38	<0.10	2.21	1.99	1.22	
		0.00567	<0.00020	0.00154	0.00146	0.00193	
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	0.000067	<0.000050	<0.000050	
	Silicon (Si)-Total (mg/L)	7.21	<0.050	6.40	6.57	6.89	
	Silver (Ag)-Total (mg/L)	0.000505	<0.000010	<0.000010	0.000015	0.000061	
	Sodium (Na)-Total (mg/L)	4.68	<0.050	5.87	5.66	2.67	
	Strontium (Sr)-Total (mg/L)	0.407	<0.00020	0.369	0.373	0.270	
	Sulfur (S)-Total (mg/L)	145	<0.50	43.2	46.5	8.78	
	Thallium (TI)-Total (mg/L)	0.000127	<0.000010	<0.000010	<0.000010	0.000015	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	0.0180	<0.00030	0.00564	0.00582	0.0220	
	Uranium (U)-Total (mg/L)	0.00383	<0.000010	0.000794	0.000850	0.000699	
	Vanadium (V)-Total (mg/L)	0.00216	<0.00050	0.00072	0.00072	0.00212	
	Zinc (Zn)-Total (mg/L)	1.26	<0.0030	0.0101	0.0101	0.0104	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	FIELD	
	Aluminum (AI)-Dissolved (mg/L)	0.0027		0.0045	0.0039	0.0066	
	Antimony (Sb)-Dissolved (mg/L)	0.0174		0.00032	0.00030	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.0695		0.00282	0.00331	0.00059	
	Barium (Ba)-Dissolved (mg/L)	0.0160		0.0926	0.0772	0.0709	
	Beryllium (Be)-Dissolved (mg/L)	<0.000020		<0.000020	<0.000020	<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.00125		0.0000998	0.000103	0.0000468	
	Calcium (Ca)-Dissolved (mg/L)	185		63.5	61.1	30.2	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	0.00104		0.00040	0.00032	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.00030		0.00099	0.00083	0.00083	
	Iron (Fe)-Dissolved (mg/L)	1.39		0.043	0.021	0.018	
	Lead (Pb)-Dissolved (mg/L)	0.000639		<0.000050	<0.000050	< 0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0092		0.0011	<0.0010	<0.0010	

L1601887 CONTD.... PAGE 6 of 11 30-APR-15 17:41 (MT) Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

					Vers	ion: FINAL
	Sample ID Description Sampled Date Sampled Time Client ID	L1601887-1 Water 20-APR-15 16:35 0146-150420-001	L1601887-2 Water 20-APR-15 18:40 0146-150420-003	L1601887-3 Water 20-APR-15 08:00 0146-150420-007	L1601887-4 Water 20-APR-15 14:55 0146-150420-010	L1601887-5 Water 21-APR-15 13:10 0146-150421-008
Grouping	Analyte					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	9.68	45.8	<0.10	21.6	105
	Manganese (Mn)-Dissolved (mg/L)	0.147	5.29	<0.00010	0.255	1.48
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	0.0000068	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000448	0.000926	<0.000050	0.000372	0.000278
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00254	<0.00050	<0.00050	0.00069
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	< 0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	1.08	5.44	<0.10	2.03	5.52
	Selenium (Se)-Dissolved (mg/L)	<0.000050	0.000195	<0.000050	<0.000050	< 0.000050
	Silicon (Si)-Dissolved (mg/L)	5.41	6.02	<0.050	6.12	6.91
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.00010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.59	25.8	< 0.050	5.41	10.0
	Strontium (Sr)-Dissolved (mg/L)	0.272	0.593	<0.00020	0.361	0.785
	Sulfur (S)-Dissolved (mg/L)	8.89	196	<0.50	44.1	255
	Thallium (TI)-Dissolved (mg/L)	<0.000010	<0.000010	<0.00010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	0.00053	<0.00030	<0.00030	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.000685	0.00126	<0.000010	0.000798	0.00328
	Vanadium (V)-Dissolved (mg/L)	< 0.00050	0.00120	<0.00050	<0.00050	< 0.00050
	Zinc (Zn)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)	0.0023	0.0200	<0.0010	0.0109	0.0176

ALS ENVIRONMENTAL ANALYTICAL REPORT

L1601887 CONTD.... PAGE 7 of 11 30-APR-15 17:41 (MT) Version: FINAL

					Vers	ion: FINAL
	Sample ID Description Sampled Date Sampled Time Client ID	L1601887-6 Water 21-APR-15 11:40 0146-150421-005	L1601887-7 Water 0146-1504 - TRAVEL BLANK	L1601887-8 Water 20-APR-15 13:07 0146-150420-009	L1601887-9 Water 20-APR-15 14:25 0146-150420-011	L1601887-10 Water 20-APR-15 16:55 0146-150420-002
Grouping	Analyte					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	59.8		22.5	21.7	9.69
	Manganese (Mn)-Dissolved (mg/L)	1.41		0.232	0.249	0.148
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050	0.0000062	0.0000059
	Molybdenum (Mo)-Dissolved (mg/L)	0.000366		0.000359	0.000377	0.000441
	Nickel (Ni)-Dissolved (mg/L)	0.00214		0.00075	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	3.48		2.39	2.01	1.08
	Selenium (Se)-Dissolved (mg/L)	<0.000050		0.000069	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	6.49		6.53	6.11	5.28
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	4.57		6.03	5.43	2.65
	Strontium (Sr)-Dissolved (mg/L)	0.414		0.379	0.366	0.271
	Sulfur (S)-Dissolved (mg/L)	143		45.2	45.6	8.84
	Thallium (TI)-Dissolved (mg/L)	0.000088		<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030		< 0.00030	<0.00030	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.00379		0.000789	0.000816	0.000671
	Vanadium (V)-Dissolved (mg/L)	<0.00050		< 0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)	1.15		0.0089	0.0084	0.0026

