



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

Date Received: 20-APR-16
Report Date: 04-MAY-16 12:41 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1758238
Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 16Y0089
C of C Numbers: 1
Legal Site Desc:

Can Dang
Senior Account Manager

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ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L1758238-1	Water	20-APR-16	11:55	WQ-PW
WATER						
Physical Tests	Colour, True (CU)					<5.0
	Conductivity (uS/cm)					378
	Hardness (as CaCO3) (mg/L)					195
	pH (pH)					7.83
	Total Dissolved Solids (mg/L)					217
	Turbidity (NTU)					0.11
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)					182
	Chloride (Cl) (mg/L)					<0.50
	Fluoride (F) (mg/L)					0.110
	Nitrate (as N) (mg/L)					0.114
	Nitrite (as N) (mg/L)					<0.0010
	Sulfate (SO4) (mg/L)					36.3
	Anion Sum (meq/L)					4.41
	Cation Sum (meq/L)					4.14
	Cation - Anion Balance (%)					-3.1
Total Metals	Aluminum (Al)-Total (mg/L)					<0.010
	Antimony (Sb)-Total (mg/L)					<0.00050
	Arsenic (As)-Total (mg/L)					0.00036
	Barium (Ba)-Total (mg/L)					0.087
	Boron (B)-Total (mg/L)					<0.10
	Cadmium (Cd)-Total (mg/L)					<0.00020
	Calcium (Ca)-Total (mg/L)					44.7
	Chromium (Cr)-Total (mg/L)					<0.0020
	Copper (Cu)-Total (mg/L)					<0.0010
	Iron (Fe)-Total (mg/L)					<0.030
	Lead (Pb)-Total (mg/L)					0.00055
	Magnesium (Mg)-Total (mg/L)					20.2
	Manganese (Mn)-Total (mg/L)					<0.0020
	Mercury (Hg)-Total (mg/L)					<0.00020
	Potassium (K)-Total (mg/L)					0.88
	Selenium (Se)-Total (mg/L)					<0.0010
	Sodium (Na)-Total (mg/L)					5.1
	Uranium (U)-Total (mg/L)					0.00180
	Zinc (Zn)-Total (mg/L)					<0.050

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Antimony (Sb)-Total	DLA	L1758238-1
Duplicate	Lead (Pb)-Total	DLA	L1758238-1
Duplicate	Selenium (Se)-Total	DLA	L1758238-1
Matrix Spike	Copper (Cu)-Total	MS-B	L1758238-1

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-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
CL-IC-N-WR	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
COLOUR-TRUE-VA	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.			
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
F-IC-N-WR	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-TOT-CVAFS-VA	Water	Total Hg in Water by CVAFS LOR=50ppt	EPA 1631E (mod)
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).			
IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			
Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:			
Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			

Reference Information

NO2-L-IC-N-WR	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-L-IC-N-WR	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
SO4-IC-N-WR	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
TDS-CALC-VA	Water	TDS (Calculated)	APHA 1030E (20TH EDITION)
This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses".			
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			

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

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

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

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 688 9878

www.alsglobal.com



COC Number: 14 -

Page ____ of ____

Report To				Report Format / D				Rush Turnaround Time (TAT) is not available for all tests)							
Company: EDI				Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)				R <input checked="" type="checkbox"/> Regular (standard TAT received by 3 pm - business days)							
Contact: Meghan Marjanovic				Quality Control (QC) Report with Report <input type="checkbox"/> Yes <input type="checkbox"/> No				P <input type="checkbox"/> Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT							
Address: 2195 - 2nd Avenue				<input type="checkbox"/> Criteria on Report - provide details below if box checked				E Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT							
Whitehorse, YT Y1A 3T8				Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				E2 <input type="checkbox"/> Same day or weekend emergency - contact ALS to confirm TAT and surcharge							
Phone: 867-393-4882				Email 1 or Fax <u>mmarianovic@edynamics.com</u>				Specify Date Required for E2, E or P:							
				Email 2 <u>Emilie.Hamm@gov.yk.ca</u>											
				Email 3 <u>erik.pit@gov.yk.ca</u>											
Invoice To				Invoice Distribution				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below							
Same as Report To <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX											
Copy of Invoice with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No															
Company: EDI				Email 1 or Fax <u>sjenner@edynamics.com</u>											
Contact: S Jenner				Email 2 <u>mmarianovic@edynamics.com</u>											
Project Information				Oil and Gas Required Fields (client use)											
ALS Quote #: <u>Q49372</u>				Approver ID: _____ Cost Center: _____				FULL-TOT-DW-WR							
Job #: <u>MOUNT NANSEN 15-Y-0146 1640089</u>				GL Account: _____ Routing Code: _____											
PO / AFE: _____				Activity Code: _____											
LSD: _____				Location: _____											
ALS Lab Work Order #: (lab use only)				ALS Contact: Sean Sluggett											
				Sampler: _____											
Number of Containers															
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mm-yy)		Time (hh:mm)						Sample Type			
	WQ - PW			20 - Jan-16		11:55						Water		R	
Drinking Water (DW) Samples ¹ (client use)				Special Instructions / Specify Criteria to add on report (client Use)											
Are samples taken from a Regulated DW System?															
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No															
Are samples for human drinking water use?															
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No															
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)							
Released by: <u>SCOTT DILLING</u>				Received by: <u>Jenny May</u>				Received by: <u>Jan</u>							
Date: <u>20-APR-2016</u>				Date: <u>Apr 20 15:55</u>				Date: <u>11 Apr 2016</u>							
Time: <u>15:55</u>				Time: <u>3:51pm</u>				Time: <u>15:35</u>							