

ENVIRONMENTAL DYNAMICS INC.

ATTN: Meghan Marjanovic

2195 - 2nd Ave

Whitehorse YT Y1A 3T8

Date Received: 07-MAY-15

Report Date: 14-MAY-15 15:35 (MT)

Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1608687

Project P.O. #: NOT SUBMITTED

Job Reference: MOUNT NANSEN 15-Y-0146

C of C Numbers: 1

Legal Site Desc:

Can Dang

Senior Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



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ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL

			 	 version	: FINA
	Sample ID Description Sampled Date Sampled Time Client ID	L1608687-1 Water 06-MAY-15 14:20 0146-150506-041			
Grouping	Analyte				
WATER	,				
Physical Tests	Colour, True (CU)	<5.0			
	Conductivity (uS/cm)	377			
	Hardness (as CaCO3) (mg/L)	196			
	pH (pH)	7.66			
	Total Dissolved Solids (mg/L)	214			
	Turbidity (NTU)	0.17			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	177			
	Chloride (CI) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	0.094			
	Nitrate (as N) (mg/L)	0.137			
	Nitrite (as N) (mg/L)	<0.0010			
	Sulfate (SO4) (mg/L)	35.4			
	Anion Sum (meq/L)	4.28			
	Cation Sum (meq/L)	4.20			
	Cation - Anion Balance (%)	-0.9			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.010			
	Antimony (Sb)-Total (mg/L)	<0.00050			
	Arsenic (As)-Total (mg/L)	0.00038			
	Barium (Ba)-Total (mg/L)	0.088			
	Boron (B)-Total (mg/L)	<0.10			
	Cadmium (Cd)-Total (mg/L)	<0.00020			
	Calcium (Ca)-Total (mg/L)	45.5			
	Chromium (Cr)-Total (mg/L)	<0.0020			
	Copper (Cu)-Total (mg/L)	<0.0010			
	Iron (Fe)-Total (mg/L)	<0.030			
	Lead (Pb)-Total (mg/L)	0.00062			
	Magnesium (Mg)-Total (mg/L)	20.1			
	Manganese (Mn)-Total (mg/L)	<0.0020			
	Mercury (Hg)-Total (mg/L)	<0.00020			
	Potassium (K)-Total (mg/L)	0.98			
	Selenium (Se)-Total (mg/L)	<0.0010			
	Sodium (Na)-Total (mg/L)	5.7			
	Uranium (U)-Total (mg/L)	0.00190			
	Zinc (Zn)-Total (mg/L)	<0.050			

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

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Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L1608687-1

Qualifiers for Individual Parameters Listed:

Qualifier Description

MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

ALK-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.

CI -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-MAN-WR Water Conductivity by Meter APHA 2510 (B)

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using an 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 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).

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-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).

MET-TOT-LOW-MS-VA Water Total Metals in Water by ICPMS(Low) EPA SW-846 3005A/6020A

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 - mass spectrometry (EPA Method 6020A).

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)

Reference Information

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

PH-MAN-WR Water pH by Meter APHA 4500-H (B)

"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."

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 analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

WR ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA

VA ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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

ALS Environmental

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1608687-COFC

COC Number: 14 -

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www.alsglobal.com Select Service Level Below (Rush Tumaround Time (TAT) is not available for all tests) Report Format / Distribution Report To Regular (Standard TAT if received by 3 pm - business days) Select Report Format: 7 PDF **▼** EXCEL EDD (DIGITAL) EDI Company: □ No Priority (2-4 bus, days if received by 3pm) 50% surcharge - contact ALS to confirm TAT Quality Control (QC) Report with Report [Yes Meghan Marjanovic Contact: F Emergency (1-2 bus, days if received by 3pm) 100% surcharge - contact ALS to confirm TAT 2195 - 2nd Avenue Criteria on Report - provide details below if box checked Address: ☐ MAIL ☐ FAX E2 Same day or weekend emergency - contact ALS to confirm TAT and surcharge Select Distribution: ☐ EMAIL Whitehorse, YT Y1A 3T8 Email 1 or Fax mmarjanovic@edynamics.com Specify Date Required for E2,E or P: Phone: 867-393-4882 **Analysis Request** Email 2 Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below ▼ Yes / 🎵 No Invoice Distribution Same as Report To Invoice To FAX Select Invoice Distribution: VEMAIL MAIL F/P ☑ Yes 🍱 No Copy of Invoice with Report Email 1 or Fax sienner@edynamics.com Company: mmarjanovic@edynamics.com Email 2 Contact: S Jenner Containers ALK-PCT-VA,PH-PCT-VA,EC-PCT-VA Oil and Gas Required Fields (client use) ANIONS-ALL-IC-WR,TSS-MAN-WR **Project Information** Cost Center: TDS-CALC-VA,IONBLANCE-VA Q49311 and Q49312 Approver ID: ALS Quote #: Routing Code: GL Account: MOUNT NANSEN 15-Y-0146 Job#: ਰ Activity Code: PO / AFE: MET-D-BCMDG-VA FULL-TOT-DW-WR Location: LSD: DH. DS. BP ALS Contact: Sean Sluggett Sampler: AH3-F-VA Date Time Sample Identification and/or Coordinates Sample Type (This description will appear on the report) (dd-mmm-yy) (hh:mm) R R 6 - May - 15 Water R R R R 0146-150 R R R .R R 6 Water R - May - 15 0146-1505 -- May - 15 Water R R R R R R 6 0146-150 R ∩G- May - 15 Water .3 0146-150**5**0% 04/ 14:20 Special Instructions / Specify Criteria to add on report (client Use) Drinking Water (DW) Samples¹ (client use) Are samples taken from a Regulated DW System? ☐ Yes □ No Are samples for human drinking water use? ☐ Yes I No INTERACES THE MENTIRE GERMON ((aby second)) SHIPMENT RELEASE (client use) Time: Released by: Brettlega ca 09:45 7Mau 2015 REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION