



FIRST NATION HEALTH AUTHORITY  
ATTN: Linda Pillsworth  
Environmental Public Health Services  
404 - 11138 Melville Street  
Vancouver BC V6E 4S5

Date Received: 20-AUG-14  
Report Date: 25-AUG-14 12:43 (MT)  
Version: FINAL

Client Phone: 604-666-6943

## Certificate of Analysis

Lab Work Order #: L1505297  
Project P.O. #: PENDING  
Job Reference: FNHA FISH SAMPLING  
C of C Numbers: 10-268943  
Legal Site Desc:

Can Dang  
Senior Account Manager

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# ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1505297-1 WATER 19-AUG-14 10:20 1 FRASER R- GANG RANCH B(BIG ROCK)	L1505297-2 WATER 19-AUG-14 14:45 1 FRASER R- RUDY JOHNSON B		
Grouping	Analyte				
<b>WATER</b>					
<b>Physical Tests</b>	Colour, True (CU)	<5.0	5.4		
	Conductivity (uS/cm)	112	116		
	Hardness (as CaCO3) (mg/L)	59.5	64.7		
	pH (pH)	8.00	8.00		
	Total Suspended Solids (mg/L)	45.5	95.4		
	Total Dissolved Solids (mg/L)	76	76		
	Turbidity (NTU)	29.8	43.4		
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO3) (mg/L)	48.8	49.7		
	Chloride (Cl) (mg/L)	0.57	0.60		
	Fluoride (F) (mg/L)	0.035	0.033		
	Nitrate (as N) (mg/L)	0.0331	0.0395		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010		
	Phosphorus (P)-Total (mg/L)	0.0458	0.0599		
	Sulfate (SO4) (mg/L)	8.84	8.57		
<b>Organic / Inorganic Carbon</b>	Total Organic Carbon (mg/L)	2.60	2.96		
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	1.61	2.09		
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	0.00081	0.00099		
	Barium (Ba)-Total (mg/L)	0.028	0.033		
	Beryllium (Be)-Total (mg/L)	<0.0050	<0.0050		
	Bismuth (Bi)-Total (mg/L)	<0.20	<0.20		
	Boron (B)-Total (mg/L)	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020		
	Calcium (Ca)-Total (mg/L)	17.2	18.6		
	Chromium (Cr)-Total (mg/L)	0.0025	0.0040		
	Cobalt (Co)-Total (mg/L)	<0.010	<0.010		
	Copper (Cu)-Total (mg/L)	0.0037	0.0049		
	Iron (Fe)-Total (mg/L)	2.31	3.30		
	Lead (Pb)-Total (mg/L)	0.00085	0.00128		
	Lithium (Li)-Total (mg/L)	<0.010	<0.010		
	Magnesium (Mg)-Total (mg/L)	4.01	4.46		
	Manganese (Mn)-Total (mg/L)	0.0521	0.0671		
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020		
	Molybdenum (Mo)-Total (mg/L)	<0.030	<0.030		
	Nickel (Ni)-Total (mg/L)	<0.050	<0.050		
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30		

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1505297-1 WATER 19-AUG-14 10:20 1 FRASER R- GANG RANCH B(BIG ROCK)	L1505297-2 WATER 19-AUG-14 14:45 1 FRASER R- RUDY JOHNSON B		
Grouping	Analyte				
<b>WATER</b>					
<b>Total Metals</b>	Potassium (K)-Total (mg/L)	0.85	0.93		
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010		
	Silicon (Si)-Total (mg/L)	4.98	5.77		
	Silver (Ag)-Total (mg/L)	<0.010	<0.010		
	Sodium (Na)-Total (mg/L)	2.3	2.3		
	Strontium (Sr)-Total (mg/L)	0.0913	0.0983		
	Thallium (Tl)-Total (mg/L)	<0.20	<0.20		
	Tin (Sn)-Total (mg/L)	<0.030	<0.030		
	Titanium (Ti)-Total (mg/L)	0.079	0.103		
	Uranium (U)-Total (mg/L)	0.00026	0.00029		
	Vanadium (V)-Total (mg/L)	<0.030	<0.030		
	Zinc (Zn)-Total (mg/L)	0.0070	0.0103		

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

## Reference Information

### Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass container with HCl preservative. Results may be biased low.

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Nitrite (as N)	DLM	L1505297-1, -2
Duplicate	Nitrate (as N)	DLM	L1505297-1, -2
Matrix Spike	Phosphorus (P)-Total	MS-B	L1505297-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L1505297-1, -2
Matrix Spike	Total Organic Carbon	MS-B	L1505297-1, -2

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects.
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**
<b>ALK-COL-VA</b>	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.			
<b>ANIONS-CL-IC-VA</b>	Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
<b>ANIONS-F-IC-VA</b>	Water	Fluoride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
<b>ANIONS-NO2-IC-VA</b>	Water	Nitrite in Water by Ion Chromatography	EPA 300.0
This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrite is detected by UV absorbance.			
<b>ANIONS-NO3-IC-VA</b>	Water	Nitrate in Water by Ion Chromatography	EPA 300.0
This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrate is detected by UV absorbance.			
<b>ANIONS-SO4-IC-VA</b>	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>COLOUR-TRUE-VA</b>	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. Apparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit.			
<b>EC-PCT-VA</b>	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.			
<b>HARDNESS-CALC-VA</b>	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.			
<b>HG-TOT-CVAFS-VA</b>	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).			

## Reference Information

**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).

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

**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.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TSS-VA** Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

**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.

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\*\* 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:*

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

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Chain of Custody Numbers:

10-268943

## Reference Information

### 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 ww* - 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 / Analytical Request Form  
 Canada Toll Free: 1 800 668 9878  
 www.alsglobal.com

<b>Report To</b>	<b>Report Format / Distribution</b>	<b>Service Request:</b> (Rush subject to availability - Contact ALS to confirm TAT)
Company: <i>First Nations Health Authority</i>	Standard: <input checked="" type="checkbox"/> Other (specify):	Regular (Standard Turnaround Times - Business Days)
Contact: <i>Linda Pillsworth</i>	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital Fax	<input checked="" type="checkbox"/> Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
Address: <i>404-1138 Melville St. VanCouver, BC V6E 4S3</i>	Email 1: <i>linda.pillsworth@fnha.ca</i>	Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
Phone: <i>604-697-6962</i> Fax: <i>604-666-3356</i>	Email 2: <i>environmental.health@fnha.ca</i> <i>patti.joyce@fnha.ca</i>	Same Day or Weekend Emergency - Contact ALS to confirm TAT

<b>Invoice To</b> Same as Report ? (circle) <input checked="" type="checkbox"/> Yes or No (if No, provide details)	<b>Client / Project Information</b>	<b>Analysis Request</b> ( Indicate Filtered or Preserved, F/P )																			
Copy of Invoice with Report? (circle) <input checked="" type="checkbox"/> Yes or No	Job #: <i>FNHA Fish Sampling</i>	SEE ATTACHED																			
Company:	PO / AFE: <i>pending</i>																				
Contact:	LSD:																				
Address:	Quote #:																				
Phone:	ALS Contact: <i>Can Dang</i>	Sampler: <i>Patti Joyce</i>	Physical etc.	Metals	TOC																Number of Containers

Sample #	Sample Description (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Physical etc.	Metals	TOC															Number of Containers
①	<i>Fraser R- Gang Ranch B. (Big Rock)</i>	<i>19-Aug-14</i>	<i>10:20<sup>am</sup></i>	<i>Water</i>	<i>1</i>	<i>1</i>	<i>1</i>															<i>3</i>
②	<i>Fraser R- Rudy Johnson B.</i>	<i>19-Aug-14</i>	<i>2:45<sup>pm</sup></i>	<i>water</i>	<i>1</i>	<i>1</i>	<i>1</i>															<i>3</i>

**RUSH**  
 Priority processing

Special Instructions / Regulation with water or land use (CCME - Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

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.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: <i>[Signature]</i>	Date: <i>Aug 19/14</i>	Time: <i>4:05pm</i>	Received by: <i>PAVL</i>	Date: <i>AUG 20</i>	Time: <i>9:45</i>	Temperature: <i>1 °C</i>	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF