

ECOLOGICAL LOGISTICS & RESEARCH LTD.

ATTN: Chris Jastrebski 204 - 105 Titanium Way Whitehorse YT Y1A 0E7 Date Received: 25-SEP-15

Report Date: 06-OCT-15 11:36 (MT)

Version: FINAL

Client Phone: 867-668-6386

Certificate of Analysis

Lab Work Order #: L1678817
Project P.O. #: NOT SUBMITTED

Job Reference: 15-210

C of C Numbers:

Legal Site Desc:

Jame Lo, B.Sc. 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

Sample ID Description Sampled Date Sampled Time Client ID		L1678817-1 Water 22-SEP-15 11:30 HLB	L1678817-2 Water 22-SEP-15 11:04 CC1	L1678817-3 Water 22-SEP-15 10:30 CC2	L1678817-4 Water 22-SEP-15 10:14 CC3	L1678817-5 Water 22-SEP-15 09:54 WC
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	288	295	454	443	379
	pH (pH)	7.81	8.11	7.99	8.01	8.14
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	5.3
Total Metals	Aluminum (Al)-Total (mg/L)	0.0518	0.0490	0.0321	0.0638	0.196
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	0.00053	0.00057	0.00073
	Arsenic (As)-Total (mg/L)	0.00080	0.00079	0.00125	0.00131	0.00121
	Barium (Ba)-Total (mg/L)	0.057	0.058	0.054	0.055	0.061
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	0.0000391	0.0000419	0.0000652	0.0000565	0.0000203
	Calcium (Ca)-Total (mg/L)	64.6	65.8	86.0	82.7	68.1
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0012
	Cobalt (Co)-Total (mg/L)	0.00045	0.00037	0.00081	0.00077	0.00035
	Copper (Cu)-Total (mg/L)	0.0028	0.0027	0.0021	0.0022	0.0022
	Iron (Fe)-Total (mg/L)	0.279	0.273	0.370	0.406	0.574
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	0.0034	0.0035	0.0113	0.0101	0.0046
	Magnesium (Mg)-Total (mg/L)	30.6	31.7	58.2	57.5	50.8
	Manganese (Mn)-Total (mg/L)	0.249	0.181	0.179	0.173	0.100
	Mercury (Hg)-Total (mg/L)	0.0000056	<0.0000050	<0.0000050	<0.000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.0013	0.0013	0.0017	0.0016	0.0012
	Nickel (Ni)-Total (mg/L)	0.0048	0.0051	0.0174	0.0168	0.0093
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	0.00162	0.00163	0.00157	0.00141	0.00104
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Total (mg/L)	2.9	3.0	4.5	4.5	4.5
	Thallium (TI)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	0.011
	Uranium (U)-Total (mg/L)	0.00203	0.00209	0.00236	0.00255	0.00313
	Vanadium (V)-Total (mg/L)	0.00075	0.00069	0.00065	0.00084	0.00127
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

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

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Reference Information

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QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)	
Duplicate	Antimony (Sb)-Total	DLB	L1678817-1, -2, -3, -4, -5	
Matrix Spike	Nickel (Ni)-Total	MS-B	L1678817-1, -2, -3, -4, -5	
Matrix Spike	Uranium (U)-Total	MS-B	L1678817-1, -2, -3, -4, -5	

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
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**
HAPDNESS-CALC-VA	Water.	Hardness	ΔΡΗΔ 23/10Β

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-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

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).

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.

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.

** 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:

Reference Information

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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.

) Environmental

Chain of Custody (COC) / Analytical Request Form

COC Number: 14 -

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Report To			Report Format / Distribution					w (Rush Turnaround Time (TAT) is not available for all tests)											
Company:	Ecological Logistics & Research Ltd.	Select Report	Select Report Format: PDF PEXCEL PEDD (DIGITAL)				R Regular (Standard TAT if received by 3 pm - business days)												
Contact: Chris Jastrebski			l (QC) Report with R	Report ⊡ Ye	s ENo	P Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT													
Address: 204-105 Titanium Way			oort - provide details belo	w if box checked		Emergency (1-2 bus, days if received by 3pm) 100% surcharge - contact ALS to confirm TAT													
Whitehorse, YT Y1A 0E7 Select Dis			ition: ZEMA	IL MAIL	□ FAX	E2Same day or weekend emergency - contact ALS to confirm TAT and surcharge													
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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.

Chris Tas Meduk

9:30