



2195 – 2ND Ave

Whitehorse, YT Y1A 3T8

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August 10, 2014

EDI Job Number: 14-Y-0270

Assessment and Abandoned Mines
Yukon Government
Box 2703, K-419
Whitehorse, YT Y1A 2C6

Attention: Adrienne Turcotte, Project Officer

Re: Rose Creek Monitoring Program – June 23, 2014 (Revised)

Assessment and Abandoned Mines (AAM) retained EDI Environmental Dynamics Inc. (EDI) to conduct water quality sampling at the Faro Mine Site. The Rose Creek Monitoring Program has been ongoing since November 2013 in response to changing water quality conditions. Table 1, attached, summarizes the field trips completed for the 2014 fiscal year. The intent of this memo is to summarize field data obtained during the June 23, 2014 field trip.

The objective of this trip was to conduct surface water sampling at 10 monitoring sites, including QA/QC samples. Figure 1 provides the locations of all sampling sites. Table 2 summarizes field data collected at each sampling site. Representative photos of each site and the ALS laboratory analytical reports for all water chemistry samples submitted during this field trip are attached.

Weather conditions on June 23, 2014 were overcast, with air temperatures ranging from 15 to 20°C. All 10 sites were sampled; however, Site R3 was sampled the following day on June 24, as part of the Pelly Aquatics field program.

If you have any questions, please contact Meighan Kearns at (867) 393-4882 or mkearns@edynamics.com.



Yours truly,

EDI Environmental Dynamics Inc.

Submitted via email

Brodie Smith, B.Sc.
Biologist

Attachments:

- Table 1. Summary of field trips conducted in the 2014 fiscal year, Rose Creek Monitoring Program.
- Table 2. Surface water sampling field data, Rose Creek Monitoring Program, June 23 - 24, 2014.
- Figure 1. Location of surface water sampling, Rose Creek Monitoring Program, June 23 - 24, 2014.
- Photos 1 – 10. Representative site photos.
- ALS Laboratory Analytical Reports



Table 1. Summary of field trips conducted in the 2014 fiscal year, Rose Creek Monitoring Program.

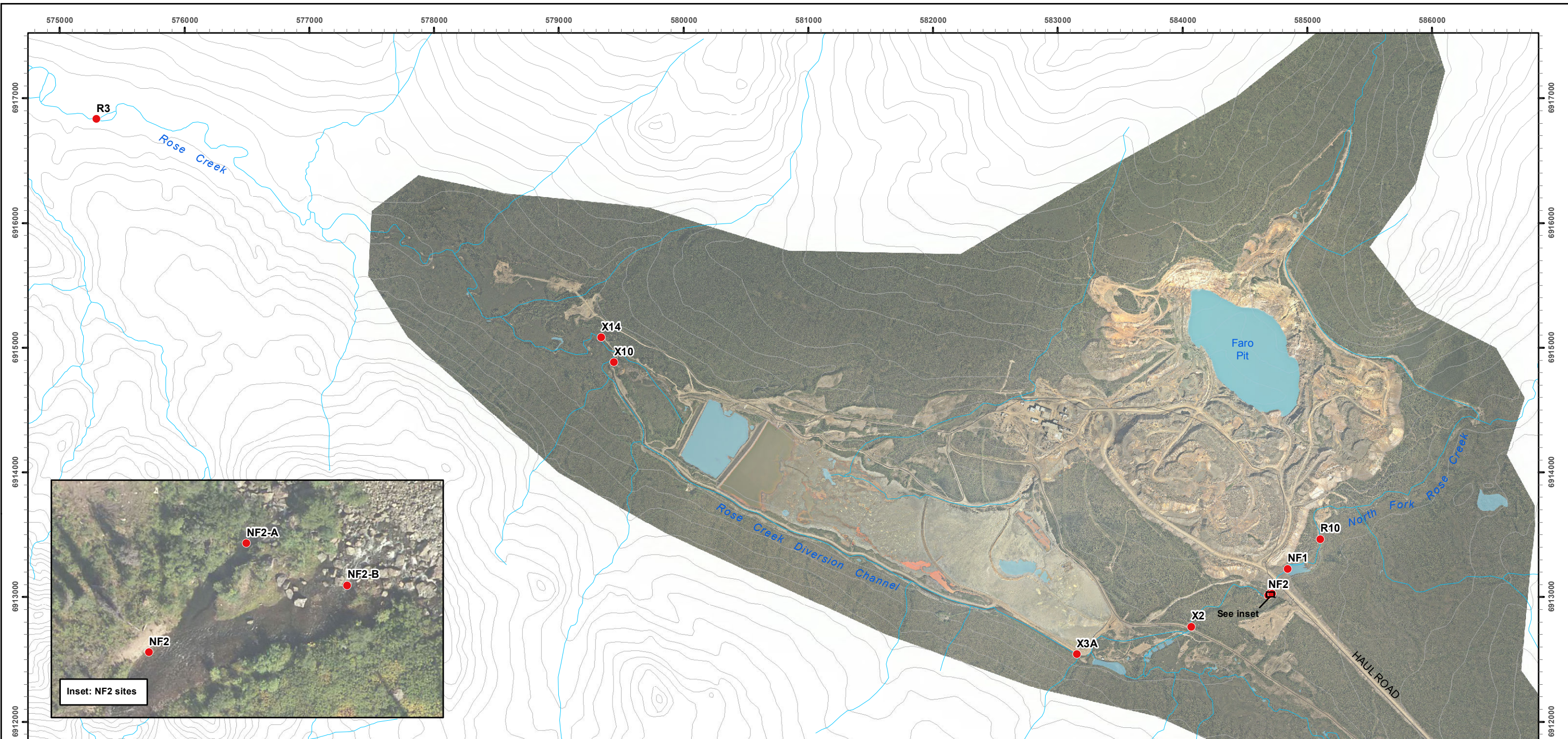
Field Date	General Tasks
April 01, 2014	• Surface water sampling
April 08, 2014	• Surface water sampling
April 15, 2014	• Surface water sampling
April 22, 2014	• Surface water sampling
April 29, 2014	• Surface water sampling
May 06, 2014	• Surface water sampling
May 13, 2014	• Surface water sampling
May 20, 2014	• Surface water sampling
May 26-27, 2014	• Surface water sampling; AAM Faro Pelly Aquatics Program combo trip
June 09, 2014	• Surface water sampling
June 23-24, 2014	• Surface water sampling; AAM Faro Pelly Aquatics Program combo trip



Table 2. Surface water sampling field data, Rose Creek Monitoring Program, June 23-24, 2014.

Site Name	UTM Location		Sample		QA/ QC Rep. ID	In-situ Parameters			
	Easting	Northing	Date	Time		Temp (°C)	SPC (µS/cm)	pH	Turbidity (NTU)
R3	0575259	6916833	24-June-2014	12:00	-	8.1	189.5	7.83	2.50
X14	0579340	6915076	23-June-2014	14:45	X14-r	8.3	194.0	7.39	2.46
X10	0579416	6914865	23-June-2014	15:04	-	8.4	119.9	7.99	2.53
X3A	0583153	6912537	23-June-2014	15:20	-	8.0	124.5	7.84	4.18
X2	0584065	6912766	23-June-2014	15:38	-	7.0	122.0	7.69	4.43
NF2-A	0584711	6913041	23-June-2014	15:54	-	7.0	117.1	7.61	5.08
NF2-B	0584728	6913031	23-June-2014	16:03	-	7.1	117.0	7.61	5.06
NF2	0584686	6913012	23-June-2014	16:15	-	7.1	125.8	7.56	3.56
NF1	0584893	6913282	23-June-2014	16:53	-	8.1	119.0	7.53	13.70
R10	0584101	6913488	23-June-2014	17:09	-	8.1	117.2	7.83	5.09

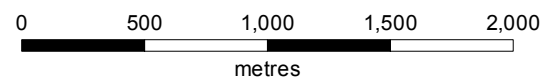
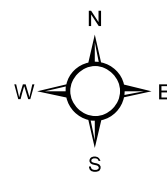
Where, UTM = Universal Transverse Mercator (NAD 83/ Zone 8);
QA/QC Rep = Quality Assurance/ Quality Control Replicate;
Temp = water temperature; and,
SPC = specific conductance.



Location of surface water sampling, Rose Creek Monitoring Program, June 23 to 24, 2014

Legend

- Surface Water Sample Collected
- Road (Mine Access/Haul)
- Topographic Contour (30 m Interval)



Map Scale = 1:30,000 (printed on 11 x 17)
 Map Projection: North American Datum 1983 UTM Zone 8N

Data sources

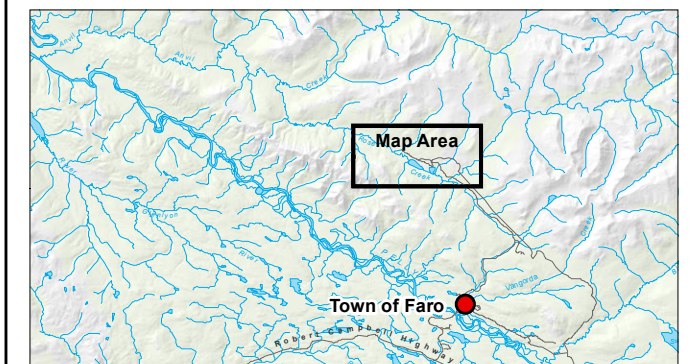
1:50,000 topographic spatial data provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

National Road Network courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Detailed topographic features of the Faro, Grum and Vangorda mine sites were provided by Yukon Government - Energy, Mines and Resources - Assessment and Abandoned Mines Branch (March 2012).

Project data displayed is site specific. Data collected by EDI Environmental Dynamics Inc. was obtained using Garmin GPS technology.

This document is not an official land survey and the spatial data presented is subject to change.



Map Prepared by
 EDI Environmental Dynamics Inc.

Drawn: LG	Checked: MK	FIGURE 1	Date: 29/04/2014
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Site Photos



Photo 1. Upstream view at surface water sampling site R3, June 24, 2014



Photo 2. Overview at surface water sampling site X14, June 23, 2014.



Photo 3. Downstream view at surface water sampling site X10, June 23, 2014.



Photo 4. Overview from surface water sampling site X3A, June 23, 2014.



Photo 5. Upstream view at surface water sampling site X2, June 23, 2014.



Photo 6. Downstream view from surface water sampling site NF2-A, June 23, 2014.

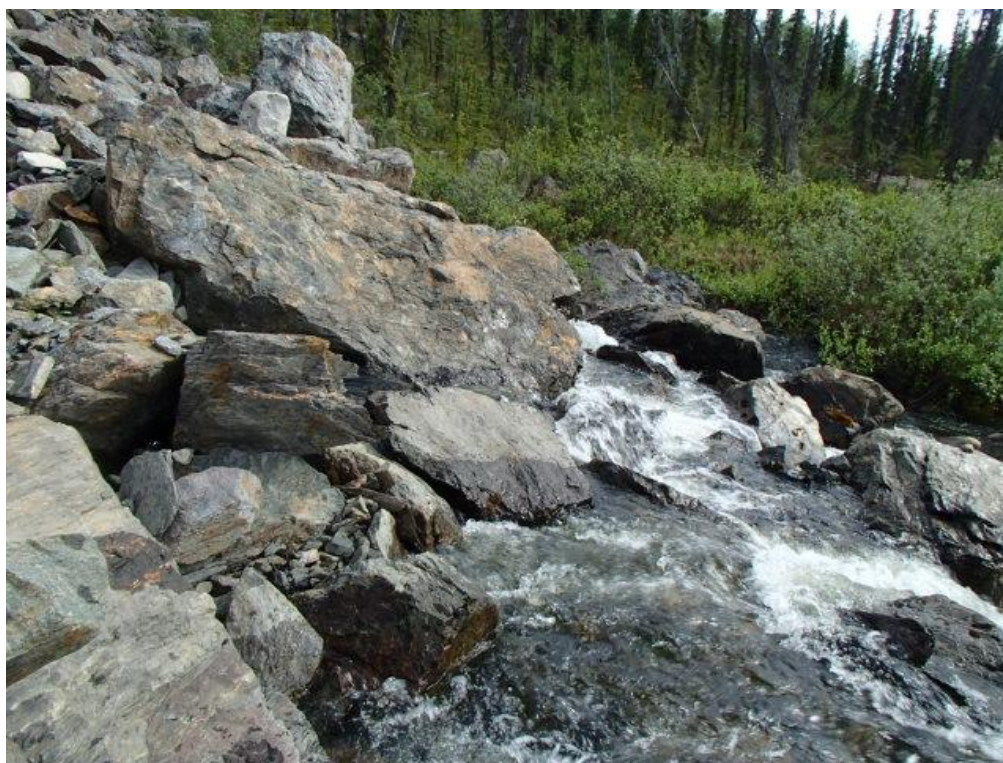


Photo 7. Overview at surface water sampling site NF2-B, June 23, 2014.



Photo 8. Upstream view at surface water sampling site NF2, June 23, 2014.



Photo 9. Upstream view at surface water sampling site NF1, June 23, 2014.



Photo 10. Downstream view at surface water sampling site R10, June 23, 2014.



ENVIRONMENTAL DYNAMICS INC.
ATTN: Meighan Kearns
2195 - 2nd Avenue
Whitehorse YT Y1A 3T8

Date Received: 25-JUN-14
Report Date: 09-JUL-14 10:25 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1477148
Project P.O. #: NOT SUBMITTED
Job Reference: 14-Y-270
C of C Numbers: 1, 2
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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1477148-1 Grab 23-JUN-14 15:54 NF2-A	L1477148-2 Grab 23-JUN-14 15:20 X3A	L1477148-3 Grab 23-JUN-14 15:00 X10	L1477148-4 Grab 23-JUN-14 16:15 NF2	L1477148-5 Grab 23-JUN-14 15:38 X2
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	107	116	129	121	119
	Hardness (as CaCO3) (mg/L)	59.3	61.4	68.5	62.5	61.4
	pH (pH)	7.62	7.78	7.79	7.62	7.67
	Total Suspended Solids (mg/L)	2.6	1.4	1.4	2.4	2.4
	Total Dissolved Solids (mg/L)	69.2	72.5	80.1	73.6	71.7
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	56.4	57.0	64.0	54.3	56.0
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.073	0.075	0.078	0.078	0.075
	Nitrate (as N) (mg/L)	0.0218	0.0152	0.0107	0.0230	0.0176
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0060	0.0048	0.0043	0.0054	0.0111
	Sulfate (SO4) (mg/L)	8.24	10.6	11.7	12.6	10.2
	Anion Sum (meq/L)	1.30	1.37	1.53	1.35	1.34
	Cation Sum (meq/L)	1.26	1.31	1.46	1.35	1.31
	Cation - Anion Balance (%)	-1.6	-2.0	-2.3	-0.2	-1.1
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.72	3.40	3.30	3.66	3.73
	Total Organic Carbon (mg/L)	3.80	3.36	3.45	3.67	3.78
Total Metals	Aluminum (Al)-Total (mg/L)	0.0777	0.0584	0.0465	0.0941	0.0874
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00049	0.00066	0.00045	0.00055	0.00055
	Barium (Ba)-Total (mg/L)	0.0275	0.0330	0.0348	0.0355	0.0343
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000025	0.000057	0.000044	0.000279	0.000089
	Calcium (Ca)-Total (mg/L)	17.8	17.5	21.7	17.6	17.4
	Chromium (Cr)-Total (mg/L)	0.00021	0.00023	0.00017	0.00029	0.00024
	Cobalt (Co)-Total (mg/L)	0.00014	0.00030	0.00025	0.00170	0.00052
	Copper (Cu)-Total (mg/L)	0.00084	0.00082	0.00086	0.00097	0.00093
	Iron (Fe)-Total (mg/L)	0.173	0.203	0.229	0.250	0.186
	Lead (Pb)-Total (mg/L)	0.000870	0.000584	0.000502	0.00116	0.000868
	Lithium (Li)-Total (mg/L)	0.00197	0.00151	0.00190	0.00215	0.00209
	Magnesium (Mg)-Total (mg/L)	3.57	3.98	4.80	4.77	4.30
	Manganese (Mn)-Total (mg/L)	0.0134	0.0295	0.0271	0.0912	0.0370
	Molybdenum (Mo)-Total (mg/L)	0.000367	0.000336	0.000387	0.000374	0.000358

