



ENVIRONMENTAL DYNAMICS INC.
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Date Received: 03-JUN-13
Report Date: 17-JUN-13 12:25 (MT)
Version: FINAL REV. 2

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1310330
Project P.O. #: NOT SUBMITTED
Job Reference: 13-Y-0215
C of C Numbers: 1
Legal Site Desc:

Comments: Revision 1: Please note we cannot report Silver results for ALS identified sample L1310330-6 because the result is > 0.1 mg/L and above this limit the results are not reliable.

Revision 2: Please note this report replaces and supercedes previously sent report. This report includes Hardness data for all samples.

17-JUN-13: This report replaces and supercedes previously sent report. This report includes Hardness data for all samples.

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		L1310330-1 Water 31-MAY-13 14:14 SRK05-09	L1310330-2 Water 31-MAY-13 17:15 P09-LCD4	L1310330-3 Water 31-MAY-13 15:09 P09-LCD1	L1310330-4 Water 31-MAY-13 16:28 P09-LCD6	L1310330-5 Water 01-JUN-13 08:53 P03-0601
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	1350	888	825	937	4200
	Hardness (as CaCO3) (mg/L)	854	323	430	537	2130
	pH (pH)	8.10	8.19	8.12	8.07	5.57
	Total Suspended Solids (mg/L)	356	158	36.7	588	75.3
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	8.0	4.1	5.4	7.2	1020
	Alkalinity, Total (as CaCO3) (mg/L)	236	350	269	258	22.5
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<2.5 ^{DLA}	<2.5 ^{DLA}	<5.0 ^{DLA}	<10 ^{DLA}
	Sulfate (SO4) (mg/L)	622	171	205	280	3360
Total Metals	Aluminum (Al)-Total (mg/L)	6.75	11.7	0.677	13.8	3.76
	Antimony (Sb)-Total (mg/L)	0.00111	0.00167	0.00029	0.00156	<0.0050 ^{DLA}
	Arsenic (As)-Total (mg/L)	0.0332	0.0215	0.105	0.227	<0.0050 ^{DLA}
	Barium (Ba)-Total (mg/L)	0.375	0.350	0.112	0.474	0.0468
	Beryllium (Be)-Total (mg/L)	0.00030	0.00050	<0.00010	0.00045	<0.0050 ^{DLA}
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.025 ^{DLA}
	Boron (B)-Total (mg/L)	<0.010	0.018	0.014	0.016	<0.50 ^{DLA}
	Cadmium (Cd)-Total (mg/L)	0.000666	0.000407	0.000088	0.000549	0.0737
	Calcium (Ca)-Total (mg/L)	146	95.8	122	162	546
	Chromium (Cr)-Total (mg/L)	0.0247	0.0353	0.00259	0.0610	0.0065
	Cobalt (Co)-Total (mg/L)	0.00962	0.0112	0.00096	0.0124	3.58
	Copper (Cu)-Total (mg/L)	0.0538	0.0279	0.00173	0.0405	<0.025 ^{DLA}
	Iron (Fe)-Total (mg/L)	13.6	16.6	5.07	33.0	433
	Lead (Pb)-Total (mg/L)	0.217	0.168	0.0814	0.392	0.0229
	Lithium (Li)-Total (mg/L)	0.0157	0.0241	0.0107	0.0287	0.103
	Magnesium (Mg)-Total (mg/L)	109	28.6	34.7	50.6	188
	Manganese (Mn)-Total (mg/L)	0.277	0.988	0.603	0.892	279
	Molybdenum (Mo)-Total (mg/L)	0.00166	0.00721	0.00523	0.00297	<0.0025 ^{DLA}
	Nickel (Ni)-Total (mg/L)	0.0290	0.0382	0.00306	0.0479	4.33
	Phosphorus (P)-Total (mg/L)	0.31	<0.30	<0.30	0.66	<15 ^{DLA}
	Potassium (K)-Total (mg/L)	3.63	3.66	2.80	3.83	9.7
	Selenium (Se)-Total (mg/L)	0.00078	0.00041	<0.00010	0.00021	<0.0050 ^{DLA}
	Silicon (Si)-Total (mg/L)	16.8	25.5	8.56	28.2	37.9
	Silver (Ag)-Total (mg/L)	0.000522	0.000284	0.000042	0.000463	<0.00050 ^{DLA}
	Sodium (Na)-Total (mg/L)	6.55	82.5	16.7	7.25	29.9
	Strontium (Sr)-Total (mg/L)	0.497	0.504	0.757	0.833	2.25
	Thallium (Tl)-Total (mg/L)	0.000207	0.000188	0.000024	0.000153	<0.00050 ^{DLA}
	Tin (Sn)-Total (mg/L)	0.00077	0.00142	0.00017	0.00098	<0.0050 ^{DLA}
	Titanium (Ti)-Total (mg/L)	0.156	0.281	0.016	0.276	<0.50 ^{DLA}

* 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		L1310330-6 Water 01-JUN-13 10:20 P03-06-6	L1310330-7 Water 01-JUN-13 08:36 FIELD BLANK	L1310330-8 Water 31-MAY-13 08:54 BH14B	L1310330-9 Water 01-JUN-13 10:51 SRK08-P9	L1310330-10 Water 01-JUN-13 09:33 P03-06-2
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	4500	<2.0	3970	1670	4730
	Hardness (as CaCO3) (mg/L)	2140	<0.50	2900	1020	1860
	pH (pH)	4.92	7.03	7.75	8.05	5.36
	Total Suspended Solids (mg/L)	8600	<1.0	88.6	2.4	8140
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1590	2.1	29.3	7.2	1800
	Alkalinity, Total (as CaCO3) (mg/L)	13.1	<2.0	458	220	16.1
	Chloride (Cl) (mg/L)	<10 ^{DLA}	<0.50	<10 ^{DLA}	<5.0 ^{DLA}	<10 ^{DLA}
	Sulfate (SO4) (mg/L)	3620	<0.50	2490	996	4300
Total Metals	Aluminum (Al)-Total (mg/L)	37.8	<0.0030	0.310	0.262	180
	Antimony (Sb)-Total (mg/L)	0.216	<0.00010	<0.00050 ^{DLA}	0.00010	<0.0020 ^{DLA}
	Arsenic (As)-Total (mg/L)	3.14	<0.00010	<0.00050 ^{DLA}	0.00030	0.158
	Barium (Ba)-Total (mg/L)	0.245	<0.000050	0.0379	0.0278	1.56
	Beryllium (Be)-Total (mg/L)	<0.010 ^{DLA}	<0.00010	<0.00050 ^{DLA}	<0.00010	0.0089
	Bismuth (Bi)-Total (mg/L)	<0.050 ^{DLA}	<0.00050	<0.0025 ^{DLA}	<0.00050	<0.010 ^{DLA}
	Boron (B)-Total (mg/L)	<1.0 ^{DLA}	<0.010	<0.050 ^{DLA}	0.010	<0.20 ^{DLA}
	Cadmium (Cd)-Total (mg/L)	0.385	<0.000010	0.000082	0.000060	0.0839
	Calcium (Ca)-Total (mg/L)	215	<0.020	729	269	528
	Chromium (Cr)-Total (mg/L)	0.284	<0.00010	<0.00050 ^{DLA}	0.00198	0.512
	Cobalt (Co)-Total (mg/L)	1.29	<0.00010	<0.00050 ^{DLA}	0.00229	2.23
	Copper (Cu)-Total (mg/L)	9.82	<0.00050	<0.0025 ^{DLA}	0.00168	0.549
	Iron (Fe)-Total (mg/L)	2850	<0.010	0.495	0.440	1280
	Lead (Pb)-Total (mg/L)	18.4	<0.000050	0.0153	0.00127	0.728
	Lithium (Li)-Total (mg/L)	0.102	<0.00050	0.0756	0.0191	0.364
	Magnesium (Mg)-Total (mg/L)	406	<0.0050	307	74.4	264
	Manganese (Mn)-Total (mg/L)	88.0	<0.000050	0.0131	0.0960	182
	Molybdenum (Mo)-Total (mg/L)	0.0382	<0.000050	<0.00025 ^{DLA}	0.00272	0.0214
	Nickel (Ni)-Total (mg/L)	0.798	<0.00050	0.0157 ^{DLA}	0.0142	3.17 ^{DLA}
	Phosphorus (P)-Total (mg/L)	<30 ^{DLA}	<0.30	<1.5 ^{DLA}	<0.30	<6.0 ^{DLA}
	Potassium (K)-Total (mg/L)	17.4 ^{DLA}	<0.050	4.44 ^{DLA}	2.38	28.8 ^{DLA}
	Selenium (Se)-Total (mg/L)	<0.010	<0.00010	<0.00050	0.00106	<0.0020
	Silicon (Si)-Total (mg/L)	51.3	<0.050	10.4	6.46	149
	Silver (Ag)-Total (mg/L)	Not Reportable ^{RRR}	<0.000010	<0.000050 ^{DLA}	<0.000010	0.00247
	Sodium (Na)-Total (mg/L)	41.8	<0.050	16.3	8.97	29.4
	Strontium (Sr)-Total (mg/L)	0.354	<0.00020	3.57	5.77	2.33
	Thallium (Tl)-Total (mg/L)	0.0302	<0.000010	<0.000050 ^{DLA}	0.000010	0.00277
	Tin (Sn)-Total (mg/L)	0.020	<0.00010	<0.00050 ^{DLA}	<0.00010	0.0027
	Titanium (Ti)-Total (mg/L)	<1.0 ^{DLA}	<0.010	<0.050 ^{DLA}	0.014	5.40

