ENVIRONMENTAL DYNAMICS INC.
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Date Received: 13-NOV-13
Report Date: 03-DEC-13 15:47 (MT)
Version: FINAL REV. 2

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1391431

Project P.O. #: NOT SUBMITTED
Job Reference: 13-Y-0452
C of C Numbers: 1
Legal Site Desc:

Comments: 3-DEC-2013 This report replaces and supersedes previously sent report. This report includes revised sample id for ALS identified sample L1391431-1 and -10.

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1391431-1	L1391431-2	L1391431-3	L1391431-4	L1391431-5
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	12-NOV-13	12-NOV-13	12-NOV-13	12-NOV-13	12-NOV-13
	Sampled Time	14:50	14:50	16:30	13:30	16:12
	Client ID	X3A-R	X10	R9	X14	R10
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	244	246	201	655	203
	Hardness (as CaCO3) (mg/L)	125	128	106	396	106
	pH (pH)	7.74	7.66	7.71	7.55	7.69
	Total Suspended Solids (mg/L)	4.6	<1.0	<1.0	4.8	<1.0
	Total Dissolved Solids (mg/L)	152	148	118	533	122
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	106	114	97.5	151	104
	Ammonia, Total (as N) (mg/L)	0.0109	<0.0050	<0.0050	0.131	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	0.54	<0.50
	Fluoride (F) (mg/L)	0.135	0.131	0.128	0.134	0.131
	Nitrate (as N) (mg/L)	0.128	0.131	0.154	0.113	0.153
	Nitrite (as N) (mg/L)	<0.0010	0.0012	0.0012	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0026	0.0022	0.0053	<0.0020	0.0034
	Sulfate (SO4) (mg/L)	32.1	27.5	16.4	279	16.4
	Anion Sum (meq/L)	2.80	2.86	2.31	8.86	2.44
	Cation Sum (meq/L)	2.91	2.70	2.23	8.64	2.25
	Cation - Anion Balance (%)	2.0	-2.9	-1.7	-1.2	-4.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.13	2.28	2.19	2.06	2.03
	Total Organic Carbon (mg/L)	1.93	1.94	1.63	1.89	1.64
Total Metals	Aluminum (Al)-Total (mg/L)	0.0103	0.0086	0.0123	0.0132	0.0163
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00036	0.00028	0.00046	0.00031	0.00042
	Barium (Ba)-Total (mg/L)	0.0594	0.0617	0.0580	0.0578	0.0592
	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)	0.000132	0.000082	<0.000010	0.000089	0.000010
	Calcium (Ca)-Total (mg/L)	33.5	35.9	31.5	118	31.1
	Chromium (Cr)-Total (mg/L)	0.00013	<0.00010	0.00012	<0.00010	0.00013
	Cobalt (Co)-Total (mg/L)	0.00085	0.00063	<0.00010	0.0140	<0.00010
	Copper (Cu)-Total (mg/L)	0.00060	0.00057	<0.00050	0.00061	0.00055
	Iron (Fe)-Total (mg/L)	2.07	0.317	0.085	1.76	0.096
	Lead (Pb)-Total (mg/L)	0.000500	0.000376	0.000095	0.000383	0.000265
	Lithium (Li)-Total (mg/L)	0.00345	0.00331	0.00415	0.00612	0.00401
	Magnesium (Mg)-Total (mg/L)	8.06	8.65	6.64	26.3	6.73
	Manganese (Mn)-Total (mg/L)	0.132	0.114	0.0244	7.73	0.0271
	Molybdenum (Mo)-Total (mg/L)	0.000479	0.000493	0.000611	0.000535	0.000608

