



ALS ENVIRONMENTAL - Whitehorse  
ATTN: Helen Franco  
13A - 151 Industrial Road  
Whitehorse YT Y1A 2V3

Date Received: 16-NOV-15  
Report Date: 17-NOV-15 17:01 (MT)  
Version: FINAL

Client Phone: 867-686-6689

## Certificate of Analysis

Lab Work Order #: L1702587  
Project P.O. #: NOT SUBMITTED  
Job Reference:  
C of C Numbers:  
Legal Site Desc:

Selam Worku  
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  
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## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1702587-1 ALS METALS TB							
Sampled By: CLIENT							
Matrix: Water							
<b>Total Metals in Water + Hg (BC MDG)</b>							
<b>Hardness</b>							
Hardness (as CaCO3)	<0.50		0.50	mg/L		17-NOV-15	
<b>Total Be (Low) in Water by CRC ICPMS</b>							
Beryllium (Be)-Total	<0.000020		0.000020	mg/L		17-NOV-15	R3312617
<b>Total Metals in Water by CRC ICPMS</b>							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		17-NOV-15	R3312617
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		17-NOV-15	R3312617
Arsenic (As)-Total	<0.00010		0.00010	mg/L		17-NOV-15	R3312617
Barium (Ba)-Total	<0.000050		0.000050	mg/L		17-NOV-15	R3312617
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		17-NOV-15	R3312617
Boron (B)-Total	<0.010		0.010	mg/L		17-NOV-15	R3312617
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L		17-NOV-15	R3312617
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		17-NOV-15	R3312617
Cobalt (Co)-Total	<0.00010		0.00010	mg/L		17-NOV-15	R3312617
Copper (Cu)-Total	<0.00050		0.00050	mg/L		17-NOV-15	R3312617
Lead (Pb)-Total	<0.000050		0.000050	mg/L		17-NOV-15	R3312617
Lithium (Li)-Total	<0.0010		0.0010	mg/L		17-NOV-15	R3312617
Manganese (Mn)-Total	<0.00010		0.00010	mg/L		17-NOV-15	R3312617
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L		17-NOV-15	R3312617
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		17-NOV-15	R3312617
Selenium (Se)-Total	<0.000050		0.000050	mg/L		17-NOV-15	R3312617
Silver (Ag)-Total	<0.000010		0.000010	mg/L		17-NOV-15	R3312617
Sodium (Na)-Total	<0.050		0.050	mg/L		17-NOV-15	R3312617
Strontium (Sr)-Total	<0.00020		0.00020	mg/L		17-NOV-15	R3312617
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		17-NOV-15	R3312617
Tin (Sn)-Total	<0.00010		0.00010	mg/L		17-NOV-15	R3312617
Titanium (Ti)-Total	<0.00030		0.00030	mg/L		17-NOV-15	R3312617
Uranium (U)-Total	<0.000010		0.000010	mg/L		17-NOV-15	R3312617
Vanadium (V)-Total	<0.00050		0.00050	mg/L		17-NOV-15	R3312617
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		17-NOV-15	R3312617
Zirconium (Zr)-Total	<0.00030		0.00030	mg/L		17-NOV-15	R3312617
<b>Total Metals in Water by ICPOES</b>							
Calcium (Ca)-Total	<0.050		0.050	mg/L		16-NOV-15	R3312656
Iron (Fe)-Total	<0.010		0.010	mg/L		16-NOV-15	R3312656
Magnesium (Mg)-Total	<0.10		0.10	mg/L		16-NOV-15	R3312656
Phosphorus (P)-Total	<0.050		0.050	mg/L		16-NOV-15	R3312656
Potassium (K)-Total	<0.10		0.10	mg/L		16-NOV-15	R3312656
Silicon (Si)-Total	<0.050		0.050	mg/L		16-NOV-15	R3312656
<b>Total Sulfur in Water by ICPOES</b>							
Sulfur (S)-Total	<0.50		0.50	mg/L		16-NOV-15	R3312656

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## Reference Information

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
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 CaCO <sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
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-LOW-ICP-VA	Water	Total 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 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).			
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.			

\*\* 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:	

### GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

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

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.

## Walter Lin

**From:** Walter Lin  
**Sent:** Monday, November 16, 2015 10:41 AM  
**To:** Sean Sluggett; Brent Mack; ALSEV Login Rush  
**Cc:** ALSEV Metals Rush  
**Subject:** RE: Metals Travel Blank

Hi Sean,

When are we expecting the sample?

Thanks,  
Walter



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**From:** Sean Sluggett  
**Sent:** Monday, November 16, 2015 9:17 AM  
**To:** Brent Mack; ALSEV Login Rush  
**Cc:** ALSEV Metals Rush  
**Subject:** RE: Metals Travel Blank

Hello – please label this as L1702587 when the sample arrives.

Thanks!

Sean.

**Sean Sluggett**

Lead Chemist / Supervisor

ALS Life Sciences Division | Environmental

SAMPLE CONDITION AS RECEIVED (lab use only)									
Frozen	<input type="checkbox"/>			SIF Observations	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	
Ice packs	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Custody seal intact	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Cooling Initiated	<input checked="" type="checkbox"/>								
INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C				
2.5					4 4 3				
FINAL SHIPMENT RECEPTION (lab use only)									
Received by: <i>Sean</i>				Date: <b>NOV 16 2015</b>		Time: <b>9:53</b>			

1 - CLIENT COPY

1 page of the white - report copy.

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**From:** Brent Mack  
**Sent:** Monday, November 16, 2015 9:13 AM  
**To:** Sean Sluggett; ALSEV Login Rush  
**Cc:** ALSEV Metals Rush  
**Subject:** RE: Metals Travel Blank

Pretty sure....if you want data reported to ALS Whitehorse you should have an account and log this guy in. How do you normally do your water checks?

Brent