* 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	L1477148-6 Grab 23-JUN-14 16:53 NF1	L1477148-7 Grab 23-JUN-14 17:09 R10	L1477148-8 Grab 23-JUN-14 18:51 FIELD BLANK	L1477148-9 Grab 23-JUN-14 16:03 NF2-B	L1477148-10 Grab TRAVEL BLANK
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	115	117	<2.0	111	<2.0
	Hardness (as CaCO3) (mg/L)	58.2	58.7	<0.50	58.0	<0.50
	pH (pH)	7.64	7.68	5.69	7.64	5.60
	Total Suspended Solids (mg/L)	1.0	2.2	<1.0	2.8	<1.0
	Total Dissolved Solids (mg/L)	67.8	69.5	<1.0	70.4	<1.0
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	53.1	57.9	<2.0	59.8	<2.0
	Ammonia, Total (as N) (mg/L)	0.0054	<0.0050	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.072	0.074	<0.020	0.073	<0.020
	Nitrate (as N) (mg/L)	0.0396	0.0197	<0.0050	0.0216	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0056	0.0070	<0.0020	0.0065	<0.0020
	Sulfate (SO4) (mg/L)	8.72	7.95	<0.50	7.97	<0.50
	Anion Sum (meq/L)	1.25	1.33	<0.10	1.37	<0.10
	Cation Sum (meq/L)	1.24	1.25	<0.10	1.24	<0.10
	Cation - Anion Balance (%)	-0.3	-3.0	0.0	-5.0	0.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.95	3.54	<0.50	3.72	
	Total Organic Carbon (mg/L)	4.14	3.72	<0.50	3.67	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0622	0.0792	<0.0030	0.0999	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00055	0.00054	<0.00010	0.00057	<0.00010
	Barium (Ba)-Total (mg/L)	0.0347	0.0339	<0.000050	0.0350	<0.000050
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000016	0.000015	<0.000010	0.000016	<0.000010
	Calcium (Ca)-Total (mg/L)	18.1	17.1	<0.020	17.2	<0.020
	Chromium (Cr)-Total (mg/L)	0.00018	0.00023	<0.00010	0.00026	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00094	0.00088	<0.00050	0.00094	<0.00050
	Iron (Fe)-Total (mg/L)	0.149	0.171	<0.010	0.208	<0.010
	Lead (Pb)-Total (mg/L)	0.000675	0.000529	<0.000050	0.00108	<0.000050
	Lithium (Li)-Total (mg/L)	0.00200	0.00198	<0.00050	0.00208	<0.00050
	Magnesium (Mg)-Total (mg/L)	3.83	3.85	<0.0050	3.97	<0.0050
	Manganese (Mn)-Total (mg/L)	0.0194	0.0150	<0.000050	0.0125	<0.000050
	Molybdenum (Mo)-Total (mg/L)	0.000506	0.000381	<0.000050	0.000356	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1477148-1	L1477148-2	L1477148-3	L1477148-4	L1477148-5
		Description	Grab	Grab	Grab	Grab	Grab
		Sampled Date	23-JUN-14	23-JUN-14	23-JUN-14	23-JUN-14	23-JUN-14
		Sampled Time	15:54	15:20	15:00	16:15	15:38
		Client ID	NF2-A	X3A	X10	NF2	X2
Grouping	Analyte						
WATER							
Total Metals	Nickel (Ni)-Total (mg/L)		0.00060	0.00084	0.00085	0.00278	0.00116
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		0.427	0.527	0.562	0.492	0.521
	Selenium (Se)-Total (mg/L)		0.00025	0.00017	0.00020	0.00021	0.00023
	Silicon (Si)-Total (mg/L)		4.04	3.75	3.55	4.34	4.04
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		1.26	1.48	1.50	1.46	1.47
	Strontium (Sr)-Total (mg/L)		0.0732	0.0805	0.101	0.0772	0.0739
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000663	0.000753	0.000932	0.000695	0.000638
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		0.0258	0.0691	0.0635	0.393	0.110
	Zirconium (Zr)-Total (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0187	0.0162	0.0157	0.0218	0.0189
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00042	0.00036	0.00035	0.00044	0.00044
	Barium (Ba)-Dissolved (mg/L)		0.0329	0.0323	0.0338	0.0345	0.0335
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000024	0.000046	0.000040	0.000277	0.000081
	Calcium (Ca)-Dissolved (mg/L)		17.4	17.9	19.3	17.1	17.7
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		0.00010	0.00026	0.00021	0.00158	0.00044
	Copper (Cu)-Dissolved (mg/L)		0.00076	0.00067	0.00070	0.00082	0.00076
	Iron (Fe)-Dissolved (mg/L)		0.051	0.082	0.151	0.107	0.067
	Lead (Pb)-Dissolved (mg/L)		0.000247	0.000177	0.000199	0.000383	0.000279
	Lithium (Li)-Dissolved (mg/L)		0.00202	0.00170	0.00179	0.00214	0.00206
	Magnesium (Mg)-Dissolved (mg/L)		3.88	4.04	4.93	4.81	4.20
	Manganese (Mn)-Dissolved (mg/L)		0.00776	0.0247	0.0236	0.0841	0.0307
	Molybdenum (Mo)-Dissolved (mg/L)		0.000365	0.000285	0.000329	0.000348	0.000354
	Nickel (Ni)-Dissolved (mg/L)		<0.00050	0.00072	0.00074	0.00263	0.00102
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		0.460	0.532	0.542	0.487	0.474

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1477148-6	L1477148-7	L1477148-8	L1477148-9	L1477148-10
		Description	Grab	Grab	Grab	Grab	Grab
		Sampled Date	23-JUN-14	23-JUN-14	23-JUN-14	23-JUN-14	
		Sampled Time	16:53	17:09	18:51	16:03	
		Client ID	NF1	R10	FIELD BLANK	NF2-B	TRAVEL BLANK
Grouping	Analyte						
WATER							
Total Metals	Nickel (Ni)-Total (mg/L)		0.00053	<0.00050	<0.00050	0.00056	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		0.475	0.463	<0.050	0.488	<0.050
	Selenium (Se)-Total (mg/L)		0.00021	0.00023	<0.00010	0.00023	<0.00010
	Silicon (Si)-Total (mg/L)		4.24	4.03	<0.050	4.18	<0.050
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		1.37	1.40	<0.050	1.41	<0.050
	Strontium (Sr)-Total (mg/L)		0.0772	0.0729	<0.00020	0.0759	<0.00020
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000679	0.000686	<0.000010	0.000667	<0.000010
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		0.0071	0.0047	<0.0030	0.0058	<0.0030
	Zirconium (Zr)-Total (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)		0.0203	0.0207	<0.0010	0.0185	
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00044	0.00046	<0.00010	0.00043	
	Barium (Ba)-Dissolved (mg/L)		0.0348	0.0331	<0.000050	0.0327	
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)		0.000015	<0.000010	<0.000010	<0.000010	
	Calcium (Ca)-Dissolved (mg/L)		17.2	17.1	<0.020	16.9	
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Dissolved (mg/L)		0.00084	0.00076	<0.00020	0.00074	
	Iron (Fe)-Dissolved (mg/L)		0.058	0.063	<0.010	0.053	
	Lead (Pb)-Dissolved (mg/L)		0.000233	0.000232	<0.000050	0.000257	
	Lithium (Li)-Dissolved (mg/L)		0.00196	0.00199	<0.00050	0.00198	
	Magnesium (Mg)-Dissolved (mg/L)		3.74	3.86	<0.0050	3.81	
	Manganese (Mn)-Dissolved (mg/L)		0.0160	0.00905	<0.000050	0.00370	
	Molybdenum (Mo)-Dissolved (mg/L)		0.000349	0.000351	<0.000050	0.000332	
	Nickel (Ni)-Dissolved (mg/L)		0.00052	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	
	Potassium (K)-Dissolved (mg/L)		0.475	0.453	<0.050	0.455	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1477148-1	L1477148-2	L1477148-3	L1477148-4	L1477148-5
		Description	Grab	Grab	Grab	Grab	Grab
		Sampled Date	23-JUN-14	23-JUN-14	23-JUN-14	23-JUN-14	23-JUN-14
		Sampled Time	15:54	15:20	15:00	16:15	15:38
		Client ID	NF2-A	X3A	X10	NF2	X2
Grouping	Analyte						
WATER							
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)		0.00021	0.00018	0.00021	0.00021	0.00021
	Silicon (Si)-Dissolved (mg/L)		3.87	3.56	3.45	3.93	3.91
	Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)		1.35	1.45	1.44	1.46	1.36
	Strontium (Sr)-Dissolved (mg/L)		0.0758	0.0827	0.0887	0.0740	0.0765
	Thallium (Tl)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)		0.000667	0.000733	0.000805	0.000653	0.000639
	Vanadium (V)-Dissolved (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)		0.0264	0.0653	0.0592	0.403	0.109
	Zirconium (Zr)-Dissolved (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1477148-6	L1477148-7	L1477148-8	L1477148-9	L1477148-10
Description	Grab	Grab	Grab	Grab	Grab	Grab
Sampled Date	23-JUN-14	23-JUN-14	23-JUN-14	23-JUN-14	23-JUN-14	
Sampled Time	16:53	17:09	18:51	16:03		
Client ID	NF1	R10	FIELD BLANK	NF2-B	TRAVEL BLANK	
Grouping	Analyte					
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00021	0.00024	<0.00010	0.00023	
	Silicon (Si)-Dissolved (mg/L)	4.08	4.04	<0.050	4.20	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	1.37	1.39	<0.050	1.38	
	Strontium (Sr)-Dissolved (mg/L)	0.0719	0.0718	<0.00020	0.0733	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.000587	0.000668	<0.000010	0.000672	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0062	0.0027	<0.0010	0.0038	
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Aluminum (Al)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Boron (B)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Phosphorus (P)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zinc (Zn)-Dissolved	DLA	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1477148-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L1477148-1, -2, -3, -4, -5, -6, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
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.			
ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1

Reference Information

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-F-IC-WR Water Fluoride 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-NO2-IC-WR Water Nitrite Nitrogen 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. Nitrate is detected by UV absorbance.

ANIONS-NO3-IC-WR Water Nitrate Nitrogen 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. Nitrate is detected by UV absorbance.

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.

CARBONS-DOC-VA Water Dissolved 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)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA 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)".

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.

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.

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:

$$\text{Ion Balance (\%)} = [\text{Cation Sum} - \text{Anion Sum}] / [\text{Cation Sum} + \text{Anion Sum}]$$

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-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).

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

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

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."

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".

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:

1 2

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.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L1477148-COFC

COC Number: 14 -

Page ___ of ___

Report To Company: EDI Contact: Meighan Kearns Address: 2195 - 2nd Avenue Whitehorse, YT Y1A 3T8 Phone: 867-393-4882		Report Format / Distribution Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Criteria on Report - provide details below if box checked Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: mkearns@edynamics.com Email 2: adrienne.turcotte@gov.yk.ca			Rush Turnaround Time (TAT) is not available for all tests R <input checked="" type="checkbox"/> Regular (Standard TAT if received by 3 pm - business days) P <input type="checkbox"/> Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT E <input type="checkbox"/> Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT E2 <input type="checkbox"/> Same day or weekend emergency - contact ALS to confirm TAT and surcharge Specify Date Required for E2,E or P:																		
Invoice To Same as Report To <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Copy of Invoice with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Company: EDI Contact: S Jenner		Invoice Distribution Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: sjenner@edynamics.com Email 2:			Analysis Request Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below										Number of Containers								
Project Information ALS Quote #: Q38556 Job #: 14-Y-270 PO / AFE: LSD:		Oil and Gas Required Fields (client use) Approver ID: Cost Center: GL Account: Routing Code: Activity Code: Location:			ALK-COL-VA,P-T-COL-VA,IONBALANCE-V	ANIONS-ALL-IC-WR, TDS-CALC-VA	EC-MAN-WR,PH-MAN-WR	TSS-LOW-WR	CARBONS-TOC-VA,NH3-F-VA	CARBONS-DOC-VA	MET-T-CCMS-VA,ZR-T-MS-VA	MET-D-CCMS-VA,ZR-D-MS-VA	HARDNESS-CALC-VA										
ALS Lab Work Order # (lab use only)		ALS Contact:		Sampler: <i>BCM, DH</i>																			
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																	
	Field Blank			23JUN14	18:51	GRAB	R	R	R	R	R	R	R	R		R							5
	NF2B			23JUN14	16:03	GRAB	R																
	Travel Blank						R																
Drinking Water (DW) Samples¹ (client use) Are samples taken from a Regulated DW System? <input type="checkbox"/> Yes <input type="checkbox"/> No Are samples for human drinking water use? <input type="checkbox"/> Yes <input type="checkbox"/> No		Special Instructions / Specify Criteria to add on report (client Use) Use CH2M_EQUIS for EDD.			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 type="checkbox"/> No <input type="checkbox"/> Custody seal intact Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Cooling initiated <input type="checkbox"/> INITIAL COOLER TEMPERATURES °C: FINAL COOLER TEMPERATURES °C:																		
SHIPMENT RELEASE (client use) Released by: <i>B. SMITH</i> Date: <i>23JUN14</i> Time:		INITIAL SHIPMENT RECEPTION (lab use only) Received by: _____ Date: _____ Time: _____			FINAL SHIPMENT RECEPTION (lab use only) Received by: _____ Date: _____ Time: _____																		