L1601887 CONTD.... PAGE 8 of 11 30-APR-15 17:41 (MT) Version: FINAL

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Boron (B)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Cobalt (Co)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Nickel (Ni)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601887-1, -10, -2, -3, -4, -5, -6, -8, -9

Qualifiers for Individual Parameters Listed:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
5	01	•	nity". Total alkalinity is determined by potentiometric titration to a nenolphthalein alkalinity and total alkalinity values.
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
			nity". Total alkalinity is determined by potentiometric titration to a nenolphthalein 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 filte	ered (0.45 um), p	preserved with nitric acid, and analyzed by CRC	ICPMS.
Method Limitation (re:	Sulfur): Sulfide a	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 dig	ested with nitric	and hydrochloric acids, and analyzed by CRC IC	CPMS.
Method Limitation (re:	Sulfur): Sulfide a	and volatile sulfur species may not be recovered	by this method.
CL-IC-N-WR	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are a	nalyzed by Ion C	hromatography with conductivity and/or UV dete	ection.
CN-CNO-WT	Water	Cyanate	APHA 4500-CN-L
This analysis is carried method using an amm	01		vanide". Cyanate is determined by the Cyanate hydrolysis
CN-SCN-VA	Water	Thiocyanate by Colour	APHA 4500-CN CYANIDE
This analysis is carried colourimetric method.	I out using proce	dures adapted from APHA Method 4500-CN- M	"Thiocyanate" Thiocyanate is determined by the ferric nitrate

L1601887 CONTD.... PAGE 9 of 11 30-APR-15 17:41 (MT) Version: FINAL

CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
CFA)". Total or strong acio colourimetric analysis. Met	l dissociable (thod Limitatio	dures adapted from ISO Method 14403:2002 "Determin (SAD) cyanide is determined by in-line UV digestion alo n: This method is susceptible to interference from thiod s method, but it would be less than 1% and could be as	ong with sample distillation and final determination by cyanate (SCN). If SCN is present in the sample, there
CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
		dures adapted from APHA Method 4500-CN I. "Weak A sample distillation with final determination by colourime	
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out electrode.	t using proced	dures adapted from APHA Method 2510 "Conductivity".	Conductivity is determined using a conductivity
F-IC-N-WR	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analy	zed by Ion Cł	nromatography with conductivity and/or UV detection.	
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
		ss) is calculated from the sum of Calcium and Magnesic centrations are preferentially used for the hardness calc	
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered with stannous chloride, and		reserved with hydrochloric acid, then undergo a cold-ox / CVAAS or CVAFS.	idation using bromine monochloride prior to reduction
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a	cold-oxidatio	n using bromine monochloride prior to reduction with sta	annous chloride, and analyzed by CVAAS or CVAFS.
IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E
Correctness of Analysis). should be near-zero.	Because all a	ce (as % difference) are calculated based on guidance aqueous solutions are electrically neutral, the calculated	d ion balance (% difference of cations minus anions)
included where data is pre	sent. Ion Bal		ved species are used where available. Minor ions are
, , <u>-</u>		um] / [Cation Sum+Anion Sum]	
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered	l (0.45 um), p	reserved with nitric acid, and analyzed by CRC ICPMS.	
Method Limitation (re: Sulf	ur): Sulfide a	nd volatile sulfur species may not be recovered by this	method.
MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B
American Public Health As	sociation, an ection Agenc	dures adapted from "Standard Methods for the Examina d with procedures adapted from "Test Methods for Eval y (EPA). The procedure involves filtration (EPA Method PA Method 6010B).	luating Solid Waste" SW-846 published by the United
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digeste	ed with nitric a	and hydrochloric acids, and analyzed by CRC ICPMS.	
Method Limitation (re: Sulf	ur): Sulfide a	nd volatile sulfur species may not be recovered by this	method.
MET-TOT-LOW-ICP-VA	Water	Total Metals in Water by ICPOES	EPA 3005A/6010B
American Public Health As States Environmental Prot	sociation, an ection Agenc	dures adapted from "Standard Methods for the Examina d with procedures adapted from "Test Methods for Eval y (EPA). The procedures may involve preliminary samp Instrumental analysis is by inductively coupled plasma	luating Solid Waste" SW-846 published by the United ple treatment by acid digestion, using either hotblock or
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
			n J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society e levels of ammonium in seawater", Roslyn J. Waston et
NO2-L-IC-N-WR	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

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

NO3-L-IC-N-WR	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyz	zed by lon (Chromatography with conductivity and/or UV detect	tion.
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out electrode	using proc	edures adapted from APHA Method 4500-H "pH Va	alue". The pH is determined in the laboratory using a pH
It is recommended that this	s analysis b	e conducted in the field.	
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out electrode	using proc	edures adapted from APHA Method 4500-H "pH Va	alue". The pH is determined in the laboratory using a pH
It is recommended that this	s analysis b	e conducted in the field.	
S-DIS-ICP-VA	Water	Dissolved Sulfur in Water by ICPOES	EPA SW-846 3005A/6010B
American Public Health As States Environmental Prote microwave oven, or filtratio Method 6010B).	sociation, a ection Agen n (EPA Me	and with procedures adapted from "Test Methods for icy (EPA). The procedures may involve preliminary thod 3005A). Instrumental analysis is by inductivel	camination of Water and Wastewater" published by the or Evaluating Solid Waste" SW-846 published by the United y sample treatment by acid digestion, using either hotblock or ly coupled plasma - optical emission spectrophotometry (EPA or other volatile forms of sulfur that may be present in
	n lost during	the sampling, preservation and analysis process.	The data reported as total and/or dissolved sulfur represents
S-TOT-ICP-VA	Water	Total Sulfur in Water by ICPOES	EPA SW-846 3005A/6010B
microwave oven, or filtratio Method 6010B). Method Limitation: This me	n (EPA Mei ethod will n n lost during	thod 3005A). Instrumental analysis is by inductive ot give total sulfur results for all samples. Sulfide c g the sampling, preservation and analysis process.	y sample treatment by acid digestion, using either hotblock or ly coupled plasma - optical emission spectrophotometry (EPA or other volatile forms of sulfur that may be present in The data reported as total and/or dissolved sulfur represents
SO4-IC-N-WR	Water	Sulfate in Water by IC	EPA 300.1 (mod)
		Chromatography with conductivity and/or UV detect	
TDS-CALC-VA	Water	TDS (Calculated)	APHA 1030E (20TH EDITION)
This analysis is carried out	using proc	edures adapted from APHA 1030E "Checking Corr	ectness of Analyses".
TSS-MAN-WR	Water	Total Suspended Solids by Gravimetric	APHA 2540 D
This analysis is carried out		1 ,	Solids are determined gravimetrically. Total Suspended at 104 degrees celsius.
ALS test methods may inco	orporate mo	difications from specified reference methods to imp	provo porformanco
			prove performance.
The last two letters of the ab	oove test co	de(s) indicate the laboratory that performed analyti	
		de(s) indicate the laboratory that performed analyti ratory Location	
Laboratory Definition Code	e Labo		ical analysis for that test. Refer to the list below:
Laboratory Definition Code	e Labo ALS E	ratory Location	NADA
The last two letters of the ab Laboratory Definition Code WR WT VA	e Labo ALS E ALS E	ratory Location ENVIRONMENTAL - WHITEHORSE, YUKON, CAN	NADA
Laboratory Definition Code WR WT	e Labo ALS E ALS E ALS E	ratory Location ENVIRONMENTAL - WHITEHORSE, YUKON, CAN ENVIRONMENTAL - WATERLOO, ONTARIO, CAN	NADA

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.

Standard Site

Chain of Custody (COC) / Analytical Request Form

ALS) Environmental

Å.



COC Number:	14	-	
Pa	age	1	of

Report To Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests) Company: EDI Select Report Format: Ppr P Excel EDO (DIGITAL) R Report Served by 3 pm - business days) Contact: Meghan Marjanovic Quality Control (QC) Report with Report F Yes No P P P Horthy (2-4 bus. days if received by 3 pm) 50% surcharge - contact ALS to confirm TAT Address: 2195 - 2nd Avenue Criteria on Report - provide details below if box checked E Remember (1-2 bus. days if received by 3 pm) 50% surcharge - contact ALS to confirm TAT Whitehorse, YT Y1A 3T8 Select Distribution: Email 1 or Fax mmatianovic@edynamics.com E2 Same day or weekend emorgency - contact ALS to confirm TAT and surcharge Phone: 867-393-4882 Email 1 or Fax mmatianovic@edynamics.com Specify Date Required for E2, E or P:	ALS	Standard SHG	R	stody (COC) / lequest Form foll Free: 1 800 6)		L1601887	 '-CO	FC			<u></u>	1. S. W.	cod	C Num	nber: 1 Pag		of	1	
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Phone: B07-3782-4882 Envite 0 First Contract Scient Since N Data Required for E2 or P Analyse Required Involue To Same as Required Wind Contract To Contract To Same as Required Find Contract To Same as Required Pind Contract To First Same Required Pind C	Address:	2195 - 2nd Avenue		Criteria on Rep	ort - provide details bei	low if box checked		Е	[^{**}]8r	nergenc	y (1-2 b	us. days	If receiv	red by (3pm) 1	00% sun	charge	- contact	ALS to (confirm TAT
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Chain of Custody (COC) / Analytical **Request Form**

Canada Toll Free: 1 800 668 9878



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ENVIRONMENTAL DYNAMICS INC. ATTN: Meghan Marjanovic 2195 - 2nd Ave Whitehorse YT Y1A 3A2 Date Received: 21-APR-15 Report Date: 01-MAY-15 11:53 (MT) Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: L1601895 NOT SUBMITTED MOUNT NANSEN 15-Y-0146

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Can Dang Senior Account Manager

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L1601895 CONTD.... PAGE 2 of 8 01-MAY-15 11:53 (MT) Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

					Version	: FINAL
	Sample ID Description Sampled Date Sampled Time Client ID	L1601895-1 Water 21-APR-15 08:43 0146-150421-016	L1601895-2 Water 21-APR-15 08:50 0146-150421-017	L1601895-3 Water 21-APR-15 09:00 0146-150421-018	L1601895-4 Water 21-APR-15 10:30 0146-150421-019	
Grouping	Analyte					
WATER	-					
Physical Tests	Colour, True (CU)				<5.0	
	Conductivity (uS/cm)	2000	1910	1770	372	
	Hardness (as CaCO3) (mg/L)	1350	1300	1310	198	
	pH (pH)	8.12	8.09	8.13	7.66	
	Total Suspended Solids (mg/L)				7.00	
	Total Dissolved Solids (mg/L)	<3.0	3.3	<3.0	040	
	Turbidity (NTU)	1720	1700	1680	218	
Anions and	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	21.0	0.05	007	<0.10	
Nutrients		218	235	237		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	218	235	237	181	
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050		
	Chloride (Cl) (mg/L)	<2.5	<2.5	<2.5	<0.50	
	Fluoride (F) (mg/L)	0.30	0.24	0.26	0.092	
	Nitrate (as N) (mg/L)	0.106	0.079	0.096	0.135	
	Nitrite (as N) (mg/L)	DLA <0.0050	DLA <0.0050	DLA <0.0050	<0.0010	
	Sulfate (SO4) (mg/L)	1090	1080	1060	37.0	
	Anion Sum (meq/L)	27.0	27.3	26.8	4.40	
	Cation Sum (meq/L)	27.8	26.7	26.9	4.19	
	Cation - Anion Balance (%)	1.5	-1.0	0.2	-2.5	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0109	0.0112	DLA <0.0060	<0.010	
	Antimony (Sb)-Total (mg/L)	0.00338	0.00297	0.00319	<0.00050	
	Arsenic (As)-Total (mg/L)	0.0101	0.0117	0.00768	0.00043	
	Barium (Ba)-Total (mg/L)	0.0154	0.0140	0.0153	0.089	
	Beryllium (Be)-Total (mg/L)	DLA <0.000040	DLA <0.000040	DLA <0.000040		
	Bismuth (Bi)-Total (mg/L)	DLA <0.00010	DLA <0.00010	DLA <0.00010		
	Boron (B)-Total (mg/L)	DLA <0.020	DLA <0.020	DLA <0.020	<0.10	
	Cadmium (Cd)-Total (mg/L)	0.00402	0.00424	0.00362	<0.00020	
	Calcium (Ca)-Total (mg/L)	373	352	347	46.3	
	Chromium (Cr)-Total (mg/L)	DLA <0.00020	<0.00020	<0.00020	<0.0020	
	Cobalt (Co)-Total (mg/L)	<0.00020 DLA <0.00020	0.00029	<0.00020 DLA <0.00020		
	Copper (Cu)-Total (mg/L)	0.0036	0.0033	0.0028	<0.0010	
	Iron (Fe)-Total (mg/L)	0.030	0.050	0.029	<0.030	
	Lead (Pb)-Total (mg/L)	0.00025	0.00032	<0.0023 DLA <0.00010	0.00061	
	Lithium (Li)-Total (mg/L)	0.00023	0.0105	0.0104		
	Magnesium (Mg)-Total (mg/L)	97.6	95.1	95.4	20.0	
	Manganese (Mn)-Total (mg/L)	0.133	0.328	0.107	<0.0020	

L1601895 CONTD.... PAGE 3 of 8 01-MAY-15 11:53 (MT) Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

					Versio	n: FINAL
	Sample ID Description Sampled Date Sampled Time Client ID	L1601895-1 Water 21-APR-15 08:43 0146-150421-016	L1601895-2 Water 21-APR-15 08:50 0146-150421-017	L1601895-3 Water 21-APR-15 09:00 0146-150421-018	L1601895-4 Water 21-APR-15 10:30 0146-150421-019	
Grouping	Analyte					
WATER						
Total Metals	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.00020	
	Molybdenum (Mo)-Total (mg/L)	0.00014	0.00015	0.00013	<0.00020	
	Nickel (Ni)-Total (mg/L)	0.00014 DLA <0.0010	<0.00013 DLA <0.0010	<0.00013 DLA <0.0010		
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050		
	Potassium (K)-Total (mg/L)	4.35	3.96	4.12	0.92	
	Rubidium (Rb)-Total (mg/L)	0.00749	0.00701	0.00698	0.92	
	Selenium (Se)-Total (mg/L)	0.00749 DLA <0.00010	<0.00701 DLA <0.00010	0.00098 DLA <0.00010	<0.0010	
	Silicon (Si)-Total (mg/L)	4.61	4.17	4.30	<0.0010	
	Silver (Ag)-Total (mg/L)	4.01 DLA <0.000020	4.17 DLA <0.000020	4.30 DLA <0.000020		
	Sodium (Na)-Total (mg/L)	<0.000020	14.5	<0.000020	4.8	
	Strontium (Sr)-Total (mg/L)	1.32	14.3	1.28	4.0	
	Sulfur (S)-Total (mg/L)	370	355	353		
	Thallium (TI)-Total (mg/L)	0.000073	0.000069	0.000067		
	Tin (Sn)-Total (mg/L)	0.000073 _{DLA} <0.00020	0.000009 DLA <0.00020	0.000007 DLA <0.00020		
	Titanium (Ti)-Total (mg/L)	<0.00020 _{DLA} <0.00060	<0.00020 DLA <0.00060	<0.00020 DLA <0.00060		
	Uranium (U)-Total (mg/L)	0.00510	0.00488	0.00495	0.00192	
	Vanadium (V)-Total (mg/L)	0.00310 DLA <0.0010	0.00488 DLA <0.0010	0.00493 DLA <0.0010	0.00192	
	Zinc (Zn)-Total (mg/L)	0.646	0.608	0.595	<0.050	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	<0.050	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	DLA	0.0027	0.0028		
	Antimony (Sb)-Dissolved (mg/L)	<0.0020 0.00313	0.0027	0.0028		
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)	0.00771 0.0148	0.00833	0.00769 0.0149		
	Beryllium (Be)-Dissolved (mg/L)	0.0140	0.0138 DLA <0.000040	0.0149 DLA <0.000040		
	Bismuth (Bi)-Dissolved (mg/L)	DLA <0.00010	DLA	<0.000040 DLA <0.00010		
	Boron (B)-Dissolved (mg/L)	<0.00010 DLA <0.020	<0.00010 DLA <0.020	<0.00010 DLA <0.020		
	Cadmium (Cd)-Dissolved (mg/L)	0.00357	0.00416	0.00364		
	Calcium (Ca)-Dissolved (mg/L)	378	354	361		
	Chromium (Cr)-Dissolved (mg/L)	0.00020	<0.00020	<0.00020		
	Cobalt (Co)-Dissolved (mg/L)	<0.00020 _{DLA} <0.00020	0.00020	<0.00020 DLA <0.00020		
	Copper (Cu)-Dissolved (mg/L)	0.00296	0.0022	0.00293		
	Iron (Fe)-Dissolved (mg/L)	<0.00298	<0.00276	<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.010 DLA <0.00010	<0.010 DLA <0.00010	<0.010 DLA <0.00010		
	Lithium (Li)-Dissolved (mg/L)	<0.00010	0.0102	<0.00010		
	Magnesium (Mg)-Dissolved (mg/L)	99.5	101	98.5		
	J (J) (····J·-/	99.0		90.0		

ALS ENVIRONMENTAL ANALYTICAL REPORT

L1601895 CONTD.... PAGE 4 of 8 01-MAY-15 11:53 (MT)

	Sample ID Description Sampled Date Sampled Time Client ID	L1601895-1 Water 21-APR-15 08:43 0146-150421-016	L1601895-2 Water 21-APR-15 08:50 0146-150421-017	L1601895-3 Water 21-APR-15 09:00 0146-150421-018	L1601895-4 Water 21-APR-15 10:30 0146-150421-019	
Grouping	Analyte					
WATER						
WATER Dissolved Metals	Mercury (Hg)-Dissolved (mg/L) Molybdenum (Mo)-Dissolved (mg/L) Nickel (Ni)-Dissolved (mg/L) Potassium (K)-Dissolved (mg/L) Selenium (Se)-Dissolved (mg/L) Silicon (Si)-Dissolved (mg/L) Silver (Ag)-Dissolved (mg/L) Sodium (Na)-Dissolved (mg/L) Strontium (Sr)-Dissolved (mg/L) Thallium (TI)-Dissolved (mg/L) Tin (Sn)-Dissolved (mg/L) Uranium (U)-Dissolved (mg/L) Vanadium (V)-Dissolved (mg/L) Zinc (Zn)-Dissolved (mg/L)	<0.000050 0.00014 DLA <0.0050 4.43 0.00010 4.66 DLA <0.000020 15.1 1.21 358 0.000066 DLA <0.00020 DLA <0.00020 DLA <0.00000 0.00491 DLA <0.0010 0.592	<0.000050 0.0013 DLA <0.050 4.03 DLA <0.00010 4.22 DLA <0.000020 14.1 1.24 358 0.000072 DLA <0.00020 DLA <0.00060 0.00498 DLA <0.0010 0.593	<0.000050 0.00014 DLA <0.050 4.17 DLA <0.00010 4.47 DLA <0.000020 14.3 1.29 343 0.000065 DLA <0.00020 DLA <0.00060 0.00495 DLA <0.00010 0.597		

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

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Boron (B)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Chromium (Cr)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Cobalt (Co)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Lead (Pb)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Nickel (Ni)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Selenium (Se)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Silver (Ag)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Tin (Sn)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Titanium (Ti)-Dissolved	DLA	L1601895-1, -2, -3
Duplicate	Vanadium (V)-Dissolved	DLA	L1601895-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1601895-1, -2, -3
Matrix Spike	Silicon (Si)-Total	MS-B	L1601895-1, -2, -3
Matrix Spike	Sulfur (S)-Total	MS-B	L1601895-1, -2, -3
Qualifiers for Individual Paran	neters Listed:		
Qualifier Description			

DLA	Detection Limit adjusted for required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2
This analysis is carried o colourimetric method.	ut using proce	dures adapted from EPA Method 310.2 "Alkalinity".	Total Alkalinity is determined using the methyl orange
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
		dures adapted from APHA Method 2320 "Alkalinity". te and hydroxide alkalinity are calculated from pheno	Total alkalinity is determined by potentiometric titration to a lphthalein alkalinity and total alkalinity values.
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
5	01	dures adapted from APHA Method 2320 "Alkalinity". te and hydroxide alkalinity are calculated from pheno	Total alkalinity is determined by potentiometric titration to a lphthalein 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 filtere	ed (0.45 um), p	preserved with nitric acid, and analyzed by CRC ICPI	MS.
Method Limitation (re: Su	llfur): Sulfide a	and volatile sulfur species may not be recovered by the	nis method.
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are diges	ted with nitric	and hydrochloric acids, and analyzed by CRC ICPM	S.
Method Limitation (re: Su	llfur): Sulfide a	and volatile sulfur species may not be recovered by the	nis method.
CL-IC-N-WR	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are ana	lyzed by Ion C	hromatography with conductivity and/or UV detection	n.
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. APHA 2510 (B) **EC-MAN-WR** Water Conductivity by Meter This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using an electrode. 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. EPA 300.1 (mod) F-IC-N-WR Water Fluoride in Water by IC 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. Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod) HG-D-CVAA-VA Water 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. Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod) HG-T-CVAA-VA 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 Mercury in Water by CVAFS EPA 245.7 This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7). Ion Balance Calculation **IONBALANCE-VA** Water **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 meg/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 Dissolved Metals in Water by CRC ICPMS Water APHA 3030B/6020A (mod) Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method. **MET-DIS-LOW-ICP-VA** Water **Dissolved Metals in Water by ICPOES** EPA 3005A/6010B This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma optical emission spectrophotometry (EPA Method 6010B). **MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod) Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method. **MET-TOT-ICP-VA** Total Metals in Water by ICPOES EPA SW-846 3005A/6010B Water This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-LOW-ICP-VA

EPA 3005A/6010B

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

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

Total Metals in Water by ICPMS(Low)

6010B).

MET-TOT-LOW-MS-VA

Water

EPA SW-846 3005A/6020A

microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A). NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON, MONIT., 2005, 7, 37-42, RSC This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et aL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod) NO2-L-IC-N-WR Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. NO3-L-IC-N-WR Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod) Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. APHA 4500-H (B) **PH-MAN-WR** Water pH by Meter "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." PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value" This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode It is recommended that this analysis be conducted in the field. **PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode It is recommended that this analysis be conducted in the field. S-DIS-ICP-VA Water **Dissolved Sulfur in Water by ICPOES** EPA SW-846 3005A/6010B This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B). Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample. S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B). Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample. SO4-IC-N-WR Water Sulfate in Water by IC EPA 300.1 (mod) Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. APHA 1030E (20TH EDITION) Water TDS (Calculated) **TDS-CALC-VA** This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses". **TSS-MAN-WR** Water Total Suspended Solids by Gravimetric APHA 2540 D This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids are determined by filtering a sample through a glass fibre filter and drying the filter at 104 degrees celsius.

