



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

Date Received: 30-APR-14  
Report Date: 09-MAY-14 17:01 (MT)  
Version: FINAL

Client Phone: 867-393-4882

## Certificate of Analysis

**Lab Work Order #:** L1449577  
**Project P.O. #:** NOT SUBMITTED  
**Job Reference:** 14-Y-270  
**C of C Numbers:**  
**Legal Site Desc:**

Can Dang  
Senior Account Manager

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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	L1449577-1 Grab 29-APR-14 09:00 X14	L1449577-2 Grab 29-APR-14 10:25 X10	L1449577-3 Grab 29-APR-14 10:55 X3A	L1449577-4 Grab 29-APR-14 11:15 X2	L1449577-5 Grab 29-APR-14 11:40 NF2-A
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Conductivity (uS/cm)	736	290	235	274	323
	Hardness (as CaCO3) (mg/L)	395	146	130	137	168
	pH (pH)	7.94	8.11	8.00	7.96	8.10
	Total Suspended Solids (mg/L)	2.6	<1.0	4.9	2.2	3.4
	Total Dissolved Solids (mg/L)	529	177	147	172	209
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO3) (mg/L)	173	124	100	115	124
	Ammonia, Total (as N) (mg/L)	0.0776	<0.0050	0.0082	0.0070	0.0074
	Chloride (Cl) (mg/L)	<2.5 <sup>DLM</sup>	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.13	0.160	0.140	0.167	0.188
	Nitrate (as N) (mg/L)	0.162	0.184	0.181	0.197	0.401
	Nitrite (as N) (mg/L)	<0.0050 <sup>DLM</sup>	<0.0010	<0.0010 <sup>RRV</sup>	<0.0010	0.0013
	Phosphorus (P)-Total (mg/L)	0.0051	0.0205	0.0130	0.0157	0.0193
	Sulfate (SO4) (mg/L)	243	30.1	23.0	28.7	43.1
	Anion Sum (meq/L)	8.53	3.13	2.50	2.91	3.41
	Cation Sum (meq/L)	8.48	3.10	2.78	2.95	3.64
	Cation - Anion Balance (%)	-0.3	-0.5	5.2	0.6	3.3
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	2.19	2.87	3.38	4.35	4.25
	Total Organic Carbon (mg/L)	2.76	2.90	3.62	4.38	4.35
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0438	0.0376	0.102	0.104	0.161
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00014	0.00023	0.00014	<0.00010
	Arsenic (As)-Total (mg/L)	0.00078	0.00064	0.00092	0.00098	0.00092
	Barium (Ba)-Total (mg/L)	0.0650	0.0673	0.0680	0.0676	0.0623
	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)	0.000258	0.000243	0.000300	0.000443	0.000799
	Calcium (Ca)-Total (mg/L)	111	42.0	35.2	38.8	39.7
	Chromium (Cr)-Total (mg/L)	0.00015	0.00017	0.0200	0.00026	0.00039
	Cobalt (Co)-Total (mg/L)	0.00390	0.00069	0.00138	0.00227	0.00557
	Copper (Cu)-Total (mg/L)	0.00152	0.00167	0.00314	0.00246	0.00307
	Iron (Fe)-Total (mg/L)	0.935	0.385	0.838	0.653	0.534
	Lead (Pb)-Total (mg/L)	0.000578	0.000586	0.0102	0.00144	0.00228
	Lithium (Li)-Total (mg/L)	0.00826	0.00597	0.00522	0.00732	0.00723
	Magnesium (Mg)-Total (mg/L)	25.9	10.1	8.08	9.46	11.4
	Manganese (Mn)-Total (mg/L)	4.68	0.0832	0.126	0.173	0.312
	Molybdenum (Mo)-Total (mg/L)	0.000697	0.000709	0.00113	0.000856	0.000861

