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Date Received: 26-JUN-14  
Report Date: 08-JUL-14 16:54 (MT)  
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Client Phone: --

## Certificate of Analysis

**Lab Work Order #:** L1477673  
**Project P.O. #:** NOT SUBMITTED  
**Job Reference:** 1343-005.02  
**C of C Numbers:** 1  
**Legal Site Desc:**

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Brent Mack  
Account Manager

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1477673-1	L1477673-2	L1477673-3		
		Description	Water	Water	Water		
		Sampled Date	24-JUN-14	24-JUN-14	24-JUN-14		
		Sampled Time	14:23	15:22	13:15		
		Client ID	P03-06-02	P03-06-01	P03-06-06		
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Conductivity (uS/cm)		4730	4760	17300		
	Hardness (as CaCO3) (mg/L)		1930	2130	12200		
	pH (pH)		5.26	5.06	3.89		
	Total Suspended Solids (mg/L)		870	47.8	6360		
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)		1470	1360	7360		
	Alkalinity, Total (as CaCO3) (mg/L)		<1.0	16.5	<1.0		
	Chloride (Cl) (mg/L)		<10	<10	<25		
	Sulfate (SO4) (mg/L)		4060	4020	20100		
	Anion Sum (meq/L)		84.5	84.1	419		
	Cation Sum (meq/L)		95.0	92.9	443		
	Cation - Anion Balance (%)		5.9	5.0	2.8		
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		30.7	3.82	20.2		
	Antimony (Sb)-Total (mg/L)		<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	0.127		
	Arsenic (As)-Total (mg/L)		0.0286	<0.0050 <sup>DLA</sup>	1.38		
	Barium (Ba)-Total (mg/L)		0.471	0.0304	0.817		
	Beryllium (Be)-Total (mg/L)		<0.0050 <sup>DLA</sup>	0.0053 <sup>DLA</sup>	<0.050 <sup>DLA</sup>		
	Bismuth (Bi)-Total (mg/L)		<0.025 <sup>DLA</sup>	<0.025 <sup>DLA</sup>	<0.25 <sup>DLA</sup>		
	Boron (B)-Total (mg/L)		<0.50 <sup>DLA</sup>	<0.50 <sup>DLA</sup>	<5.0 <sup>DLA</sup>		
	Cadmium (Cd)-Total (mg/L)		0.0560	0.0917	0.277		
	Calcium (Ca)-Total (mg/L)		473	498	369		
	Chromium (Cr)-Total (mg/L)		0.0837	<0.0050 <sup>DLA</sup>	0.119		
	Cobalt (Co)-Total (mg/L)		2.66	3.78	1.43		
	Copper (Cu)-Total (mg/L)		0.107	0.052	4.45		
	Iron (Fe)-Total (mg/L)		919	716	3200		
	Lead (Pb)-Total (mg/L)		0.133	0.0325	18.7		
	Lithium (Li)-Total (mg/L)		0.203	0.179	0.34		
	Magnesium (Mg)-Total (mg/L)		205	211	2600		
	Manganese (Mn)-Total (mg/L)		191	246	366		
	Mercury (Hg)-Total (mg/L)		<0.000050 <sup>DLM</sup>	<0.000010	0.0118		
	Molybdenum (Mo)-Total (mg/L)		0.0035	<0.0025 <sup>DLA</sup>	<0.025 <sup>DLA</sup>		
	Nickel (Ni)-Total (mg/L)		3.13	4.15	1.37		
	Phosphorus (P)-Total (mg/L)		0.48	<0.10 <sup>DLA</sup>	0.88		
	Potassium (K)-Total (mg/L)		10.5	7.38	16.5		
	Selenium (Se)-Total (mg/L)		<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>		
	Silicon (Si)-Total (mg/L)		75.4	39.3	34.7		
	Silver (Ag)-Total (mg/L)		<0.000050 <sup>DLA</sup>	<0.000050 <sup>DLA</sup>	0.0495		
	Sodium (Na)-Total (mg/L)		26.3	26.3	92		

\* 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	L1477673-1 Water 24-JUN-14 14:23 P03-06-02	L1477673-2 Water 24-JUN-14 15:22 P03-06-01	L1477673-3 Water 24-JUN-14 13:15 P03-06-06		
Grouping	Analyte				
<b>WATER</b>					
<b>Total Metals</b>	Strontium (Sr)-Total (mg/L)	1.97	2.32	0.20	
	Sulfur (S)-Total (mg/L)	1260	1280	7120	
	Thallium (Tl)-Total (mg/L)	0.00055	<0.00050 <sup>DLA</sup>	0.0158	
	Tin (Sn)-Total (mg/L)	<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>	
	Titanium (Ti)-Total (mg/L)	1.01	<0.50 <sup>DLA</sup>	<5.0 <sup>DLA</sup>	
	Uranium (U)-Total (mg/L)	0.00423	0.00365	0.0556	
	Vanadium (V)-Total (mg/L)	0.059	<0.050 <sup>DLA</sup>	<0.50 <sup>DLA</sup>	
	Zinc (Zn)-Total (mg/L)	32.9	29.6	2140	
	Zirconium (Zr)-Total (mg/L)	<0.040 <sup>DLA</sup>	<0.040 <sup>DLA</sup>	<0.40 <sup>DLA</sup>	
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	1.45	4.20	2.16	
	Antimony (Sb)-Dissolved (mg/L)	<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>	
	Arsenic (As)-Dissolved (mg/L)	<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	0.053 <sup>DLA</sup>	
	Barium (Ba)-Dissolved (mg/L)	0.0121	0.0156	<0.025 <sup>DLA</sup>	
	Beryllium (Be)-Dissolved (mg/L)	<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>	
	Bismuth (Bi)-Dissolved (mg/L)	<0.025 <sup>DLA</sup>	<0.025 <sup>DLA</sup>	<0.25 <sup>DLA</sup>	
	Boron (B)-Dissolved (mg/L)	<0.50 <sup>DLA</sup>	<0.50 <sup>DLA</sup>	<5.0 <sup>DLA</sup>	
	Cadmium (Cd)-Dissolved (mg/L)	0.0530	0.107	0.0733	
	Calcium (Ca)-Dissolved (mg/L)	463	492	386	
	Chromium (Cr)-Dissolved (mg/L)	<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>	
	Cobalt (Co)-Dissolved (mg/L)	2.70	4.13	0.992	
	Copper (Cu)-Dissolved (mg/L)	<0.010 <sup>DLA</sup>	0.037	<0.10 <sup>DLA</sup>	
	Iron (Fe)-Dissolved (mg/L)	873	707	2200	
	Lead (Pb)-Dissolved (mg/L)	0.0110	0.0270	1.53	
	Lithium (Li)-Dissolved (mg/L)	0.159	0.147	0.33	
	Magnesium (Mg)-Dissolved (mg/L)	187	218	2730	
	Manganese (Mn)-Dissolved (mg/L)	195	265	368	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010 <sup>DLA</sup>	<0.000010 <sup>DLA</sup>	<0.000010 <sup>DLA</sup>	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0025 <sup>DLA</sup>	<0.0025 <sup>DLA</sup>	<0.025 <sup>DLA</sup>	
	Nickel (Ni)-Dissolved (mg/L)	3.11	4.45	1.13	
	Phosphorus (P)-Dissolved (mg/L)	<0.10 <sup>DLA</sup>	<0.10 <sup>DLA</sup>	<0.50 <sup>DLA</sup>	
	Potassium (K)-Dissolved (mg/L)	6.68	7.30	15.2	
	Selenium (Se)-Dissolved (mg/L)	<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>	
	Silicon (Si)-Dissolved (mg/L)	32.8	39.8	12.7	
	Silver (Ag)-Dissolved (mg/L)	<0.00050	<0.00050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	
	Sodium (Na)-Dissolved (mg/L)	25.8	28.0	92	

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1477673-1	L1477673-2	L1477673-3		
Description	Water	Water	Water	Water		
Sampled Date	24-JUN-14	24-JUN-14	24-JUN-14	24-JUN-14		
Sampled Time	14:23	15:22	13:15			
Client ID	P03-06-02	P03-06-01	P03-06-06			
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Strontium (Sr)-Dissolved (mg/L)	1.96	2.43	0.20		
	Sulfur (S)-Dissolved (mg/L)	1270	1290	6580		
	Thallium (Tl)-Dissolved (mg/L)	<0.00050 <sup>DLA</sup>	<0.00050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>		
	Tin (Sn)-Dissolved (mg/L)	<0.0050 <sup>DLA</sup>	<0.0050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>		
	Titanium (Ti)-Dissolved (mg/L)	<0.50 <sup>DLA</sup>	<0.50 <sup>DLA</sup>	<5.0 <sup>DLA</sup>		
	Uranium (U)-Dissolved (mg/L)	0.00154	0.00375	0.0309		
	Vanadium (V)-Dissolved (mg/L)	<0.050 <sup>DLA</sup>	<0.050 <sup>DLA</sup>	<0.50 <sup>DLA</sup>		
	Zinc (Zn)-Dissolved (mg/L)	34.2	29.0	2050		
	Zirconium (Zr)-Dissolved (mg/L)	<0.040 <sup>DLA</sup>	<0.040 <sup>DLA</sup>	<0.40 <sup>DLA</sup>		

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

## Reference Information

### Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1477673-1	P03-06-02	WSMT	Water sample(s) for total mercury analysis was not submitted in glass container with HCl preservative. Results may be biased low.
L1477673-3	P03-06-06	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	Aluminum (Al)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Beryllium (Be)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Boron (B)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Chromium (Cr)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Cobalt (Co)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Copper (Cu)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Lead (Pb)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Nickel (Ni)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Selenium (Se)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Silver (Ag)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Thallium (Tl)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Tin (Sn)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Titanium (Ti)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Vanadium (V)-Dissolved	DLA	L1477673-1, -2, -3
Duplicate	Zinc (Zn)-Dissolved	DLA	L1477673-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477673-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1477673-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477673-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1477673-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1477673-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477673-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477673-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1477673-1, -2, -3

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
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>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 "Acidity"
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
<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>ALK-PCT-VA</b>	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>ALK-PCT-VA</b>	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

**ANIONS-CL-IC-WR**      Water      Chloride by Ion Chromatography      EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

**ANIONS-SO4-IC-WR**      Water      Sulphate by Ion Chromatography      EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

**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.

**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.

**HG-DIS-LOW-CVAFS-VA**      Water      Dissolved Mercury in Water by CVAFS(Low)      EPA SW-846 3005A & 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 procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and 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).

**HG-TOT-LOW-CVAFS-VA**      Water      Total Mercury in Water by CVAFS(Low)      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-D-CCMS-VA**      Water      Dissolved Metals in Water by CRC ICPMS      APHA 3030 B&E / EPA SW-846 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 hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

**MET-DIS-LOW-ICP-VA**      Water      Dissolved 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 procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

**MET-T-CCMS-VA**      Water      Total Metals in Water by CRC ICPMS      APHA 3030 B&E / EPA SW-846 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 hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

**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).

**PH-PCT-VA**      Water      pH by Meter (Automated)      APHA 4500-H "pH Value"

## Reference Information

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.

**S-DIS-ICP-VA**                      Water              Dissolved 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.

**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.

**TSS-LOW-WR**                      Water              Total Suspended Solids by Grav. (1 mg/L)    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.

**ZR-D-MS-VA**                      Water              Dissolved Zr in Water by ICPMS    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).

**ZR-T-MS-VA**                      Water              Total Zr in Water by ICPMS    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).

\*\* 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
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

**Chain of Custody Numbers:**

## 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 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.*





L1477673-COFC

<b>Report To</b>		<b>Report Format</b>			Low (Rush Turnaround Time (TAT) is not available for all tests)																			
Company: Hemmera Environchem Inc.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			R <input checked="" type="checkbox"/> Regular (Standard TAT if received by 3 pm - business days)																			
Contact: Natasha Sandys		Quality Control (QC) Report with Report <input checked="" 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: 230 - 2237 2nd Avenue Whitehorse, YT		<input type="checkbox"/> Criteria on Report - provide details below if box checked			E <input type="checkbox"/> Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT																			
Phone: 867-456-4865		Select Distribution: <input checked="" 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																			
		Email 1 or Fax nsandys@hemmera.com, rmartinka@hemmera.com			Specify Date Required for E2, E or P:																			
		Email 2 chris@elr.ca			<b>Analysis Request</b>																			
<b>Invoice To</b> Same as Report To <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																			
Copy of Invoice with Report <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input checked="" type="checkbox"/> MAIL <input type="checkbox"/> FAX																						
Company: Hemmera Environchem Inc.		Email 1 or Fax nsandys@hemmera.com																						
Contact: Natasha Sandys		Email 2 chris@elr.ca																						
<b>Project Information</b>					<b>Oil and Gas Required Fields (client use)</b>					Number of Containers														
ALS Quote #: Q45291		Approver ID:		Cost Center:																				
Job #: 1343-005.02		GL Account:		Routing Code:																				
PO / AFE:		Activity Code:																						
LSD:		Location:																						
ALS Lab Work Order # (lab use only)		ALS Contact:		Sampler: RM, AB, AN, M																				
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>			<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>	acidity (to pH 8.3)	alkalinity	chloride	conductivity	pH	sulphate	suspended solids, total (TSS)	dissolved metals	total metals									
							R	R	R	R	R	R	R	R	R							3		
							R	R	R	R	R	R	R	R	R	R								3
							R	R	R	R	R	R	R	R	R	R								3
Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report (client Use)					<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																	
Are samples taken from a Regulated DW System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		- EDD must be in EQUIS format common to Faro Mine Remediation Project. Contact client if clarification is required. - See attached parameter sheet for required detection limits.					Frozen <input type="checkbox"/>			SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>														
Are samples for human drinking water use? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							Ice packs Yes <input type="checkbox"/> No <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>		Cooling Initiated <input type="checkbox"/>													
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)					FINAL SHIPMENT RECEPTION (lab use only)																	
Released by: C. Jostnebski		Date: Jun 26 / 14	Time: 11:30	Received by: [Signature]		Date: 26 JUN 14	Time: 11:30	Received by: [Signature]			Date:		Time:											