TURBIDITY-VA This analysis is carried out	Water using proce	Turbidity by Meter edures adapted from APHA N	APHA 2130 "Turbidity" Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.				
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity				
This analysis is carried out	using proce	edures adapted from APHA	Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.				
** ALS test methods may inco	orporate mo	difications from specified ref	erence methods to improve performance.				
The last two letters of the ab	ove test co	de(s) indicate the laboratory	that performed analytical analysis for that test. Refer to the list below:				
Laboratory Definition Code	e Labor	atory Location					
WR	ALS E	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA					

VA

ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

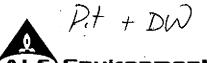
< - Less than.

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

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

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

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Chain of Custody (COC) / Analytical **Request Form**

S) Environmental

Canada Toll Free: 1 800 668 9878



COC Number: 14 -Page _____ of _____

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ALSLabWo	rk Order ##(lab use only)		ALS Contact:	Sean Sluggett	Sampler:	DH, DS, BSm	ALK-PCT-VA, PH-PCT-VA,	ANIONS-ALL-IC-WR, TSS-MAN-WR	4	MET-T-BCMDG-VA	MET-D-BCMDG-VA	TDS-CALC-VA,IONBLANCE-VA							Ż
ALS Sample #]	Sample Identificatio	on and/or Coordinates		Date	Time	Compte Turne	E E	SN SN	NH3-F-VA	8-1-1	ē	CAI		Ľ.					4
(lab use only)	(This description wi	Il appear on the report)		(dd-mmm-yy)	(hh:mm)	Sample Type	ALK	AN	Ξ	WE	Щ. М	Ĩ		Ē					
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ENVIRONMENTAL DYNAMICS INC. ATTN: Meghan Marjanovic 2195 - 2nd Ave Whitehorse YT Y1A 3T8 Date Received: 21-APR-15 Report Date: 13-MAY-15 16:22 (MT) Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: L1601926 NOT SUBMITTED MOUNT NANSEN 15-Y-0148

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Comments: The bioassay analysis was subcontracted to Nautilus Environmental Ltd in Burnaby, BC. Refer to their report appended for detail.

Can Dang Senior Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT Version: FINAL Sample ID Description Sampled Date Sampled Time **Client ID** Grouping Analyte

L1601926 CONTD.... PAGE 2 of 3 13-MAY-15 16:22 (MT)

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**		
** 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

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



ALS Environmental ATTN: Can Dang Suite 100-8081 Lougheed Hwy. Burnaby, BC V5A 1W9 Report Date: May 13, 2015 Work Order: 15343

Data Report

Species:Rainbow trout (Oncorhynchus mykiss)Protocol:EPS 1/RM/13 (Second Ed. with 2007 amendments)

Table 1.Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	96-h LC50
L1601926-1	April 20, 2015 @ N/A	>100
0146-150420-003	1 ' /	

Due to an insufficient number of viable fish, the 96-h rainbow trout toxicity testing was subcontracted to Integrated Resource Consultants. The test met performance criteria and there were no deviations from the test method. The results presented here relate only to the sample tested.

Yvonne Lam, B.Sc. Laboratory Biologist

Reviewed By: Julianna Kalocai, M.Sc., R.P.Bio QA Officer



Suite 160, 14480 River Road Richmond, BC, Canada V6V 1L4 Tel. 604-278-7714 Fax 604-278-7741 info@ircintegratedresource.com

FILE:NAUTILUS/1504135.RTL

DATE:	05 May 2015

REPORT TO: Mr. Josh Baker Nautilus Environmental 8664 Commerce Court Burnaby, B.C. V5A 4N7

REPORT ON: RAINBOW TROUT BIOASSAY RESULTS

SAMPLE DESCRIPTION:

1504135
L1601926-1 PO # 15343
N/A
20 April 2015
24 April 2015; 1425 hrs.
Grab
3 x 20 L plastic containers
Opaque, orange liquid
25 April 2015; 0915 hrs.
25 April 2015; 0915 hrs.
as greater than 100% (v/v sample).

0% trout mortality in 100% concentration.

The LC_{50} is defined as the median lethal concentration or the concentration at which there is 50% fish mortality. Results are calculated following the methods described in "Guidance Document on Statistical Methods for Environmental Toxicity Tests" EPS 1/RM/46 – March 2005 (with June 2007 amendments), using the software CETIS, ver 1.8.7E (2014).

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Rainbow Trout Holding and Testing" RTver5. This procedure follows the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" EPS 1/RM/13, Second Edition – December 2000 (with May 2007 amendments). Test volume was 16 litres with 10 fish exposed per test vessel. Aeration was by forced air through airstones at a rate of approximately 6.5 ± 1 ml/L/min. The sample was not pH adjusted or filtered prior to testing

The initial dissolved oxygen level was 8.1 mg/L at 15.0° C, the conductivity was $1282 \ \mu$ S/cm and the initial pH was 6.7. After pre-aerating the sample for 30 minutes, the dissolved oxygen level was 9.0 mg/L. As the dissolved oxygen level was greater than 70% saturation and less than 100% saturation the test was initiated at this time. The test set-up technician was DB.

Please call should you have any questions.

IRC Integrated Resource Consultants Inc.

Darcie Blackall Laboratory Biologist b003.1 enclosure

FILE:NAUTILUS/1504135.RTL

RAW DATA:

TEST	HOURS										
CONCENTRATION		0	1.0	2.0	4.0	24	48	72	96		
	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%		
	Dissolved Oxygen (mg/L)	9.0	10070	10070		9.7	10.1	9.5	9.5		
	Temperature (°C)	15.0				15.5	15.5	15.5	15.5		
100%	pH	6.8				7.9	8.0	8.0	8.0		
10070	Conductivity (µS/cm)	1285						010	1319		
	Symptoms	1	2	2	2	2	2	2	2		
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		
	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%		
	Dissolved Oxygen (mg/L)	9.6			100	9.5	10.0	9.1	9.2		
	Temperature (°C)	15.5				15.5	15.5	15.5	15.5		
50%	pH	6.8				7.5	7.7	7.6	7.6		
	Conductivity (µS/cm)	723							746		
	Symptoms	1	2	2	2	2	2	2	2		
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		
	D + C + 1	1000/	1000/	1000/	1000/	1000/	1000/	100%	100%		
	Percent Survival	100%	100%	100%	100%	100%	100%	9.0	8.9		
	Dissolved Oxygen (mg/L)	9.8				9.5	10.0	9.0	15.5		
250/	Temperature (°C)	15.5 6.8				15.5 7.2	15.5 7.3				
25%	pH			-		1.2	1.5	7.2	7.3		
	Conductivity (µS/cm)	408	2	2	2	2	2	2	420		
	Symptoms	0.38	2 0.38	2 0.38	2 0.38	0.38	0.38	0.38	0.38		
	Loading Density (g/L)	0.58	0.38	0.38	0.58	0.38	0.38	0.58	0.56		
	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%		
	Dissolved Oxygen (mg/L)	10.0				9.5	10.0	9.1	8.9		
	Temperature (°C)	15.5			100	15.5	15.5	15.5	15.5		
12.5%	pH	6.8				7.3	7.2	7.1	7.2		
	Conductivity (µS/cm)	240							249		
	Symptoms	1	1,2	1,2	1,2	1,2	1,2	1,2	1,2		
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		
	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%		
	Dissolved Oxygen (mg/L)	10.0				9.6	10.0	8.9	8.7		
	Temperature (°C)	15.5				15.5	15.5	15.5	15.5		
6.25%	pH	6.8				7.3	7.2	7.1	7.2		
	Conductivity (µS/cm)	140							147		
	Symptoms	1	1	1	1	1	1,2	1,2	1,2		
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		
	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%		
		005230027	10076	10070	10070	800700	12/12/12		1.2		
	Dissolved Oxygen (mg/L) Temperature (°C)	10.1				9.8 15.5	10.1	9.3 15.5	8.9 15.5		
CONTROL		6.9				7.5	7.3	7.3	7.3		
CONTROL	pH Conductivity (µS/cm)					1.5	1.5	1.5	42		
		40	1	1	1	1	1	1	42		
	Symptoms Loading Density (g/L)	0.38	0.38	1 0.38	1 0.38	0.38	0.38	0.38	0.38		
	Loading Density (g/L)	0.30	0.56	0.30	0.50	0.50	0.50	0.50	0.30		
	Technician	DB	DB	DB	DB	MH	RC	RC	RC		

KEY TO SYMPTOMS:

1 = no apparent effect 2 = fish showing signs of stress 3 = loss of equilibrium

FILE:NAUTILUS/1504135.RTL

TEST FISH STOCK INFORMATION:

Date received:	12 March 2015					
Source:	Aquafarms	3 JV				
Species:	Oncorhynchus mykiss (Rainbow Trout)					
Fork Length:	Mean:	41.6 mm ± 2.8 mm				
	Range:	36.0 mm – 45.0 mm				
Wet weight:	Mean:	0.62 g ± 0.15 g				
	Range:	0.38 g – 0.87 g				
Condition Factor (100xWt/length ³ cm):	0.85					

Acclimation History						
Acclimation temperature:	14.5 to 15.0 °CELSIUS					
Treatments:	None					
Water:	Dechlorinated tap water					
Feeding:	BioVita Starter #1 Crum					
Mortality:	0.08%					

RAINBOW TROUT REFERENCE TOXICANT DATA

Stock Arrival Date (y/m/d)			LC50 (mg/L)	95% Confidence Interval
13.11.21	13.12.05	Phenol	9.02	7.42 to 10.65
13.12.12	13.12.30	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	14.10	12.06 to 16.42
13.12.23	14.01.14		10.66	9.60 to 11.82
14.01.20	14.02.04	ec.	11.07	9.34 to 12.45
14.02.05	14.02.19		8.94	7.96 to 10.04
14.02.25	14.03.11	ec -	14.10	11.86 to 16.57
14.03.11	14.03.25	**	11.07	9.84 to 12.45
14.04.01	14.04.10	**	10.16	8.41 to 12.08
14.04.04	14.04.18	**	10.15	8.87 to 11.61
14.04.28	14.05.06	**	8.94	7.96 to 10.04
14.05.13	14.05.25	**	10.20	9.45 to 11.02
14.05.29	14.06.12	**	9.96	8.19 to 11.89
14.06.12	14.07.09	cc	9.02	7.42 to 10.65
14.06.24	14.07.18	**	9.58	9.14 to 10.05
14.07.16	14.08.06	ee	12.00	10.56 to 13.64
14.07.30	14.08.14	ec	10.20	9.45 to 11.02
14.08.14	14.09.09	ec.	11.57	9.40 to 13.98
14.09.01	14.09.05	cc	10.59	9.54 to 11.74
14.09.24	14.10.08	66	11.52	10.16 to 13.07
14.10.10	14.10.24	66	10.22	9.45 to 11.05
14.10.22	14.11.12	**	10.66	8.74 to 12.55
14.11.30	14.12.19	66	9.80	8.00 to 12.00
14.12.21	15.01.19	66	9.80	8.00 to 12.00
15.01.25	15.02.10	55	12.50	11.02 to 14.17
15.02.01	15.02.17	<u></u>	11.52	10.16 to 13.07
15.02.15	15.03.03	**	10.63	9.59 to 11.77
15.03.12	15.03.26		10.63	9.59 to 11.77
LAB GEOMETRIC ME	$10.82 \text{ mg/L} \pm 3.76$			
Warning Limits:	7.05 mg/L to 14.58 mg/L			

CONTROL/DILUTION WATER QUALITY: Hardness: 20 mg/L Total Residual Chlorine:

6

Nautilus Environmental

í i **BRITISH COLUMBIA** 8664 Commerce Court Burnaby British Columbia Canada VSA 4N7 Phone 604.420.8773

Chain of Custody

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As per Krysta's e	mails	· mani	nord. S	urviv	o of th	0	(Printed Name)		(Date)	(Printed Na	ame)						(Date)
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Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator



VANCOUVER

L1601926

Subcontract Request Form

Subcontract To:

NOTES: Please reference on final report ar		huimber Trout urs monitoring. (NY =	LCSO and LTSO
ALS requires QC data to be provid	led with your final result	ivo# 15	5343
Please see enclosed <u>1</u> sample(s) in	n <u>3</u> Container(s)		
SAMPLE NUMBER ANALYTICAL REQU	JIRED	DATE SAMPLED DUE DATE	Priority Flag
L1601926-1 0146-150420-003 Special Request- Na REQUEST-NL 14)	utilus Environmental (SPEC)	4/ 20/ 2015 AL 4/29/2015	e.
Analysis and reporting info contact: Can Da 8081 LG SUITE BURNA	DUGHEED HWY	Email:can.dang@alsglobal.	com
Please email confirmation of receipt to: Shipped By:	can.dang@alsg Date Shipped: <u>AMAM0</u> Bate Received:	APRIL 24/2 Apr 24/15 @ 11	:05
Verified By:	Date Verified: Temperature:	6.2 (2x20L) 8.4 (1×20L) blue jug.	

Subcontracted to IRC



Chain of Custody (COC) / Analytical **Request Form**

Canada Toll Free: 1 800 668 9878



COC Number: 14 -

Page (____

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Report To		Report Format + bw (Rush Turnaround Time (TAT) is n					is not a	ivailable	for all te	sts)								
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Address:	2195 - 2nd Avenue	Criteri:	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 D	Distribution:	MATL 🗌 MATL	🔲 FAX	E2	2 Same day or weekend emergency - contact ALS to confirm TAT and surcharge											
Phone:	867-393-4882	Email 1	Email 1 or Fax mmarlanovic@edynamics.com				ify Dat	e Req	uired fo	or E2,E	or P;	Ĩ						
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(lab use only)	(This description will appear on	the report)	(dd-mmm-yy)	(hh:mm)	Sample Type	Rainbow	Rainbow											
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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NA-FM-03254 v09 Front Q4 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.



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
materia de activita de la 1274 - Ang	a a state a state state and a state of the s
Contact Information · Coordo	nnées de la personne ressource
Personne ressource Maghan Mariana	Phone 867-3913 488 2
Mailing address)195 second Aug	Fax Jog Lick
	Postal code
Whitehouse YT VIA 378	Code postal 9 LIT 518
First Nation, Municipal or Business Name Nom de la Première nation, de la municipalité ou de l'entreprise	EDI (Environmentel Dynamice inc
Agent	Fax Télécopieur
Agent	
Sampling Location · Lie	u de la prise d'échantillon
Municipal Address Adresse municipale WQ - PW	Subdivision Lotissement
Legal Description Lot Quad	Plan no.
Désignation officielle Lot Quadrilatère Other Information (e.g., Location, Business / Building Name) Autres renseignements (ex. : emplacement, nom de l'entreprise, n	M 1 MAISTAL
Sample Collection / Pré	lèvement de l'échantillon
Sample Collected By BP, DS, JM Échantillon prélevé par	Date <u>IS 04 21</u> YY/MM/DD · AA/MM/JJ
Sampling Site (e.g., kitchen tap) Point d'échantillonnage (ex. : robinet de cuisine) Is this a Resample from a Previous Test? Yes	No Previous Sample Number
Est-ce un deuxième échantillon d'un test antérieur?	Non Numéro de l'échantillon précédent
Sample Supply / Source of	l'approvisionnement en eau
Public Supply Municipal – par canalisation Bulk Water Distributor Municipal – par canalisation	Business Privé – entreprise Privé – résidence
Sample Source / Prov	venance de l'échantillon
Dug Well Driven Well Puits trebulaire	Drilled Well Depth of Well Puits foré à la sondeuse Profondeur du puits
Water Holding Tank Other (explain) Réservoir d'eau Autre (précisez)	
Water Treatment /	Traitement de l'eau
Is the Water Chlorinated? Yes No	Free Available Chlorine ppm
L'eau contient-elle du chlore? Oui Non	Chlore libre disponiblemg/L
Other Treatment Systems (e.g., UV, softener, filter) Autre dispositif de traitement (ex. : désinfection aux rayons UV, adoucis	sseur d'eau, filtre)
For Laboratory Uso Ophy / À /	'usage du laboratoire seulement
Receipt of Sample Réception de l'échantilion Date 5/04/22	Time 8 3D and By W
Condition of Sample Satisfactory Unsatisfac État de l'échantillon Satisfactory Unsatisfac	
Incubation Date 15-04-22	Time 945 m By Sk Incubator 4
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Results (See Reverse Side fo Résultats (Voir au verso l'in	
Total Coliforms/Coliformes totaux	E. coli/E. coli
Present / Présence	Present / Présence
Comments/ Amail MMarjanovik@ady	Commentaires
	osition WLT. Date 15-04-23 Date YY/MM/DD - AA/MM/JJ
Distribution: White - Chain of Custody Distribution Blanc - Chaîne de possession	Yellow - Lab Copy Pink - Client Copy n Jaune - Laboratoire Rose - Client
	Sample Number - 62720