\* 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	L1449577-6 Grab 29-APR-14 11:55 NF2-B	L1449577-7 Grab 29-APR-14 12:00 NF2	L1449577-8 Grab 29-APR-14 12:05 NF2-R	L1449577-9 Grab 29-APR-14 12:45 FIELD BLANK	L1449577-10 Grab TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Conductivity (uS/cm)	246	264	262	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	121	131	126	<0.50	<0.50
	pH (pH)	8.01	7.99	8.00	5.52	5.52
	Total Suspended Solids (mg/L)	3.4	3.0	2.8	<1.0	<2.0
	Total Dissolved Solids (mg/L)	158	166	167	<10	<10
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO3) (mg/L)	112	115	118	<2.0	<2.0
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0051	0.0052	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.154	0.164	0.164	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.190	0.200	0.197	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0242	0.0197	0.0193	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	18.9	24.1	24.1	<0.50	<0.50
	Anion Sum (meq/L)	2.66	2.83	2.88	<0.10	<0.10
	Cation Sum (meq/L)	2.60	2.81	2.71	<0.10	<0.10
	Cation - Anion Balance (%)	-1.1	-0.3	-3.1	0.0	0.0
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	4.86	4.52	4.57	<0.50	<0.50
	Total Organic Carbon (mg/L)	4.93	4.60	4.60	<0.50	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.136	0.119	0.114	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	0.00011	0.00010	0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00096	0.00096	0.00094	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	0.0667	0.0674	0.0665	<0.000050	<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)	0.000164	0.000398	0.000404	<0.000010	<0.000010
	Calcium (Ca)-Total (mg/L)	35.5	36.0	36.3	<0.020	<0.020
	Chromium (Cr)-Total (mg/L)	0.00035	0.00034	0.00029	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00062	0.00216	0.00221	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00258	0.00255	0.00255	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.404	0.472	0.477	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	0.00156	0.00152	0.00151	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.00641	0.00661	0.00666	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	8.17	9.37	9.12	<0.0050	<0.0050
	Manganese (Mn)-Total (mg/L)	0.0471	0.149	0.147	<0.000050	<0.000050
	Molybdenum (Mo)-Total (mg/L)	0.000808	0.000815	0.000813	<0.000050	<0.000050

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1449577-1	L1449577-2	L1449577-3	L1449577-4	L1449577-5
		Description	Grab	Grab	Grab	Grab	Grab
		Sampled Date	29-APR-14	29-APR-14	29-APR-14	29-APR-14	29-APR-14
		Sampled Time	09:00	10:25	10:55	11:15	11:40
		Client ID	X14	X10	X3A	X2	NF2-A
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Nickel (Ni)-Total (mg/L)		0.00910	0.00307	0.00339	0.00391	0.00817
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		2.27	1.41	1.29	1.46	1.57
	Selenium (Se)-Total (mg/L)		0.00042	0.00038	0.00031	0.00037	0.00043
	Silicon (Si)-Total (mg/L)		6.08	4.96	4.73	5.31	5.42
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	0.000020	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		7.15	2.77	2.35	2.88	3.66
	Strontium (Sr)-Total (mg/L)		0.350	0.204	0.174	0.191	0.184
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	0.00012	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.00309	0.00232	0.00204	0.00226	0.00234
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		0.309	0.393	0.393	0.554	1.20
	Zirconium (Zr)-Total (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
<b>Dissolved Metals</b>	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0091	0.0145	0.0215	0.0316	0.0355
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00044	0.00044	0.00041	0.00059	0.00067
	Barium (Ba)-Dissolved (mg/L)		0.0626	0.0670	0.0622	0.0665	0.0625
	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)		0.000245	0.000234	0.000296	0.000406	0.000867
	Calcium (Ca)-Dissolved (mg/L)		115	41.7	37.4	38.7	46.5
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	0.00072
	Cobalt (Co)-Dissolved (mg/L)		0.00378	0.00065	0.00131	0.00219	0.00577
	Copper (Cu)-Dissolved (mg/L)		0.00117	0.00167	0.00190	0.00209	0.00248
	Iron (Fe)-Dissolved (mg/L)		0.604	0.174	0.155	0.204	0.260
	Lead (Pb)-Dissolved (mg/L)		0.000128	0.000253	0.000405	0.000448	0.000995
	Lithium (Li)-Dissolved (mg/L)		0.00866	0.00633	0.00577	0.00760	0.00832
	Magnesium (Mg)-Dissolved (mg/L)		26.4	10.2	8.93	9.88	12.6
	Manganese (Mn)-Dissolved (mg/L)		4.61	0.0797	0.126	0.173	0.321
	Molybdenum (Mo)-Dissolved (mg/L)		0.000681	0.000665	0.000602	0.000765	0.000968
	Nickel (Ni)-Dissolved (mg/L)		0.00886	0.00309	0.00264	0.00379	0.00812
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		2.24	1.42	1.39	1.49	1.62

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1449577-6	L1449577-7	L1449577-8	L1449577-9	L1449577-10
		Description	Grab	Grab	Grab	Grab	Grab
		Sampled Date	29-APR-14	29-APR-14	29-APR-14	29-APR-14	
		Sampled Time	11:55	12:00	12:05	12:45	
		Client ID	NF2-B	NF2	NF2-R	FIELD BLANK	TRAVEL BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Nickel (Ni)-Total (mg/L)		0.00169	0.00366	0.00363	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.46	1.49	1.45	<0.050	<0.050
	Selenium (Se)-Total (mg/L)		0.00042	0.00039	0.00036	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)		5.03	5.30	5.10	<0.050	<0.050
	Silver (Ag)-Total (mg/L)		0.000013	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		2.69	2.86	2.85	<0.050	<0.050
	Strontium (Sr)-Total (mg/L)		0.175	0.176	0.182	<0.00020	<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)		0.00198	0.00204	0.00207	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		0.154	0.521	0.521	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
<b>Dissolved Metals</b>	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)		0.0363	0.0352	0.0340	<0.0010	
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00064	0.00066	0.00063	<0.00010	
	Barium (Ba)-Dissolved (mg/L)		0.0657	0.0660	0.0640	<0.000050	
	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)		0.000147	0.000386	0.000384	<0.000010	
	Calcium (Ca)-Dissolved (mg/L)		35.5	37.0	36.2	<0.020	
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)		0.00051	0.00206	0.00206	<0.00010	
	Copper (Cu)-Dissolved (mg/L)		0.00227	0.00224	0.00222	<0.00020	
	Iron (Fe)-Dissolved (mg/L)		0.147	0.207	0.223	<0.010	
	Lead (Pb)-Dissolved (mg/L)		0.000467	0.000461	0.000462	<0.000050	
	Lithium (Li)-Dissolved (mg/L)		0.00689	0.00702	0.00673	<0.00050	
	Magnesium (Mg)-Dissolved (mg/L)		7.99	9.30	8.54	<0.0050	
	Manganese (Mn)-Dissolved (mg/L)		0.0373	0.140	0.141	<0.000050	
	Molybdenum (Mo)-Dissolved (mg/L)		0.000762	0.000779	0.000762	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)		0.00182	0.00343	0.00338	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	
	Potassium (K)-Dissolved (mg/L)		1.48	1.47	1.45	<0.050	

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1449577-1	L1449577-2	L1449577-3	L1449577-4	L1449577-5
Description	Grab	Grab	Grab	Grab	Grab	Grab
Sampled Date	29-APR-14	29-APR-14	29-APR-14	29-APR-14	29-APR-14	29-APR-14
Sampled Time	09:00	10:25	10:55	11:15	11:40	11:40
Client ID	X14	X10	X3A	X2	NF2-A	NF2-A
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Selenium (Se)-Dissolved (mg/L)	0.00039	0.00041	0.00035	0.00044	0.00051
	Silicon (Si)-Dissolved (mg/L)	6.08	5.05	4.82	5.20	5.80
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	7.16	2.77	2.59	2.95	3.90
	Strontium (Sr)-Dissolved (mg/L)	0.357	0.196	0.180	0.186	0.214
	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)	0.00307	0.00231	0.00209	0.00209	0.00268
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.306	0.403	0.404	0.579	1.35
	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 Description Sampled Date Sampled Time Client ID	L1449577-6 Grab 29-APR-14 11:55 NF2-B	L1449577-7 Grab 29-APR-14 12:00 NF2	L1449577-8 Grab 29-APR-14 12:05 NF2-R	L1449577-9 Grab 29-APR-14 12:45 FIELD BLANK	L1449577-10 Grab TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Selenium (Se)-Dissolved (mg/L)	0.00041	0.00039	0.00035	<0.00010	
	Silicon (Si)-Dissolved (mg/L)	5.19	5.13	5.12	<0.050	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	2.74	2.87	2.78	<0.050	
	Strontium (Sr)-Dissolved (mg/L)	0.170	0.177	0.165	<0.00020	
	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)	0.00197	0.00204	0.00207	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.155	0.539	0.530	<0.0010	
	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 &amp; Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Antimony (Sb)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Phosphorus (P)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Total	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Bismuth (Bi)-Total	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Phosphorus (P)-Total	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Silver (Ag)-Total	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Tin (Sn)-Total	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Titanium (Ti)-Total	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Vanadium (V)-Total	DLA	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Nitrite (as N)	DLM	L1449577-10
Duplicate	Nitrate (as N)	DLM	L1449577-10
Duplicate	Nitrite (as N)	DLM	L1449577-10
Duplicate	Nitrate (as N)	DLM	L1449577-10
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1449577-1, -10, -2, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1449577-3
Matrix Spike	Phosphorus (P)-Total	MS-B	L1449577-3
Matrix Spike	Phosphorus (P)-Total	MS-B	L1449577-3
Matrix Spike	Nitrate (as N)	MS-B	L1449577-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1449577-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Total	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Total	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Total	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Total	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9



## Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1449577-1, -2, -3, -4, -5, -6, -7, -8, -9

## 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.
RRV	Reported Result Verified By Repeat Analysis

## 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-DOC-VA</b>	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.			
<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)".			

## Reference Information

<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 CaCO <sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
<b>IONBALANCE-VA</b>	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]			
<b>MET-D-CCMS-VA</b>	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).			
<b>MET-T-CCMS-VA</b>	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).			
<b>NH3-F-VA</b>	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. Weston et al.			
<b>P-T-COL-VA</b>	Water	Total P in Water by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorous is determined colourimetrically after persulphate digestion of the sample.			
<b>PH-PCT-VA</b>	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.			
<b>PH-PCT-VA</b>	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.			
<b>TDS-VA</b>	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.			
<b>TSS-LOW-VA</b>	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 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.			
<b>ZR-D-MS-VA</b>	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).			
<b>ZR-T-MS-VA</b>	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).			

## Reference Information

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

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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:

#### 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



L1449577-COFC

COC Number: 14 -

Page 1 of 1

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<b>Report To</b>		<b>Report Format / Distribution</b>			<b>Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)</b>												
Company: EDI		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: Meighan Kearns		Quality Control (QC) Report with Report <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			P <input type="checkbox"/> Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT												
Address: 2195 - 2nd Avenue Whitehorse, YT Y1A 3T8		<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: 867-393-4882		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: mkearns@edynamics.com			Specify Date Required for E2, E or P:												
		Email 2: adrienne.turcotte@gov.yk.ca			<b>Analysis Request</b>												
<b>Invoice To</b>		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												
Same as Report To <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX															
Copy of Invoice with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Email 1 or Fax: sjenner@edynamics.com															
Company: EDI		Email 2:															
Contact: S Jenner																	
<b>Project Information</b>		<b>Oil and Gas Required Fluids (client use)</b>															
ALS Quote #: Q38556		Approver ID:															
Job #: 14-Y-270		GL Account:															
PO / AFE:		Activity Code:															
LSD:		Location:															
ALS Lab Work Order # (lab use only)		ALS Contact:															
L1449577		Sampler: ESM, CB															
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	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-COMS-VA, ZR-T-MS-VA	MET-D-COMS-VA, ZR-D-MS-VA	HARDNESS-CALC-VA	Number of Containers	
1	X14			29 APR 14	9:00	GRAB	R	R	R	R	R	R	R	R	R	5	
2	X10			29 APR 14	10:25	GRAB	R										
3	X3A			29 APR 14	10:55	GRAB	R										
4	XZ			29 APR 14	11:15	GRAB	R										
5	NF2-A			29 APR 14	11:40	GRAB	R										
6	NF2-B			29 APR 14	11:55	GRAB	R										
7	NF2			29 APR 14	12:00	GRAB	R										
8	NF2-F			29 APR 14	12:05	GRAB	R										
9	Field Blank			29 APR 14	12:45		R										
10	Travel Blank						R										
<b>Drinking Water (DW) Sample</b>		<b>Short Holding Time</b>			<b>Rush Processing</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>									
Are samples taken from a Regulated I <input type="checkbox"/> Yes <input type="checkbox"/> No								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 type="checkbox"/> No								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				
								1.0									
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>									
Released by:		Date:		Time:		Received by:		Date:		Time:		Received by:		Date:		Time:	
						J.K.		30-Apr-14		9:30		2.4C		2.4C		10:25	