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1310330-1 Water 31-MAY-13 14:14 SRK05-09	L1310330-2 Water 31-MAY-13 17:15 P09-LCD4	L1310330-3 Water 31-MAY-13 15:09 P09-LCD1	L1310330-4 Water 31-MAY-13 16:28 P09-LCD6	L1310330-5 Water 01-JUN-13 08:53 P03-0601
Grouping	Analyte					
WATER						
Total Metals	Uranium (U)-Total (mg/L)	0.0154	0.00562	0.00752	0.00426	0.00207
	Vanadium (V)-Total (mg/L)	0.0167	0.0264	0.0015	0.0281	<0.050 ^{DLA}
	Zinc (Zn)-Total (mg/L)	0.114	0.0904	0.0152	0.151	19.3
	Zirconium (Zr)-Total (mg/L)	0.00116	0.00463	<0.00080	0.00255	<0.040 ^{DLA}
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0037	0.0057	<0.0010	<0.0010	1.82 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	0.00025	0.00067	0.00013	<0.00010	<0.0050 ^{DLA}
	Arsenic (As)-Dissolved (mg/L)	0.00068	0.00294	0.101	0.122	<0.0050 ^{DLA}
	Barium (Ba)-Dissolved (mg/L)	0.0498	0.0876	0.0345	0.0449	0.0154 ^{DLA}
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0050 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.025 ^{DLA}
	Boron (B)-Dissolved (mg/L)	<0.010	0.013	0.011	0.011	<0.50 ^{DLA}
	Cadmium (Cd)-Dissolved (mg/L)	0.000130	0.000131	0.000037	0.000023	0.0753
	Calcium (Ca)-Dissolved (mg/L)	157	90.8	118	147	548 ^{DLA}
	Chromium (Cr)-Dissolved (mg/L)	0.00023	0.00014	<0.00010	<0.00010	<0.0050
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00034	0.00046	0.00128	3.61
	Copper (Cu)-Dissolved (mg/L)	0.00232	0.00570	<0.00020	<0.00020	0.010
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.012	3.83	7.09	424
	Lead (Pb)-Dissolved (mg/L)	0.000496	0.00135	0.0203	0.00415	0.0108
	Lithium (Li)-Dissolved (mg/L)	0.00553	0.00788	0.00913	0.00796	0.102
	Magnesium (Mg)-Dissolved (mg/L)	112	23.4	33.0	41.3	185
	Manganese (Mn)-Dissolved (mg/L)	0.000298	0.303	0.583	0.560	279 ^{DLA}
	Molybdenum (Mo)-Dissolved (mg/L)	0.00116	0.00598	0.00508	0.00237	<0.0025
	Nickel (Ni)-Dissolved (mg/L)	0.00092	0.00624	0.00065	0.00117	4.39 ^{DLA}
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<15 ^{DLA}
	Potassium (K)-Dissolved (mg/L)	2.87	1.83	2.66	2.44	9.4 ^{DLA}
	Selenium (Se)-Dissolved (mg/L)	0.00061	0.00028	<0.00010	<0.00010	<0.0050
	Silicon (Si)-Dissolved (mg/L)	3.85	4.56	7.23	7.70	36.2 ^{DLA}
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.00050
	Sodium (Na)-Dissolved (mg/L)	6.49	84.2	15.6	6.83	29.5
	Strontium (Sr)-Dissolved (mg/L)	0.534	0.467	0.739	0.783	2.26 ^{DLA}
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000024	<0.000010	<0.000010	<0.00050 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00013	<0.00010	<0.00010	<0.0050 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.50 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.0169	0.00498	0.00710	0.00341	0.00196 ^{DLA}
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.050
	Zinc (Zn)-Dissolved (mg/L)	0.0034	0.0073	0.0060	0.0029	19.2