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1391431-6	L1391431-7	L1391431-8	L1391431-9	L1391431-10
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	12-NOV-13	12-NOV-13	12-NOV-13	13-NOV-13	13-NOV-13
	Sampled Time	15:30	15:05	14:50	09:30	08:17
	Client ID	NF2	X2	X3A	R-08	NF1-F
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	224	226	283	185	211
	Hardness (as CaCO3) (mg/L)	118	111	125	95.0	112
	pH (pH)	7.35	7.53	6.97	7.75	7.55
	Total Suspended Solids (mg/L)	3.4	<1.0	40.0	2.0	2.2
	Total Dissolved Solids (mg/L)	136	133	183	106	128
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	103	104	73.0	96.4	106
	Ammonia, Total (as N) (mg/L)	0.0051	<0.0050	0.0092	0.0056	0.0154
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.141	0.136	0.137	0.123	0.139
	Nitrate (as N) (mg/L)	0.161	0.152	0.126	0.0970	0.187
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0044	0.0025	0.0032	0.0050	0.0052
	Sulfate (SO4) (mg/L)	25.3	24.6	79.1	8.75	16.8
	Anion Sum (meq/L)	2.61	2.60	3.12	2.12	2.49
	Cation Sum (meq/L)	2.53	2.36	3.12	2.02	2.39
	Cation - Anion Balance (%)	-1.6	-4.8	0.0	-2.4	-1.9
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.97	1.98	2.08	2.05	2.45
	Total Organic Carbon (mg/L)	1.70	2.06	1.73	1.96	2.10
Total Metals	Aluminum (Al)-Total (mg/L)	0.0546	0.0118	0.0148	0.0234	0.0410
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00049	0.00034	0.00034	0.00055	0.00057
	Barium (Ba)-Total (mg/L)	0.0606	0.0612	0.0605	0.0546	0.0613
	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)	0.000326	0.000165	0.000130	<0.000010	0.000015
	Calcium (Ca)-Total (mg/L)	32.9	34.8	38.5	28.6	34.1
	Chromium (Cr)-Total (mg/L)	0.00019	<0.00010	<0.00010	0.00015	0.00020
	Cobalt (Co)-Total (mg/L)	0.00286	0.00142	0.00106	<0.00010	0.00016
	Copper (Cu)-Total (mg/L)	0.00122	<0.00050	0.00054	0.00075	0.00095
	Iron (Fe)-Total (mg/L)	0.339	0.117	4.78	0.123	0.202
	Lead (Pb)-Total (mg/L)	0.00287	0.000950	0.000527	0.000155	0.00118
	Lithium (Li)-Total (mg/L)	0.00484	0.00504	0.00373	0.00419	0.00444
	Magnesium (Mg)-Total (mg/L)	8.06	7.97	8.44	5.50	6.85
	Manganese (Mn)-Total (mg/L)	0.181	0.126	0.196	0.0236	0.0812
	Molybdenum (Mo)-Total (mg/L)	0.000616	0.000622	0.000486	0.000655	0.000727

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1391431-1	L1391431-2	L1391431-3	L1391431-4	L1391431-5
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	12-NOV-13	12-NOV-13	12-NOV-13	12-NOV-13	12-NOV-13
	Sampled Time	14:50	14:50	16:30	13:30	16:12
	Client ID	X3A-R	X10	R9	X14	R10
Grouping	**Analyte**					
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)	0.00171	0.00174	<0.00050	0.0103	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	0.928	0.939	0.735	1.93	0.730
	Selenium (Se)-Total (mg/L)	0.00031	0.00033	0.00034	0.00032	0.00031
	Silicon (Si)-Total (mg/L)	5.37	5.48	5.73	6.02	5.75
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.43	2.41	2.43	7.24	2.38
	Strontium (Sr)-Total (mg/L)	0.159	0.165	0.134	0.364	0.134
	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)	0.00169	0.00177	0.00158	0.00246	0.00159
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.267	0.182	<0.0030	0.169	0.0060
	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)	0.0031	0.0024	0.0036	0.0017	0.0048
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00030	0.00018	0.00039	0.00021	0.00038
	Barium (Ba)-Dissolved (mg/L)	0.0603	0.0621	0.0576	0.0567	0.0580
	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)	0.000136	0.000071	<0.000010	0.000086	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	36.9	37.1	31.4	116	31.4
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00100	0.00061	<0.00010	0.0135	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00040	0.00041	0.00031	0.00033	0.00039
	Iron (Fe)-Dissolved (mg/L)	4.81 DTC	0.194	0.043	1.44	0.046
	Lead (Pb)-Dissolved (mg/L)	0.000191	0.000130	<0.000050	0.000069	0.000098
	Lithium (Li)-Dissolved (mg/L)	0.00385	0.00355	0.00425	0.00587	0.00448
	Magnesium (Mg)-Dissolved (mg/L)	8.03	8.55	6.60	26.0	6.77
	Manganese (Mn)-Dissolved (mg/L)	0.191 DTC	0.111	0.0231	7.48	0.0249
	Molybdenum (Mo)-Dissolved (mg/L)	0.000494	0.000511	0.000610	0.000507	0.000631
	Nickel (Ni)-Dissolved (mg/L)	0.00185	0.00161	<0.00050	0.0100	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.953	0.933	0.725	1.90	0.728

