



ENVIRONMENTAL DYNAMICS INC.
ATTN: Meighan Kearns
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Date Received: 12-FEB-14
Report Date: 17-FEB-14 16:39 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1421713
Project P.O. #: NOT SUBMITTED
Job Reference: 13-Y-0452
C of C Numbers: 1, 2
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	L1421713-1 Surface Water 12-FEB-14 13:00 TRAVEL BLANK	L1421713-2 Surface Water 11-FEB-14 15:25 X2	L1421713-3 Surface Water 11-FEB-14 14:50 X10	L1421713-4 Surface Water 11-FEB-14 19:20 FIELD BLANK	L1421713-5 Surface Water 11-FEB-14 15:50 NF2	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	297	301	<2.0	289
	Hardness (as CaCO3) (mg/L)	<0.50	148	161	<0.50	149
	pH (pH)	5.71	7.48	7.73	5.85	7.42
	Total Suspended Solids (mg/L)	<1.0	1.2	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	<1.0	176	181	<1.0	173
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<2.0	128	134	<2.0	129
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0061	0.0086	<0.0050	0.0083
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	0.186	0.173	<0.020	0.184
	Nitrate (as N) (mg/L)	<0.0050	0.270	0.258	<0.0050	0.299
	Nitrite (as N) (mg/L)	<0.0010	0.0012	<0.0010	<0.0010	0.0011
	Phosphorus (P)-Total (mg/L)	<0.0020	0.0023	<0.0020	<0.0020	0.0024
	Sulfate (SO4) (mg/L)	<0.50	39.4	36.3	<0.50	34.5
	Anion Sum (meq/L)	<0.10	3.41	3.46	<0.10	3.33
	Cation Sum (meq/L)	<0.10	3.17	3.42	<0.10	3.18
	Cation - Anion Balance (%)	0.0	-3.7	-0.6	0.0	-2.3
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		1.36	1.37	<0.50	1.33
	Total Organic Carbon (mg/L)	<0.50	1.38	1.29	<0.50	1.32
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	0.0238	0.0063	<0.0030	0.0189
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	<0.00010	0.00042	0.00026	<0.00010	0.00043
	Barium (Ba)-Total (mg/L)	<0.000050	0.0736	0.0709	<0.000050	0.0723
	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)	<0.000010	0.000573	0.000266	<0.000010	0.000654
	Calcium (Ca)-Total (mg/L)	<0.020	39.1	44.7	<0.020	43.1
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00387	0.00117	<0.00010	0.00440
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	<0.010	0.270	0.207	<0.010	0.237
	Lead (Pb)-Total (mg/L)	<0.000050	0.000326	0.000150	<0.000050	0.000301
	Lithium (Li)-Total (mg/L)	<0.00050	0.00764	0.00649	<0.00050	0.00788
	Magnesium (Mg)-Total (mg/L)	<0.0050	10.8	11.0	<0.0050	10.7
	Manganese (Mn)-Total (mg/L)	<0.000050	0.257	0.111	<0.000050	0.249
	Molybdenum (Mo)-Total (mg/L)	<0.000050	0.000756	0.000702	<0.000050	0.000877

* 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	L1421713-6 Surface Water 11-FEB-14 14:25 X14	L1421713-7 Surface Water 11-FEB-14 16:20 R9	L1421713-8 Surface Water 11-FEB-14 14:25 X14-R	L1421713-9 Surface Water 11-FEB-14 16:35 R10	L1421713-10 Surface Water 11-FEB-14 15:05 X3A
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	610	269	638	261	301
	Hardness (as CaCO3) (mg/L)	386	139	383	143	150
	pH (pH)	7.56	7.86	7.56	7.72	7.56
	Total Suspended Solids (mg/L)	2.0	<1.0	1.8	<1.0	1.6
	Total Dissolved Solids (mg/L)	475	154	475	155	176
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	171	127	169	125	130
	Ammonia, Total (as N) (mg/L)	0.0867	0.0053	0.0769	<0.0050	0.0187
	Chloride (Cl) (mg/L)	<0.50	<0.50	0.68	<0.50	<0.50
	Fluoride (F) (mg/L)	0.165	0.169	0.164	0.169	0.175
	Nitrate (as N) (mg/L)	0.224	0.284	0.224	0.272	0.255
	Nitrite (as N) (mg/L)	<0.0010	0.0011	<0.0010	0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020	0.0041	<0.0020	0.0047	0.0031
	Sulfate (SO4) (mg/L)	218	21.5	219	22.0	36.7
	Anion Sum (meq/L)	7.98	3.02	8.00	2.99	3.39
	Cation Sum (meq/L)	8.26	2.95	8.21	3.02	3.20
	Cation - Anion Balance (%)	1.7	-1.2	1.3	0.5	-2.9
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.35	1.28	1.28	1.16	1.45
	Total Organic Carbon (mg/L)	1.40	1.20	1.13	1.41	1.43
Total Metals	Aluminum (Al)-Total (mg/L)	0.0150	0.0132	0.0132	0.0100	0.0236
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00037	0.00058	0.00038	0.00054	0.00043
	Barium (Ba)-Total (mg/L)	0.0687	0.0710	0.0721	0.0700	0.0726
	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)	0.000261	<0.000010	0.000274	0.000016	0.000391
	Calcium (Ca)-Total (mg/L)	98.5	36.9	103	37.5	41.8
	Chromium (Cr)-Total (mg/L)	0.00011	0.00012	<0.00010	<0.00010	0.00013
	Cobalt (Co)-Total (mg/L)	0.00361	<0.00010	0.00357	<0.00010	0.00247
	Copper (Cu)-Total (mg/L)	0.00058	<0.00050	<0.00050	<0.00050	0.00074
	Iron (Fe)-Total (mg/L)	0.734	0.138	0.732	0.136	0.341
	Lead (Pb)-Total (mg/L)	0.000168	0.000429	0.000222	0.000057	0.000581
	Lithium (Li)-Total (mg/L)	0.00745	0.00601	0.00773	0.00626	0.00615
	Magnesium (Mg)-Total (mg/L)	23.7	8.67	23.8	8.57	10.8
	Manganese (Mn)-Total (mg/L)	4.00	0.0227	3.97	0.0248	0.207
	Molybdenum (Mo)-Total (mg/L)	0.000680	0.000821	0.000704	0.000801	0.000682

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1421713-1 Surface Water 12-FEB-14 13:00 TRAVEL BLANK	L1421713-2 Surface Water 11-FEB-14 15:25 X2	L1421713-3 Surface Water 11-FEB-14 14:50 X10	L1421713-4 Surface Water 11-FEB-14 19:20 FIELD BLANK	L1421713-5 Surface Water 11-FEB-14 15:50 NF2
Grouping	Analyte					
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)	<0.00050	0.00603	0.00371	<0.00050	0.00664
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	<0.050	1.01	1.09	<0.050	1.00
	Selenium (Se)-Total (mg/L)	<0.00010	0.00041	0.00039	<0.00010	0.00042
	Silicon (Si)-Total (mg/L)	<0.050	5.61	5.48	<0.050	5.96
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	<0.050	3.05	2.94	<0.050	3.13
	Strontium (Sr)-Total (mg/L)	<0.00020	0.176	0.207	<0.00020	0.192
	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)	<0.000010	0.00238	0.00267	<0.000010	0.00261
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	<0.0030	0.936	0.532	<0.0030	1.01
	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)		0.0028	0.0015	<0.0010	0.0041
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00020	0.00015	<0.00010	0.00028
	Barium (Ba)-Dissolved (mg/L)		0.0755	0.0806	0.000174 ^{RRV}	0.0714
	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)		0.000603	0.000282	<0.000010	0.000634
	Calcium (Ca)-Dissolved (mg/L)		39.4	43.7	<0.020	41.5
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		0.00410	0.00131	<0.00010	0.00426
	Copper (Cu)-Dissolved (mg/L)		0.00029	0.00033	<0.00020	0.00028
	Iron (Fe)-Dissolved (mg/L)		0.045	0.017	<0.010	0.097
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	0.000056
	Lithium (Li)-Dissolved (mg/L)		0.00714	0.00659	<0.00050	0.00750
	Magnesium (Mg)-Dissolved (mg/L)		12.0	12.5	<0.0050	10.9
	Manganese (Mn)-Dissolved (mg/L)		0.277	0.125	<0.000050	0.242
	Molybdenum (Mo)-Dissolved (mg/L)		0.000716	0.000661	<0.000050	0.000783
	Nickel (Ni)-Dissolved (mg/L)		0.00632	0.00426	<0.00050	0.00635
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		1.10	1.27	<0.050	1.01

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1421713-6 Surface Water 11-FEB-14 14:25 X14	L1421713-7 Surface Water 11-FEB-14 16:20 R9	L1421713-8 Surface Water 11-FEB-14 14:25 X14-R	L1421713-9 Surface Water 11-FEB-14 16:35 R10	L1421713-10 Surface Water 11-FEB-14 15:05 X3A
Grouping	Analyte					
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)	0.00893	<0.00050	0.00856	<0.00050	0.00461
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	1.82	0.971	1.82	0.940	1.11
	Selenium (Se)-Total (mg/L)	0.00040	0.00044	0.00036	0.00041	0.00037
	Silicon (Si)-Total (mg/L)	5.98	5.92	6.05	5.69	5.74
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	6.57	3.12	6.52	2.78	3.03
	Strontium (Sr)-Total (mg/L)	0.325	0.159	0.328	0.164	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	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00301	0.00248	0.00328	0.00245	0.00252
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.428	<0.0030	0.429	0.0088	0.688
	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)	<0.0010	0.0014	<0.0010	0.0046	0.0020
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00021	0.00044	0.00022	0.00040	0.00017
	Barium (Ba)-Dissolved (mg/L)	0.0741	0.0773	0.0741	0.0796	0.0715
	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)	0.000290	<0.000010	0.000283	0.000017	0.000365
	Calcium (Ca)-Dissolved (mg/L)	112	40.4	110	41.8	43.1
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00389	<0.00010	0.00390	<0.00010	0.00232
	Copper (Cu)-Dissolved (mg/L)	0.00033	0.00025	0.00033	0.00027	0.00029
	Iron (Fe)-Dissolved (mg/L)	0.382	0.026	0.385	0.029	0.061
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.00865	0.00695	0.00823	0.00712	0.00634
	Magnesium (Mg)-Dissolved (mg/L)	25.7	9.32	26.3	9.30	10.4
	Manganese (Mn)-Dissolved (mg/L)	4.31	0.0215	4.47	0.0256	0.197
	Molybdenum (Mo)-Dissolved (mg/L)	0.000755	0.000836	0.000731	0.000843	0.000652
	Nickel (Ni)-Dissolved (mg/L)	0.00944	<0.00050	0.00954	<0.00050	0.00440
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	2.04	1.03	2.05	1.06	1.12

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L1421713-1	L1421713-2	L1421713-3	L1421713-4	L1421713-5
					Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
		12-FEB-14	13:00			11-FEB-14	11-FEB-14	11-FEB-14	11-FEB-14
					TRAVEL BLANK	X2	X10	FIELD BLANK	NF2
Grouping	Analyte								
WATER									
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)					0.00032	0.00041	<0.00010	0.00045
	Silicon (Si)-Dissolved (mg/L)					4.38	6.25	<0.050	6.02
	Silver (Ag)-Dissolved (mg/L)					<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)					3.30	3.40	<0.050	3.21
	Strontium (Sr)-Dissolved (mg/L)					0.171	0.208	<0.00020	0.187
	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)					0.00234	0.00263	<0.000010	0.00252
	Vanadium (V)-Dissolved (mg/L)					<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)					1.01	0.599	<0.0010	1.03
	Zirconium (Zr)-Dissolved (mg/L)					<0.00080	<0.00080	<0.00080	<0.00080

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1421713-6	L1421713-7	L1421713-8	L1421713-9	L1421713-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	11-FEB-14	11-FEB-14	11-FEB-14	11-FEB-14	11-FEB-14	11-FEB-14
Sampled Time	14:25	16:20	14:25	16:35	15:05	15:05
Client ID	X14	R9	X14-R	R10	X3A	X3A
Grouping	Analyte					
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00042	0.00048	0.00042	0.00048	0.00036
	Silicon (Si)-Dissolved (mg/L)	6.60	6.15	6.57	6.48	5.58
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	6.97	3.11	7.15	3.19	2.98
	Strontium (Sr)-Dissolved (mg/L)	0.373	0.172	0.359	0.181	0.194
	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)	0.00355	0.00249	0.00355	0.00253	0.00273
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.462	0.0011	0.467	0.0104	0.671
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

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Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Antimony (Sb)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Boron (B)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lithium (Li)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Phosphorus (P)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zinc (Zn)-Dissolved	DLA	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1421713-10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1421713-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1421713-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1421713-1, -10, -2, -3, -4, -5, -6, -7, -8, -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.
RRV	Reported Result Verified By Repeat Analysis

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
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.			

Reference Information

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 CaCO ₃ 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:			
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-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-COL-VA	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.			
PH-MAN-WR	Water	pH by Meter	APHA 4500-H (B)
"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			

Reference Information

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
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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.



...s subject to availability)



Report To		Report Format / Distribution		<input type="radio"/> Regular (Standard Turnaround Times - Business Days) <input checked="" type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Company: EDI		<input checked="" type="checkbox"/> Standard	<input type="checkbox"/> Other		
Contact: Meighan Kearns		<input checked="" type="checkbox"/> PDF	<input checked="" type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address: 2195 - 2nd Avenue		Email 1: <u>mkearns@edynamics.com</u>			
Whitehorse, YT Y1A 3T8		Email 2: <u>adrienne.turcotte@gov.yk.ca</u>			
Phone: 867-393-4882	Fax:	Email 3:			
Invoice To Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Client / Project Information		Analysis Request Please indicate below Filtered, Preserved or both (F, P, F/P)	
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Job #:	13-Y-0452		
Company:		PO / AFE:			
Contact:		LSD:			
Address:		Quote #:	Q38556		
Phone:	Fax:	ALS Contact:	Sampler: <u>L.GRIEVE</u>		

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-COL-VA,P-T-COL-VA	ANIONS-ALL-IC-WR	CARBONS-DOC-VA	CARBONS-TOC-VA,NH3-F-V	EC-MAN-WR,PH-MAN-WR	MET-D-CCMS-VA,ZR-D-MS-	MET-T-CCMS-VA,ZR-T-MS-	IONBALANCE-VA	TDS-CALC-VA	TSS-LOW-WR	HARDNESS-CALC-VA	Number of Containers
1	TRAVEL BLANK	N/A	N/A	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
2	X2	11-FEB-14	1525	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
3	X10	11-FEB-14	1450	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
4	Field Blank	11-FEB-14	1920	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
5	NF2	11-FEB-14	1550	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
6	X14	11-FEB-14	1425	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
7	R9	11-FEB-14	1620	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
8	X14-r	11-FEB-14	14:25	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5

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

Use Faro Equis Format to report
 Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
 By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
 Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)				
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Laura Briere			[Signature]	12-FEB-14	2:05	6.9 / 10.5 °C				



Analysis subject to availability)

Report To			Report Format / Distribution				Analysis Request									
Company: EDI			<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax				<input type="radio"/> Regular (Standard Turnaround Times - Business Days) <input checked="" type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT									
Contact: Meighan Kearns			Email 1: mkearns@edynamics.com													
Address: 2195 - 2nd Avenue			Email 2: adrienne.turcotte@gov.yk.ca													
Whitehorse, YT Y1A 3T8			Email 3:													
Phone: 867-393-4882 Fax:			Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)									
Invoice To Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			Job #: 13-Y-0452													
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			PO / AFE:													
Company:			LSD:													
Contact:			Quote #: Q38556													
Address:			ALS Contact:													
Phone: Fax:			Sampler: L. GRIEVE													
Lab Work Order # (lab use only)																
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-COL-VA, P, T-COL-VA	ANIONS-ALL-IC-WR	CARBONS-DOC-VA	CARBONS-TOC-VA, NH3-F-N	EC-MAN-WR, PH-MAN-WR	MET-D-CCMS-VA, ZR-D-MS	MET-T-CCMS-VA, ZR-T-MS	IONBALANCE-VA	TDS-CALC-VA	TSS-LOW-WR	HARDNESS-CALC-VA	Number of Containers
1	R10	11-FEB-14	16:35	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
2	X3A	11-FEB-14	15:05	Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
				Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
				Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
				Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
				Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
				Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
				Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
				Surface Water	X	X	X	X	X	X	X	X	X	X	X	5
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details																
Use Faro Equis Format to report																
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																
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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.																
SHIPMENT RELEASE (client use)					SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)						
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:						
Laura Grieve						°C				Yes / No ? If Yes add SIF						