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1310330-6 Water 01-JUN-13 10:20 P03-06-6	L1310330-7 Water 01-JUN-13 08:36 FIELD BLANK	L1310330-8 Water 31-MAY-13 08:54 BH14B	L1310330-9 Water 01-JUN-13 10:51 SRK08-P9	L1310330-10 Water 01-JUN-13 09:33 P03-06-2
Grouping	Analyte					
WATER						
Total Metals	Uranium (U)-Total (mg/L)	0.0369	<0.000010	0.183 ^{DLA}	0.00513	0.0176
	Vanadium (V)-Total (mg/L)	0.15	<0.0010	<0.0050	0.0011	0.356
	Zinc (Zn)-Total (mg/L)	513 ^{DLA}	<0.0030	0.641 ^{DLA}	0.0110	28.4
	Zirconium (Zr)-Total (mg/L)	<0.080	<0.00080	<0.0040	<0.00080	0.020
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.11 ^{DLA}	<0.0010	<0.0050 ^{DLA}	0.0014	0.725 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	<0.010	<0.00010	<0.00050 ^{DLA}	<0.00010	<0.0020 ^{DLA}
	Arsenic (As)-Dissolved (mg/L)	0.020 ^{DLA}	<0.00010	<0.00050 ^{DLA}	0.00011	<0.0020 ^{DLA}
	Barium (Ba)-Dissolved (mg/L)	<0.0050 ^{DLA}	<0.000050	0.0208 ^{DLA}	0.0223	0.0125 ^{DLA}
	Beryllium (Be)-Dissolved (mg/L)	<0.010 ^{DLA}	<0.00010	<0.00050 ^{DLA}	<0.00010	<0.0020 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.050 ^{DLA}	<0.00050	<0.0025 ^{DLA}	<0.00050	<0.010 ^{DLA}
	Boron (B)-Dissolved (mg/L)	<1.0 ^{DLA}	<0.010	<0.050 ^{DLA}	<0.010	<0.20 ^{DLA}
	Cadmium (Cd)-Dissolved (mg/L)	0.0261	<0.000010	0.000088	0.000049	0.0342
	Calcium (Ca)-Dissolved (mg/L)	195 ^{DLA}	<0.020	683 ^{DLA}	285	457 ^{DLA}
	Chromium (Cr)-Dissolved (mg/L)	<0.010	<0.00010	<0.00050 ^{DLA}	<0.00010	<0.0020 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	0.194 ^{DLA}	<0.00010	<0.00050 ^{DLA}	0.00233	2.02 ^{DLA}
	Copper (Cu)-Dissolved (mg/L)	<0.020 ^{DLA}	<0.00020	<0.0010 ^{DLA}	0.00054	<0.0040 ^{DLA}
	Iron (Fe)-Dissolved (mg/L)	564	<0.010	<0.050 ^{DLA}	<0.010	997
	Lead (Pb)-Dissolved (mg/L)	0.149 ^{DLA}	<0.000050	0.00647	0.000111	0.0100
	Lithium (Li)-Dissolved (mg/L)	<0.050	<0.00050	0.0720	0.0190	0.080
	Magnesium (Mg)-Dissolved (mg/L)	400	<0.0050	291	74.3 ^{DTC}	176
	Manganese (Mn)-Dissolved (mg/L)	73.8 ^{DLA}	<0.000050	0.00101 ^{DLA}	0.135	180
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0050	<0.000050	<0.00025 ^{DLA}	0.00322	0.0053
	Nickel (Ni)-Dissolved (mg/L)	0.245 ^{DLA}	<0.00050	0.0146 ^{DLA}	0.0108	2.61 ^{DLA}
	Phosphorus (P)-Dissolved (mg/L)	<30	<0.30	<1.5 ^{DLA}	<0.30	<6.0 ^{DLA}
	Potassium (K)-Dissolved (mg/L)	12.9 ^{DLA}	<0.050	4.14 ^{DLA}	2.00	6.8 ^{DLA}
	Selenium (Se)-Dissolved (mg/L)	<0.010	<0.00010	<0.00050 ^{DLA}	0.00113	<0.0020 ^{DLA}
	Silicon (Si)-Dissolved (mg/L)	6.1 ^{DLA}	<0.050	8.99 ^{DLA}	6.04	24.7 ^{DLA}
	Silver (Ag)-Dissolved (mg/L)	<0.0010	<0.000010	<0.000050 ^{DLA}	<0.000010	<0.00020 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)	39.8	<0.050	15.8	9.46	24.1
	Strontium (Sr)-Dissolved (mg/L)	0.306 ^{DLA}	<0.00020	3.33 ^{DLA}	6.38	1.78 ^{DLA}
	Thallium (Tl)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.000010	<0.000050 ^{DLA}	<0.000010	<0.00020 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)	<0.010 ^{DLA}	<0.00010	<0.00050 ^{DLA}	<0.00010	<0.0020 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<1.0 ^{DLA}	<0.010	<0.050 ^{DLA}	<0.010	<0.20 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.0030 ^{DLA}	<0.000010	0.183 ^{DLA}	0.00484	0.00155 ^{DLA}
	Vanadium (V)-Dissolved (mg/L)	<0.10	<0.0010	<0.0050 ^{DLA}	<0.0010	<0.020 ^{DLA}
	Zinc (Zn)-Dissolved (mg/L)	344	<0.0010	0.619	0.0027	24.6