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1391431-6	L1391431-7	L1391431-8	L1391431-9	L1391431-10
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	12-NOV-13	12-NOV-13	12-NOV-13	13-NOV-13	13-NOV-13
	Sampled Time	15:30	15:05	14:50	09:30	08:17
	Client ID	NF2	X2	X3A	R-08	NF1-F
Grouping	**Analyte**					
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)	0.00469	0.00254	0.00186	<0.00050	0.00070
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	0.779	0.820	0.960	0.671	0.878
	Selenium (Se)-Total (mg/L)	0.00030	0.00032	0.00027	0.00033	0.00032
	Silicon (Si)-Total (mg/L)	5.74	5.88	5.52	5.65	5.98
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.45	2.55	2.47	2.32	2.49
	Strontium (Sr)-Total (mg/L)	0.143	0.148	0.173	0.121	0.140
	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)	0.00158	0.00159	0.00181	0.00146	0.00175
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.568	0.286	0.389	<0.0030	0.0162
	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)	0.0070	0.0054	0.0031	0.0045	0.0052
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00035	0.00031	0.00028	0.00045	0.00050
	Barium (Ba)-Dissolved (mg/L)	0.0611	0.0605	0.0595	0.0583	0.0649
	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)	0.000313	0.000160	0.000145	<0.000010	0.000011
	Calcium (Ca)-Dissolved (mg/L)	34.2	31.6	36.2	28.4	33.1
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00264	0.00138	0.00131 DTC	<0.00010	0.00015
	Copper (Cu)-Dissolved (mg/L)	0.00039	0.00043	0.00037	0.00043	0.00050
	Iron (Fe)-Dissolved (mg/L)	0.145	0.057	8.75 DTC	0.070	0.107
	Lead (Pb)-Dissolved (mg/L)	0.000316	0.000307	0.000132	<0.000050	0.000205
	Lithium (Li)-Dissolved (mg/L)	0.00494	0.00475	0.00359	0.00417	0.00468
	Magnesium (Mg)-Dissolved (mg/L)	8.02	7.75	8.29	5.87	7.11
	Manganese (Mn)-Dissolved (mg/L)	0.169	0.124	0.283 DTC	0.0232	0.0824
	Molybdenum (Mo)-Dissolved (mg/L)	0.000607	0.000582	0.000436	0.000639	0.000738
	Nickel (Ni)-Dissolved (mg/L)	0.00427	0.00253	0.00215	<0.00050	0.00056
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.782	0.805	0.973	0.684	0.909

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1391431-1	L1391431-2	L1391431-3	L1391431-4	L1391431-5
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	12-NOV-13	12-NOV-13	12-NOV-13	12-NOV-13	12-NOV-13
	Sampled Time	14:50	14:50	16:30	13:30	16:12
	Client ID	X3A-R	X10	R9	X14	R10
Grouping	**Analyte**					
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00033	0.00032	0.00037	0.00030	0.00036
	Silicon (Si)-Dissolved (mg/L)	5.41	5.43	5.77	5.85	5.79
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.48	2.37	2.33	7.18	2.36
	Strontium (Sr)-Dissolved (mg/L)	0.169	0.165	0.132	0.360	0.135
	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)	0.00171	0.00168	0.00157	0.00241	0.00159
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.392 DTC	0.182	<0.0010	0.162	0.0061
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1391431-6 Surface Water 12-NOV-13 15:30 NF2	L1391431-7 Surface Water 12-NOV-13 15:05 X2	L1391431-8 Surface Water 12-NOV-13 14:50 X3A	L1391431-9 Surface Water 13-NOV-13 09:30 R-08	L1391431-10 Surface Water 13-NOV-13 08:17 NF1-F
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00034	0.00034	0.00031	0.00035	0.00036
	Silicon (Si)-Dissolved (mg/L)	5.93	5.88	5.40	5.81	6.06
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.50	2.50	2.49	2.35	2.89
	Strontium (Sr)-Dissolved (mg/L)	0.143	0.144	0.164	0.120	0.143
	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)	0.00159	0.00159	0.00168	0.00142	0.00172
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.551	0.289	0.570 DTC	0.0015	0.0122
	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.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfate (SO4)	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Antimony (Sb)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1391431-1, -10, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
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.

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.

Reference Information

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.

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:

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.

Reference Information

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 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:	Meighan Kearns			☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	2195 - 2nd Avenue			Email 1:	mkearns@edynamics.com			◉ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Whitehorse, YT Y1A 3T8			Email 2:	Adrienne.Turcotte@gov.yk.ca			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-393-4882	Fax:		Email 3:	Patricia.Randell@gov.yk.ca			
Invoice To	Same as Report ?	☑ Yes	☐ No	Client / Project Information				
Hardcopy of Invoice with Report?		☑ Yes	☐ No	Job #:	13-Y-0452			
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q38556			
Lab Work Order # (lab use only)				ALS Contact:		Sampler:	MK | LG	

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-VA	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
	BL	12-Nov-13	14:50	Surface Water	X	X	X	X	X	X	X	X	X	X	X		5
	X10	12-Nov-13	14:50	"	X	X	X	X	X	X	X	X	X	X	X		
	B9	12-Nov-13	16:30	"	X	X	X	X	X	X	X	X	X	X	X		
	X14	12-Nov-13	13:30	"	X	X	X	X	X	X	X	X	X	X	X		
	R10	12-Nov-13	16:12	"	X	X	X	X	X	X	X	X	X	X	X		
	NF2	12-Nov-13	16:30	"	X	X	X	X	X	X	X	X	X	X	X		
	X2	12-Nov-13	15:05	"	X	X	X	X	X	X	X	X	X	X	X		
	X3A	12-Nov-13	14:50	"	X	X	X	X	X	X	X	X	X	X	X		
	R-08	13-Nov-13	9:30	"	X	X	X	X	X	X	X	X	X	X	X		
	NF1	13-Nov-13	8:17	"	X	X	X	X	X	X	X	X	X	X	X		

L1391431-COFC

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
	13-Nov-13	15:20		13-Nov13	15:20	2.8 °C				

GENF 18.01 Front