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1310330-1 Water 31-MAY-13 14:14 SRK05-09	L1310330-2 Water 31-MAY-13 17:15 P09-LCD4	L1310330-3 Water 31-MAY-13 15:09 P09-LCD1	L1310330-4 Water 31-MAY-13 16:28 P09-LCD6	L1310330-5 Water 01-JUN-13 08:53 P03-0601
Grouping	Analyte					
WATER						
Dissolved Metals	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.040 ^{DLA}

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Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Cadmium (Cd)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1310330-1, -10, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRR	Refer to Report Remarks for issues regarding this analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 "Acidity"
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
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-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
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

Reference Information

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).

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

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

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

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

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

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.



ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC #

Page 1 of 1

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)			
Company: EDI				☒ Standard ☐ Other				☒ Regular (Standard Turnaround Times - Business Days)			
Contact: Lindsey Doetzel				☒ PDF ☒ Excel ☐ Digital ☐ Fax				☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT			
Address: 2195 2nd Avenue				Email 1: ldoetzel@edynamics.com				☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT			
Y1A 3T8				Email 2: bsnow@edynamics.com				☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT			
Phone: 867-393-4882				Fax: hvandevosse@edynamics.com				Analysis Request			
Invoice To: Same as Report?				☒ Yes ☐ No				Please indicate below Filtered, Preserved or both (F, P, F/P)			
Hardcopy of Invoice with Report?				☒ Yes ☐ No							
Company:				PO / AFE:							
Contact:				LSD:							
Address:											
Phone:				Quote #: 38554							
Fax:											
Lab Work Order #				ALS Contact: Sean Sluggett				Sampler: HV, BS, JD, DS			
(lab use only)											
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	General (Acidity, Alkalinity, Chloride, pH COND., sulfates, TSS)	Dissolved Metals (LL)	Total Metals (LL)	F	P	F/P	Number of Containers
1	SRN05-09	31-05-13	14:14	Water							3
2	PO9-LCD4B	31-05-13	17:15	Water							3
3	PO9-LCD1	31-05-13	15:09	Water							3
4	PO9-LCD6	31-05-13	16:28	Water							3
5	PO3-06-1	01-06-13	8:53	Water							3
6	PO3-06-6	01-06-13	10:20	Water							3
7	Field Blank	01-06-13	8:36	Water							3
	BH14B	31-05-13	8:54	Water							3
	SRK08-P9	31-06-13	10:51	Water							3
	PO3-06-2	01-06-13	9:33	Water							3
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/B/C CSR - Commercial/AB Tier 1 - Nat											
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 provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding											
SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: BSN	Date (dd-mm-yy): 03-06-13	Time (hh:mm): 12:00	Received by: [Signature]	Date: 03-Jun-13	Time: 12:05	Temperature: 0.5 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF	