



HEMMERA ENVIROCHEM INC.  
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Date Received: 23-SEP-16  
Report Date: 21-OCT-16 11:45 (MT)  
Version: FINAL REV. 2

Client Phone: 867-456-4865

## Certificate of Analysis

Lab Work Order #: L1833355  
Project P.O. #: NOT SUBMITTED  
Job Reference: 1343-005.20  
C of C Numbers: 1, 2  
Legal Site Desc:

Comments: 21-OCT-2016 This version of the report includes total and dissolved chromium data for select samples.

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Brent Mack, B.Sc.  
Account Manager

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1833355-1 Water 20-SEP-16 17:50 E1	L1833355-2 Water 20-SEP-16 16:20 E2	L1833355-3 Water 20-SEP-16 16:20 DUP1	L1833355-4 Water 20-SEP-16 15:55 E3	L1833355-5 Water 20-SEP-16 14:10 R3
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Conductivity (uS/cm)	602	750	760	665	675
	Hardness (as CaCO3) (mg/L)	290	382	385	322	341
	pH (pH)	8.26	8.26	8.27	8.25	8.24
<b>Anions and Nutrients</b>	Ammonia, Total (as N) (mg/L)	0.0164	0.0147	0.0145	0.0289	0.0389
	Nitrate (as N) (mg/L)	0.119	0.125	0.125	0.188	0.105
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0047	0.0056	0.0054	0.0395	0.051
	Sulfate (SO4) (mg/L)	176	247	247	209	231
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	14.5	13.8	13.6	12.5	12.7
	Total Organic Carbon (mg/L)					
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0473	0.123	0.118	1.18	0.705
	Antimony (Sb)-Total (mg/L)	0.00032	0.00056	0.00052	0.00068	0.00020
	Arsenic (As)-Total (mg/L)	0.00082	0.00159	0.00161	0.00227	0.00124
	Barium (Ba)-Total (mg/L)	0.0629	0.0643	0.0643	0.108	0.0817
	Beryllium (Be)-Total (mg/L)	<0.000020	<0.000020	<0.000020	0.000053	0.000034
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	0.027	0.027	0.038	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000499	0.0000722	0.0000763	0.000145	0.0000640
	Calcium (Ca)-Total (mg/L)	65.3	72.8	71.6	58.5	54.4
	Chromium (Cr)-Total (mg/L)	0.00064	0.00568	0.00560	0.00631	0.00190
	Cobalt (Co)-Total (mg/L)	0.00052	0.00128	0.00129	0.00184	0.00110
	Copper (Cu)-Total (mg/L)	0.00290	0.00302	0.00306	0.00630	0.00370
	Iron (Fe)-Total (mg/L)	0.313	0.755	0.761	2.81	1.74
	Lead (Pb)-Total (mg/L)	0.000101	0.000277	0.000278	0.00157	0.000615
	Lithium (Li)-Total (mg/L)	0.0033	0.0082	0.0083	0.0042	0.0035
	Magnesium (Mg)-Total (mg/L)	33.0	49.1	50.3	46.5	47.2
	Manganese (Mn)-Total (mg/L)	0.223	0.214	0.221	0.241	0.283
	Mercury (Hg)-Total (mg/L)	<0.0000050	0.0000063	0.0000062	0.0000147	0.0000087
	Molybdenum (Mo)-Total (mg/L)	0.00129	0.00159	0.00160	0.00175	0.00111
	Nickel (Ni)-Total (mg/L)	0.00489	0.0211	0.0212	0.0143	0.00529
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	0.105	0.055
	Potassium (K)-Total (mg/L)	0.57	0.77	0.78	0.81	0.72
	Selenium (Se)-Total (mg/L)	0.00182	0.00195	0.00202	0.00170	0.00100
Silicon (Si)-Total (mg/L)	5.08	5.63	5.69	8.22	7.36	
Silver (Ag)-Total (mg/L)	<0.000010	0.000012	0.000010	0.000058	0.000018	
Sodium (Na)-Total (mg/L)	3.00	3.82	3.85	4.68	4.14	

\* 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		L1833355-6 Water 21-SEP-16 08:50 R7	L1833355-7 Water 21-SEP-16 10:35 FB1	L1833355-8 Water 20-SEP-16 12:25 R11	L1833355-9 Water 21-SEP-16 12:40 GWCC-1	L1833355-10 Water 21-SEP-16 12:25 GWCC-2
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Conductivity (uS/cm)	280	<2.0	460	2610	2130
	Hardness (as CaCO3) (mg/L)	128	<0.50	219	1700	1350
	pH (pH)	7.96	5.75	8.14	8.12	8.20
<b>Anions and Nutrients</b>	Ammonia, Total (as N) (mg/L)	0.0795	<0.0050	0.0320	<0.0050	<0.0050
	Nitrate (as N) (mg/L)	0.198	<0.0050	0.177	0.528	0.530
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	<0.0050 <sup>DLDS</sup>
	Phosphorus (P)-Total (mg/L)	0.177	<0.0020	0.0475	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	66.3	<0.30	134	1360	1070
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	29.4	<0.50	13.1	4.90	6.55
	Total Organic Carbon (mg/L)					
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	1.75	<0.0030	1.43	0.0035	0.0108
	Antimony (Sb)-Total (mg/L)	0.00033	<0.00010	0.00031	0.00133	0.00120
	Arsenic (As)-Total (mg/L)	0.00232	<0.00010	0.00170	0.00271	0.00210
	Barium (Ba)-Total (mg/L)	0.117	<0.000050	0.113	0.0243	0.0227
	Beryllium (Be)-Total (mg/L)	0.000076	<0.000020	0.000050	<0.000020	0.000038
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	0.339	0.154
	Cadmium (Cd)-Total (mg/L)	0.0000598	<0.000050	0.000180	0.000207	0.000251
	Calcium (Ca)-Total (mg/L)	27.9	<0.050	53.0	205	187
	Chromium (Cr)-Total (mg/L)	0.00463	<0.00010	0.00373	0.00429	0.00363
	Cobalt (Co)-Total (mg/L)	0.00214	<0.00010	0.00174	<0.00010	0.00027
	Copper (Cu)-Total (mg/L)	0.00836	<0.00050	0.00723	0.00138	0.00190
	Iron (Fe)-Total (mg/L)	3.67	<0.010	2.91	<0.010	2.59
	Lead (Pb)-Total (mg/L)	0.00116	<0.000050	0.00154	<0.000050	0.000161
	Lithium (Li)-Total (mg/L)	0.0016	<0.0010	0.0020	0.0983	0.0227
	Magnesium (Mg)-Total (mg/L)	16.6	<0.10	23.9	309	243
	Manganese (Mn)-Total (mg/L)	0.363	<0.00010	0.190	0.00059	0.0384
	Mercury (Hg)-Total (mg/L)	0.0000074	<0.0000050	0.0000190	<0.0000050	0.0000054
	Molybdenum (Mo)-Total (mg/L)	0.000915	<0.000050	0.00147	0.00248	0.00286
	Nickel (Ni)-Total (mg/L)	0.00769	<0.00050	0.00716	0.0877	0.0606
	Phosphorus (P)-Total (mg/L)	0.119	<0.050	0.077	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.37	<0.10	0.60	3.59	2.24
	Selenium (Se)-Total (mg/L)	0.000744	<0.000050	0.00195	0.00500	0.00441
	Silicon (Si)-Total (mg/L)	8.38	<0.050	8.27	7.24	5.71
Silver (Ag)-Total (mg/L)	0.000027	<0.000010	0.000059	<0.000010	<0.000010	
Sodium (Na)-Total (mg/L)	2.34	<0.050	5.42	23.2	9.01	

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1833355-11	L1833355-12	L1833355-13	L1833355-14	L1833355-15
		Description	Water	Water	Water	Water	Water
		Sampled Date	21-SEP-16	21-SEP-16	21-SEP-16	21-SEP-16	
		Sampled Time	12:05	11:50	15:25	14:05	
		Client ID	GWCC-3	GWCC-4	GWCC-5	SL	TRAVEL BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Conductivity (uS/cm)		1310	910	975	1530	<2.0
	Hardness (as CaCO3) (mg/L)		773	507	541	937	
	pH (pH)		8.20	8.23	8.26	8.34	6.01
<b>Anions and Nutrients</b>	Ammonia, Total (as N) (mg/L)		<0.0050	<0.0050	<0.0050	0.0059	<0.0050
	Nitrate (as N) (mg/L)		0.203	0.108	0.0155	0.123	<0.0050
	Nitrite (as N) (mg/L)		<0.0020 <sup>DLDS</sup>	<0.0010	<0.0010	<0.0020 <sup>DLDS</sup>	<0.0010
	Phosphorus (P)-Total (mg/L)		<0.0020	<0.0020	<0.0020	0.0045	<0.0020
	Sulfate (SO4) (mg/L)		541	310	308	694	<0.30
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)		8.49	9.23	7.66	7.42	
	Total Organic Carbon (mg/L)						<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		<0.0030	0.0050	<0.0030	0.0367	<0.0030
	Antimony (Sb)-Total (mg/L)		0.00089	0.00094	0.00057	0.00316	<0.00010
	Arsenic (As)-Total (mg/L)		0.00089	0.00127	0.00058	0.0152	<0.00010
	Barium (Ba)-Total (mg/L)		0.0262	0.0152	0.0513	0.0275	<0.000050
	Beryllium (Be)-Total (mg/L)		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Total (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)		0.069	0.048	0.034	0.043	<0.010
	Cadmium (Cd)-Total (mg/L)		0.000102	0.0000534	0.000144	0.0000322	<0.000050
	Calcium (Ca)-Total (mg/L)		125	36.3	129	221	<0.050
	Chromium (Cr)-Total (mg/L)		0.00061	0.00078	0.00056	0.00253	<0.00010
	Cobalt (Co)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00025	<0.00010
	Copper (Cu)-Total (mg/L)		0.00132	0.00199	0.00157	0.00138	<0.00050
	Iron (Fe)-Total (mg/L)		<0.010	0.011	0.026	0.103	<0.010
	Lead (Pb)-Total (mg/L)		<0.000050	<0.000050	<0.000050	0.000090	<0.000050
	Lithium (Li)-Total (mg/L)		0.0088	0.0069	0.0090	0.0104	<0.0010
	Magnesium (Mg)-Total (mg/L)		119	76.7	60.5	95.5	<0.10
	Manganese (Mn)-Total (mg/L)		0.00016	0.00030	0.00270	0.0169	<0.00010
	Mercury (Hg)-Total (mg/L)		0.0000063	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.00286	0.00266	0.00184	0.00209	<0.000050
	Nickel (Ni)-Total (mg/L)		0.0340	0.0351	0.0226	0.0189	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)		1.32	1.18	0.95	1.41	<0.10
	Selenium (Se)-Total (mg/L)		0.00182	0.000994	0.00434	0.0109	<0.000050
	Silicon (Si)-Total (mg/L)		5.29	6.12	5.11	5.80	<0.050
Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Total (mg/L)		4.67	651	4.36	2.64	<0.050	

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

21-OCT-16 11:45 (MT)

Version: FINAL REV. 2

Sample ID Description Sampled Date Sampled Time Client ID		L1833355-1 Water 20-SEP-16 17:50 E1	L1833355-2 Water 20-SEP-16 16:20 E2	L1833355-3 Water 20-SEP-16 16:20 DUP1	L1833355-4 Water 20-SEP-16 15:55 E3	L1833355-5 Water 20-SEP-16 14:10 R3
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Strontium (Sr)-Total (mg/L)	0.323	0.417	0.416	0.314	0.289
	Sulfur (S)-Total (mg/L)	63.8	90.9	92.9	77.4	85.5
	Thallium (Tl)-Total (mg/L)	<0.000010	0.000019	0.000020	0.000023	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.00097	0.00215	0.00165	0.0284	0.0225
	Uranium (U)-Total (mg/L)	0.00221	0.00245	0.00241	0.00283	0.00305
	Vanadium (V)-Total (mg/L)	0.00060	0.00084	0.00082	0.00417	0.00276
	Zinc (Zn)-Total (mg/L)	<0.0030	0.0055	0.0058	0.0131	0.0085
	Zirconium (Zr)-Total (mg/L)	0.00089	0.00098	0.00095	0.00073	0.00050
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0329	0.0236	0.0246	0.0593	0.0450
	Antimony (Sb)-Dissolved (mg/L)	0.00029	0.00037	0.00037	0.00046	0.00016
	Arsenic (As)-Dissolved (mg/L)	0.00077	0.00103	0.00101	0.00083	0.00056
	Barium (Ba)-Dissolved (mg/L)	0.0635	0.0591	0.0587	0.0658	0.0592
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	0.025	0.026	0.034	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000491	0.0000537	0.0000532	0.0000285	0.0000204
	Calcium (Ca)-Dissolved (mg/L)	63.0	71.4	72.2	55.3	59.0
	Chromium (Cr)-Dissolved (mg/L)	0.00046	0.00064	0.00069	0.00079	0.00052
	Cobalt (Co)-Dissolved (mg/L)	0.00046	0.00071	0.00070	0.00049	0.00058
	Copper (Cu)-Dissolved (mg/L)	0.00236	0.00208	0.00210	0.00179	0.00172
	Iron (Fe)-Dissolved (mg/L)	0.236	0.232	0.233	0.279	0.303
	Lead (Pb)-Dissolved (mg/L)	0.000078	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0033	0.0081	0.0080	0.0032	0.0033
	Magnesium (Mg)-Dissolved (mg/L)	32.2	49.6	49.6	44.7	47.0
	Manganese (Mn)-Dissolved (mg/L)	0.211	0.204	0.203	0.180	0.259
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00110	0.00130	0.00137	0.00107	0.000988
	Nickel (Ni)-Dissolved (mg/L)	0.00447	0.0114	0.0115	0.00501	0.00360
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.56	0.78	0.78	0.63	0.62
	Selenium (Se)-Dissolved (mg/L)	0.00195	0.00205	0.00192	0.00135	0.000872
	Silicon (Si)-Dissolved (mg/L)	5.03	5.03	5.03	6.03	5.94
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.88	3.86	3.86	4.59	4.06

\* 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		L1833355-6 Water 21-SEP-16 08:50 R7	L1833355-7 Water 21-SEP-16 10:35 FB1	L1833355-8 Water 20-SEP-16 12:25 R11	L1833355-9 Water 21-SEP-16 12:40 GWCC-1	L1833355-10 Water 21-SEP-16 12:25 GWCC-2
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Strontium (Sr)-Total (mg/L)	0.100	<0.00020	0.261	2.32	1.14
	Sulfur (S)-Total (mg/L)	25.0	<0.50	46.1	503	389
	Thallium (Tl)-Total (mg/L)	0.000014	<0.000010	0.000026	0.000094	0.000072
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.0617	<0.00030	0.0279	<0.00030	<0.00030
	Uranium (U)-Total (mg/L)	0.000453	<0.000010	0.00148	0.00773	0.00385
	Vanadium (V)-Total (mg/L)	0.00670	<0.00050	0.00461	<0.00050	0.00136
	Zinc (Zn)-Total (mg/L)	0.0118	<0.0030	0.0147	0.0106	0.0143
	Zirconium (Zr)-Total (mg/L)	0.00124	<0.00030	0.00082	<0.00030	0.00034
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.143	<0.0010	0.0517	0.0011	0.0016
	Antimony (Sb)-Dissolved (mg/L)	0.00023	<0.00010	0.00015	0.00130	0.00108
	Arsenic (As)-Dissolved (mg/L)	0.00134	<0.00010	0.00050	0.00253	0.00157
	Barium (Ba)-Dissolved (mg/L)	0.0785	<0.000050	0.0695	0.0239	0.0199
	Beryllium (Be)-Dissolved (mg/L)	0.000030	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.309	0.142
	Cadmium (Cd)-Dissolved (mg/L)	0.0000325	<0.0000050	0.0000378	0.000200	0.000191
	Calcium (Ca)-Dissolved (mg/L)	26.4	<0.050	49.7	197	173
	Chromium (Cr)-Dissolved (mg/L)	0.00153	<0.00010	0.00076	0.00364	0.00266
	Cobalt (Co)-Dissolved (mg/L)	0.00100	<0.00010	0.00048	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00517	<0.00020	0.00213	0.00083	0.00107
	Iron (Fe)-Dissolved (mg/L)	1.10	<0.010	0.299	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	0.000080	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0931	0.0215
	Magnesium (Mg)-Dissolved (mg/L)	15.2	<0.10	22.9	294	223
	Manganese (Mn)-Dissolved (mg/L)	0.314	<0.00010	0.133	0.00035	0.00018
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000055	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000720	<0.000050	0.000980	0.00224	0.00263
	Nickel (Ni)-Dissolved (mg/L)	0.00490	<0.00050	0.00272	0.0799	0.0520
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.23	<0.10	0.38	3.51	2.09
	Selenium (Se)-Dissolved (mg/L)	0.000653	<0.000050	0.00173	0.00467	0.00410
	Silicon (Si)-Dissolved (mg/L)	5.68	<0.050	6.01	6.81	5.20
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.20	<0.050	5.14	21.9	8.39

\* 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		L1833355-11 Water 21-SEP-16 12:05 GWCC-3	L1833355-12 Water 21-SEP-16 11:50 GWCC-4	L1833355-13 Water 21-SEP-16 15:25 GWCC-5	L1833355-14 Water 21-SEP-16 14:05 SL	L1833355-15 Water TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Strontium (Sr)-Total (mg/L)	0.651	0.214	0.732	1.04	<0.00020
	Sulfur (S)-Total (mg/L)	208	129	118	273	<0.50
	Thallium (Tl)-Total (mg/L)	0.000063	0.000059	0.000021	0.000020	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	0.00079	<0.00030
	Uranium (U)-Total (mg/L)	0.00209	0.00122	0.00256	0.00322	<0.000010
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	0.0033	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.00030	0.00052	<0.00030	<0.00030	<0.00030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0017	0.0016	0.0013	0.0037	
	Antimony (Sb)-Dissolved (mg/L)	0.00088	0.00089	0.00058	0.00307	
	Arsenic (As)-Dissolved (mg/L)	0.00087	0.00120	0.00056	0.0158	
	Barium (Ba)-Dissolved (mg/L)	0.0266	0.0277 <sup>DTC</sup>	0.0507	0.0283	
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	0.064	0.046	0.030	0.040	
	Cadmium (Cd)-Dissolved (mg/L)	0.000102	0.0000579 <sup>DTC</sup>	0.000128	0.0000299	
	Calcium (Ca)-Dissolved (mg/L)	119	83.6	123	214	
	Chromium (Cr)-Dissolved (mg/L)	0.00059	0.00045	0.00049	0.00120	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00012	
	Copper (Cu)-Dissolved (mg/L)	0.00105	0.00109	0.00088	0.00096	
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	0.019	<0.010	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0087	0.0068	0.0090	0.0104	
	Magnesium (Mg)-Dissolved (mg/L)	115	72.3	56.7	97.6	
	Manganese (Mn)-Dissolved (mg/L)	0.00012	0.00026	0.00267	0.0150	
	Mercury (Hg)-Dissolved (mg/L)	0.0000057	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.00258	0.00232	0.00166	0.00188	
	Nickel (Ni)-Dissolved (mg/L)	0.0326	0.0335	0.0218	0.0176	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	1.28	1.04	0.91	1.43	
	Selenium (Se)-Dissolved (mg/L)	0.00186	0.00103	0.00440	0.0110	
	Silicon (Si)-Dissolved (mg/L)	4.96	5.59	4.81	5.48	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	4.45	3.87	3.98	2.67	

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1833355-1	L1833355-2	L1833355-3	L1833355-4	L1833355-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	20-SEP-16	20-SEP-16	20-SEP-16	20-SEP-16	20-SEP-16
		Sampled Time	17:50	16:20	16:20	15:55	14:10
		Client ID	E1	E2	DUP1	E3	R3
Grouping	Analyte						
<b>WATER</b>							
<b>Dissolved Metals</b>	Strontium (Sr)-Dissolved (mg/L)	0.308	0.410	0.413	0.293	0.315	
	Sulfur (S)-Dissolved (mg/L)	62.2	88.5	89.0	74.7	80.4	
	Thallium (Tl)-Dissolved (mg/L)	<0.00010	0.00013	0.00014	<0.00010	<0.00010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	0.00061	0.00046	0.00048	0.00133	0.00118	
	Uranium (U)-Dissolved (mg/L)	0.00202	0.00224	0.00228	0.00245	0.00316	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00055	0.00050	
	Zinc (Zn)-Dissolved (mg/L)	0.0019	0.0044	0.0022	<0.0010	0.0069	
	Zirconium (Zr)-Dissolved (mg/L)	0.00081	0.00071	0.00075	0.00071	0.00059	
<b>Speciated Metals</b>	Chromium (III)-Dissolved (mg/L)						
	Chromium (III)-Total (mg/L)		0.00568	0.00560	0.00631	0.00190	
	Hexavalent Chromium (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	Hexavalent Chromium-Dissolved (mg/L)						

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



## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1833355-6	L1833355-7	L1833355-8	L1833355-9	L1833355-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	21-SEP-16	21-SEP-16	20-SEP-16	21-SEP-16	21-SEP-16
		Sampled Time	08:50	10:35	12:25	12:40	12:25
		Client ID	R7	FB1	R11	GWCC-1	GWCC-2
Grouping	Analyte						
<b>WATER</b>							
<b>Dissolved Metals</b>	Strontium (Sr)-Dissolved (mg/L)		0.0887	<0.00020	0.240	2.19	1.07
	Sulfur (S)-Dissolved (mg/L)		22.9	<0.50	43.3	469	355
	Thallium (Tl)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	0.000091	0.000068
	Tin (Sn)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)		0.00364	<0.00030	0.00088	<0.00030	<0.00030
	Uranium (U)-Dissolved (mg/L)		0.000257	<0.000010	0.00125	0.00728	0.00361
	Vanadium (V)-Dissolved (mg/L)		0.00121	<0.00050	0.00056	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)		0.0018	<0.0010	0.0012	0.0074	0.0061
	Zirconium (Zr)-Dissolved (mg/L)		0.00143	<0.00030	0.00097	<0.00030	<0.00030
<b>Speciated Metals</b>	Chromium (III)-Dissolved (mg/L)		0.00153			<0.00080	<0.00075
	Chromium (III)-Total (mg/L)		0.00463		0.00373	<0.00097	0.00093
	Hexavalent Chromium (mg/L)		<0.0010		<0.0010	0.0037	0.0027
	Hexavalent Chromium-Dissolved (mg/L)		<0.0010			0.0034	0.0024

\* 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		L1833355-11 Water 21-SEP-16 12:05 GWCC-3	L1833355-12 Water 21-SEP-16 11:50 GWCC-4	L1833355-13 Water 21-SEP-16 15:25 GWCC-5	L1833355-14 Water 21-SEP-16 14:05 SL	L1833355-15 Water TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Strontium (Sr)-Dissolved (mg/L)	0.618	0.447 <sup>DTC</sup>	0.708	1.01	
	Sulfur (S)-Dissolved (mg/L)	193	114	109	261	
	Thallium (Tl)-Dissolved (mg/L)	0.000057	0.000054	0.000017	0.000019	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Uranium (U)-Dissolved (mg/L)	0.00196	0.00118	0.00243	0.00307	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	0.0029	0.0018	<0.0010	0.0024	
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Speciated Metals</b>	Chromium (III)-Dissolved (mg/L)				<0.00071	
	Chromium (III)-Total (mg/L)				0.00143	
	Hexavalent Chromium (mg/L)				0.0011	
	Hexavalent Chromium-Dissolved (mg/L)				0.0010	

\* 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)
Matrix Spike	Dissolved Organic Carbon	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L1833355-6
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cadmium (Cd)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9

## Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Dissolved	MS-B	L1833355-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Total	MS-B	L1833355-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9

## Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
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**
<b>BE-D-L-CCMS-VA</b>	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
		Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.	
		Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.	
<b>BE-T-L-CCMS-VA</b>	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
		Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.	
		Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.	
<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B 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 5310B TOTAL ORGANIC CARBON (TOC)

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

**CR-CR3-DIS-CALC-ED** Water Dissolved Trivalent Chromium in Water CALCULATION

Chromium (III)-Dissolved is calculated as the difference between the dissolved chromium and the dissolved hexavalent chromium (Cr(VI)) results.

**CR-CR3-TOT-CALC-ED** Water Total Trivalent Chromium in Water CALCULATION

Chromium (III)-Total is calculated as the difference between the total chromium and the hexavalent chromium (Cr(VI)) results.

**CR-CR6-ED** Water Chromium, Hexavalent (Cr +6) APHA 3500-Cr C (Ion Chromatography)

This analysis is carried out using procedures adapted from method 3500-Cr C in "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1636 published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Results are based on an un-filtered, field-preserved sample.

**CR6-D-IC-ED** Water Chromium, Dissolved Hexavalent (Cr +6) APHA 3500-Cr C (Ion Chromatography)

This analysis is carried out using procedures adapted from method 3500-Cr C in "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1636 published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Results are based on a field-filtered, field-preserved sample.

**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 CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**NH3-F-VA** Water Ammonia in Water by Fluorescence APHA 4500 NH3-NITROGEN (AMMONIA)

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.

**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.

**NO2-L-IC-N-WR** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-WR** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

**PH-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.

**SO4-IC-N-WR**                      Water              Sulfate in Water by IC    EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

\*\* 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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

**Chain of Custody Numbers:**

1    2

**GLOSSARY OF REPORT TERMS**

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



Contact: Brent Mack  
Company: ALS Environmental  
Address: 8081 Lougheed HWY, Suite 100  
Burnaby, BC V5A1W9

## REFERENCE DATA

---

Project / Location: L1833355

PO Number: L1833355

ALS Work Order: 1609786

TEM Water Narrative: Analysis performed on FEI Tecnai TEM with integrated EDXA capabilities. Morphology, EDXA, and SAED measurements used to determine fiber species. Representative EDXA spectra of each asbestos type detected included. Compliance samples must be received and filtered within 48 hours of collection. Collection is performed outside ALS and is the responsibility of the client. Samples disposed after 60 days. TEM grids archived 3 years. Results apply only to portions analyzed.

TEM Water Methods: "EPA 100.2" refers to drinking water samples filtered on 47mm, 0.22µm pore MCE filters. "EPA 100.1" refers to drinking water samples filtered on 47mm, 0.1µm pore Polycarbonate filters. No standard method for asbestos in nonpotable water exists. All TEM waters (potable and nonpotable) analyzed at >10,000x magnification for asbestos fibers >10µm long. Whenever possible, sufficient volume is analyzed to yield an AS of <0.20 MFL based on the detection of 1 confirmed asbestos fiber in the total area analyzed. However, the volume analyzed is dependent upon a filter loading of <25% particulate. Samples containing excessive suspended solids may not reach the recommended AS of <0.20 MFL. In any case, a minimum of 4 and a maximum of 10 openings are analyzed regardless of the AS reached or asbestos concentration detected. ALS will report results directly to state of origin only when;

- a) the Chain of Custody clearly states "drinking water for state compliance",
- b) the appropriate state drinking water form is submitted with the samples,
- c) the state form is completely filled out by the client prior to submittal, and
- d) the address to which the form is to be sent is provided.

NOTES: NA=Not Applicable, ND=None Detected, AS=Analytical Sensitivity, MFL=Millions of Fibers per Liter. † Act-Tremolite concentrations include Actinolite as well as the Libby Amphiboles; Tremolite, Winchite, & Richterite.

OH Lab ID: #4077, Ohio Analysts; P. Johnson #2268, A. Sohn #3431

PA Lab ID: #68-01320, Cert. #003

## TEM ANALYSIS DATA

---

EDXA Resolution (eV): <175

Accelerating Voltage (keV): 100

Prep Start Date: 10/2/2016

Calibration Constant (µm/cm): 0.74

Camera Constant (mm-Å): 129.25

Analysis Start Date: 10/3/2016

*Pamela Johnson*

---

Pamela Johnson  
ALS TEM Analyst

*Shawn Smythe*

---

Shawn Smythe  
ALS Project Manager

*This report shall not be reproduced except in full without written approval of ALS.*

**IDENTIFICATION**

Client Sample ID:	L1833355-2 E2	L1833355-4 E3	L1833355-5 R3
ALS Sample ID:	1609786-02B	1609786-04B	1609786-05B
Method:	EPA 100.2	EPA 100.2	EPA 100.2
Date of Collection:	9/20/2016	9/20/2016	9/20/2016
Time of Collection:	Not Provided	Not Provided	Not Provided

**FILTRATION & ANALYSIS**

Date of Filtration:	9/28/2016	9/28/2016	9/28/2016
Time of Filtration:	10:00	10:00	10:00
Volume Filtered (L):	0.05	0.05	0.05
Openings Analyzed:	4	4	10
Avg. Opening Area (mm <sup>2</sup> ):	0.0108	0.0108	0.0108
AS (MFL):	0.50	0.50	0.20

**ASBESTOS COUNT**

Chrysotile:	68	24	3
Amosite:	0	0	0
Crocidolite:	0	0	0
Act-Tremolite <sup>†</sup> :	0	0	0
Anthophyllite:	0	0	0
Total Asbestos:	68	24	3

**ASBESTOS CONCENTRATION (MFL)**

Chrysotile:	33.84	11.94	0.60
Amosite:	<AS	<AS	<AS
Crocidolite:	<AS	<AS	<AS
Act-Tremolite <sup>†</sup> :	<AS	<AS	<AS
Anthophyllite:	<AS	<AS	<AS
<b>Total Asbestos:</b>	<b>33.84</b>	<b>11.94</b>	<b>0.60</b>

**NOTES**

Sample L1833355-2 E2 may have a negative bias due to the heavy concentration of asbestos fibers too small to be counted by this method as well as sediment particulate. Analysis of this sample was terminated upon completion of the minimum 4 openings analyzed.

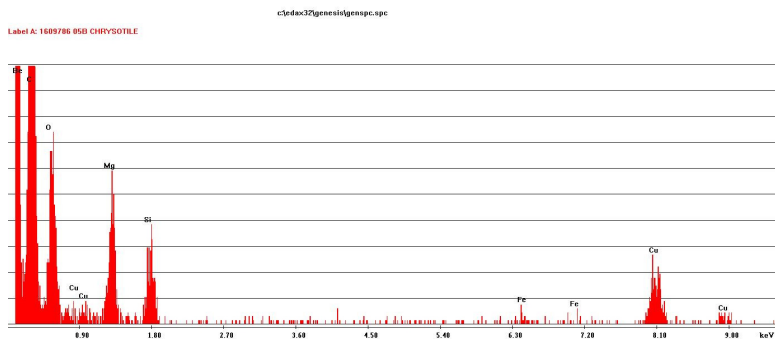
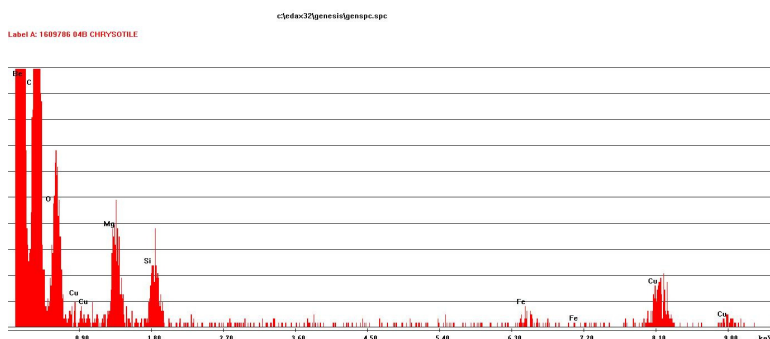
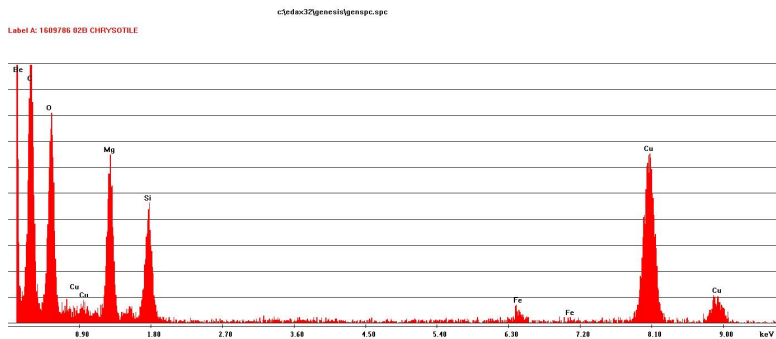
Sample L1833355-4 E3 may have a negative bias due to the heavy concentration of sediment particulate. Analysis of this sample was terminated upon completion of the minimum 4 openings were analyzed.

Sample L1833355-5 R3 contained many asbestos fibers that were too small to be counted by this method.



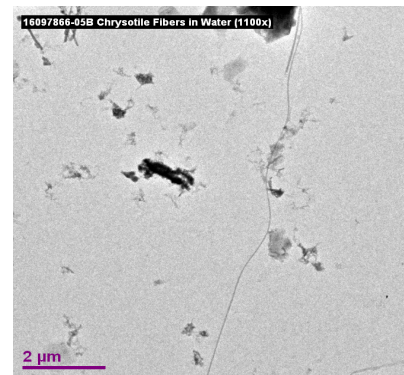
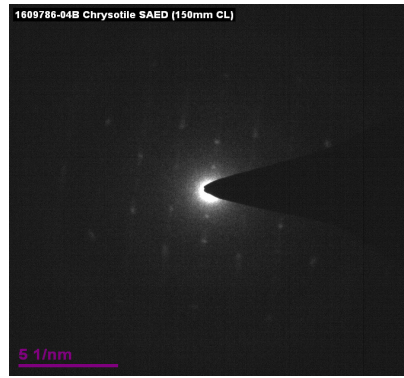
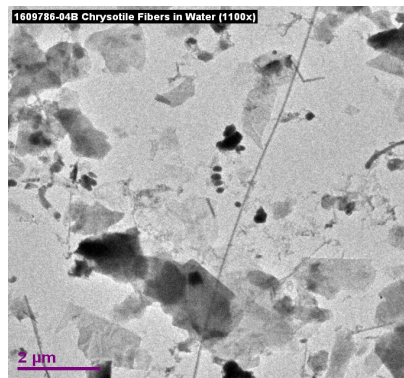
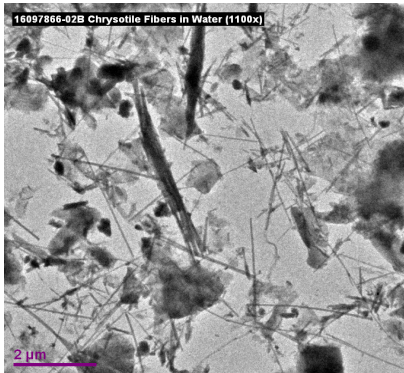
## EDXA SPECTRA

NOTE: Spurious peaks may originate from low background sample holder, column pole pieces, TEM grids, prep solutions or matrix materials.



## PHOTOMICROGRAPHS

Collected using Gatan Digital Micrograph.





04-Oct-2016

Brent Mack  
ALS Environmental  
8081 Lougheed HWY  
Suite 100  
Burnaby, BC V5A1W9

Tel: (604) 253-4188  
Fax:

Re: L1833355

Work Order: **1609786**

Dear Brent,

ALS Environmental received 15 samples on 27-Sep-2016 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 20.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

**Shawn Smythe**

Electronically approved by: Shawn Smythe

Shawn Smythe  
Project Manager

ADDRESS 4388 Glendale Milford Rd Cincinnati, Ohio 45242- | PHONE (513) 733-5336 | FAX (513) 733-5347

ALS GROUP USA, CORP. Part of the ALS Group An ALS Limited Company

Environmental 

[www.alsglobal.com](http://www.alsglobal.com)

RIGHT SOLUTIONS RIGHT PARTNER

Client: ALS Environmental  
Project: L1833355  
Work Order: 1609786

**Work Order Sample Summary**

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
1609786-01	L1833355-1 E1	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-02	L1833355-2 E2	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-03	L1833355-3 DUP1	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-04	L1833355-4 E3	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-05	L1833355-5 R3	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-05	L1833355-5 R3	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-06	L1833355-6 R7	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-07	L1833355-7 FB1	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-08	L1833355-8 R11	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-09	L1833355-9 GWCC-1	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-10	L1833355-10 GWCC-2	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-11	L1833355-11 GWCC-3	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-12	L1833355-12 GWCC-4	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-13	L1833355-13 GWCC-5	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-14	L1833355-14 SL	Water		9/20/2016	9/27/2016	<input type="checkbox"/>
1609786-15	L1833355-15 TRAVEL BLANK	Water		9/20/2016	9/27/2016	<input type="checkbox"/>

---

**Client:** ALS Environmental

**Project:** L1833355

**Work Order:** 1609786

**Case Narrative**

---

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Results relate only to the items tested and are not blank corrected unless indicated.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental

Project: L1833355

Work Order: 1609786

Sample ID: L1833355-1 E1

Lab ID: 1609786-01

Collection Date: 9/20/2016

Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	ND		2.0	mg/L	1	9/27/2016

---

**Note:**

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental

Project: L1833355

Work Order: 1609786

Sample ID: L1833355-2 E2

Lab ID: 1609786-02

Collection Date: 9/20/2016

Matrix: WATER

---

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	ND		2.0	mg/L	1	9/27/2016

---

Note:

**ALS Environmental**

Date: 04-Oct-16

**Client:** ALS Environmental  
**Project:** L1833355  
**Sample ID:** L1833355-3 DUP1  
**Collection Date:** 9/20/2016

**Work Order:** 1609786  
**Lab ID:** 1609786-03  
**Matrix:** WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	12		2.0	mg/L	1	9/27/2016

---

**Note:**



**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental

Project: L1833355

Work Order: 1609786

Sample ID: L1833355-4 E3

Lab ID: 1609786-04

Collection Date: 9/20/2016

Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	38		2.0	mg/L	1	9/27/2016

---

**Note:**

**ALS Environmental**

**Date:** 04-Oct-16

**Client:** ALS Environmental

**Project:** L1833355

**Work Order:** 1609786

**Sample ID:** L1833355-5 R3

**Lab ID:** 1609786-05

**Collection Date:** 9/20/2016

**Matrix:** WATER

---

<b>Analyses</b>	<b>Result</b>	<b>Qual</b>	<b>Report Limit</b>	<b>Units</b>	<b>Dilution Factor</b>	<b>Date Analyzed</b>
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: <b>rmb</b>
Total suspended solids	45		2.0	mg/L	1	9/27/2016

---

**Note:**

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental  
Project: L1833355  
Sample ID: L1833355-6 R7  
Collection Date: 9/20/2016

Work Order: 1609786  
Lab ID: 1609786-06  
Matrix: WATER

---

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: <b>rmb</b>
Total suspended solids	73		2.0	mg/L	1	9/27/2016

---

---

**Note:**

**ALS Environmental**

Date: 04-Oct-16

**Client:** ALS Environmental  
**Project:** L1833355  
**Sample ID:** L1833355-7 FB1  
**Collection Date:** 9/20/2016

**Work Order:** 1609786  
**Lab ID:** 1609786-07  
**Matrix:** WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: <b>rmb</b>
Total suspended solids	ND		2.0	mg/L	1	9/27/2016

---

**Note:**

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental  
Project: L1833355  
Sample ID: L1833355-8 R11  
Collection Date: 9/20/2016

Work Order: 1609786  
Lab ID: 1609786-08  
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	78		2.0	mg/L	1	9/27/2016

---

Note:

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental  
Project: L1833355  
Sample ID: L1833355-9 GWCC-1  
Collection Date: 9/20/2016

Work Order: 1609786  
Lab ID: 1609786-09  
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	3.8		2.0	mg/L	1	9/27/2016

---

Note:

# ALS Environmental

Date: 04-Oct-16

Client: ALS Environmental  
Project: L1833355  
Sample ID: L1833355-10 GWCC-2  
Collection Date: 9/20/2016

Work Order: 1609786  
Lab ID: 1609786-10  
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	4.0		2.0	mg/L	1	9/27/2016

Note:

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental  
Project: L1833355  
Sample ID: L1833355-11 GWCC-3  
Collection Date: 9/20/2016

Work Order: 1609786  
Lab ID: 1609786-11  
Matrix: WATER

---

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	2.8		2.0	mg/L	1	9/27/2016

---

Note:



**ALS Environmental**

Date: 04-Oct-16

**Client:** ALS Environmental  
**Project:** L1833355  
**Sample ID:** L1833355-12 GWCC-4  
**Collection Date:** 9/20/2016

**Work Order:** 1609786  
**Lab ID:** 1609786-12  
**Matrix:** WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: <b>rmb</b>
Total suspended solids	ND		2.0	mg/L	1	9/27/2016

---

**Note:**

**ALS Environmental**

Date: 04-Oct-16

**Client:** ALS Environmental  
**Project:** L1833355  
**Sample ID:** L1833355-13 GWCC-5  
**Collection Date:** 9/20/2016

**Work Order:** 1609786  
**Lab ID:** 1609786-13  
**Matrix:** WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: <b>rmb</b>
Total suspended solids	ND		2.0	mg/L	1	9/27/2016

---

**Note:**

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental  
Project: L1833355  
Sample ID: L1833355-14 SL  
Collection Date: 9/20/2016

Work Order: 1609786  
Lab ID: 1609786-14  
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: <b>rmb</b>
Total suspended solids	6.4		2.0	mg/L	1	9/27/2016

---

**Note:**

**ALS Environmental**

Date: 04-Oct-16

Client: ALS Environmental

Project: L1833355

Work Order: 1609786

Sample ID: L1833355-15 TRAVEL BLANK

Lab ID: 1609786-15

Collection Date: 9/20/2016

Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>TOTAL SUSPENDED SOLIDS</b>			<b>E160.2</b>			Analyst: rmb
Total suspended solids	ND		2.0	mg/L	1	9/27/2016

---

**Note:**

**Client:** ALS Environmental  
**Project:** L1833355  
**WorkOrder:** 1609786

**QUALIFIERS,  
ACRONYMS, UNITS**

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
E	EPA Method
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SDL	Sample Detection Limit
SW	SW-846 Method

<u>Units Reported</u>	<u>Description</u>
%	
mg/L	

Sample Receipt Checklist

Client Name: ALS-VANCOUVER

Date/Time Received: 27-Sep-16 10:00

Work Order: 1609786

Received by: SNH

Checklist completed by: Shawn Smythe 27-Sep-16  
eSignature Date

Reviewed by: Shawn Smythe 27-Sep-16  
eSignature Date

Matrices:

Carrier name: FedEx

- Shipping container/cooler in good condition? Yes  No  Not Present
- Custody seals intact on shipping container/cooler? Yes  No  Not Present
- Custody seals intact on sample bottles? Yes  No  Not Present
- Chain of custody present? Yes  No
- Chain of custody signed when relinquished and received? Yes  No
- Chain of custody agrees with sample labels? Yes  No
- Samples in proper container/bottle? Yes  No
- Sample containers intact? Yes  No
- Sufficient sample volume for indicated test? Yes  No
- All samples received within holding time? Yes  No
- Container/Temp Blank temperature in compliance? Yes  No

Temperature(s)/Thermometer(s): 2.6

Cooler(s)/Kit(s):

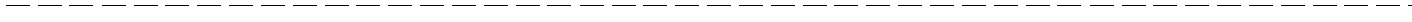
Water - VOA vials have zero headspace? Yes  No  No VOA vials submitted

Water - pH acceptable upon receipt? Yes  No  N/A

pH adjusted? Yes  No  N/A

pH adjusted by: -

Login Notes:



Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

[Empty text box for comments]

CorrectiveAction:

[Empty text box for corrective action]



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Canada Toll Free: 1 800 668 9878



L1833355-COFC

COC Number: 1

Page 1 of 2

<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: Hemmera Environchem Inc.		Select Report Format:				R																	
Contact: Natasha Sandys		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				P																	
Address: 230 - 2237 2nd Avenue Whitehorse, YT		Select Distribution:				E																	
Phone: 867-456-4865		Email 1 or Fax nsandys@hemmera.com				E2																	
		Email 2 chris@elr.ca				Specify Date Required for E2,E or P:																	
<b>Invoice To</b>		<b>Invoice Distribution</b>				<b>Analysis Request</b>																	
Same as Report To <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Select Invoice Distribution:				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																	
Copy of Invoice with Report <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Email 1 or Fax nsandys@hemmera.com				F/P P P F/P P F/P																	
Company: Hemmera Environchem Inc.		Email 2 chris@elr.ca				F/P P P F/P P F/P																	
Contact: Natasha Sandys						F/P P P F/P P F/P																	
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>				F/P P P F/P P F/P																	
ALS Quote #: Q56044		Approver ID:		Cost Center:		F/P P P F/P P F/P																	
Job #: 1343-005.20		GL Account:		Routing Code:		F/P P P F/P P F/P																	
PO / AFE:		Activity Code:				F/P P P F/P P F/P																	
LSD:		Location:				F/P P P F/P P F/P																	
ALS Lab Work Order # (lab use only)		ALS Contact:		Sampler: AN/CH		F/P P P F/P P F/P																	
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mm-yy)	Time (hh:mm)	Sample Type	Low Level Diss. Met (incl. Hg) and Hardness	Low Level Tot. Met (incl. Hg) and Hardness	Chromium Speciation (III/VI) - Total	Chromium Speciation (III/VI) - Dissolved	Ammonia - N	Dissolved Organic Carbon (DOC)	Nitrate-N	Nitrite - N	Total Phosphorus	Sulphate	pH, Conductivity	Asbestos-TEM-AD	Total Suspended Solids	Number of Containers			
E1				20-Sep-16	17:50	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
E2				20-Sep-16	16:20	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	11		
DUP1				20-Sep-16	16:20	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
E3				20-Sep-16	15:55	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	11		
R3				20-Sep-16	14:10	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	11		
R7				21-Sep-16	8:50	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
FB1				21-Sep-16	10:35	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
R11				20-Sep-16	12:25	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
GWCC-1				21-Sep-16	12:40	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
GWCC-2				21-Sep-16	12:25	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
GWCC-3				21-Sep-16	12:05	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
GWCC-4				21-Sep-16	11:50	Water	R R				R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	10		
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>				<b>Special Instructions / Specify Criteria to add on report (client Use)</b>				<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>															
Are samples taken from a Regulated DW System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				Please hold samples for total and dissolved Chromium III/VI pending regular metals analysis results. Please supply ELR EQWIN EDD file with results.				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 checked="" 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									
								3.0		2.0		3.0											
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>															
Released by: <i>nsandys</i>		Date: 23-Sep-16		Time: 10:08		Received by: <i>[Signature]</i>		Date: 23-SEP-16		Time: 10:08		Received by:				Date:				Time:			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0376v03 Form 04 January 2014

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



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Canada Toll Free: 1 800 668 9878



L1833355-COFC

COC Number: 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: Hemmera Environchem Inc.		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: Natasha Sandys		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			P <input type="checkbox"/> Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT																																																																			
Address: 230 - 2237 2nd Avenue Whitehorse, YT		<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: 867-456-4865		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 nsandys@hemmera.com			Specify Date Required for E2, E or P:																																																																			
		Email 2 chris@elr.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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input checked="" type="checkbox"/> MAIL <input type="checkbox"/> FAX			F/P P P F/P P F/P																																																																			
Copy of Invoice with Report <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Email 1 or Fax nsandys@hemmera.com			<table border="1"> <tr> <td>Low Level Diss. Met (incl. Hg) and Hardness</td> <td>Low Level Tot. Met (incl. Hg) and Hardness</td> <td>Chromium Speciation (III/VI) - Total</td> <td>Chromium Speciation (III/VI) - Dissolved</td> <td>Ammonia - N</td> <td>Dissolved Organic Carbon (DOC)</td> <td>Nitrate-N</td> <td>Nitrite - N</td> <td>Total Phosphorus</td> <td>Sulphate</td> <td>pH, Conductivity</td> <td>Asbestos-TEM-AD</td> <td>Total Suspended Solids</td> <td rowspan="4">Number of Containers</td> </tr> <tr> <td>R</td> <td>R</td> <td></td> <td></td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td></td> <td>R</td> <td>10</td> </tr> <tr> <td>R</td> <td>R</td> <td></td> <td></td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td></td> <td>R</td> <td>10</td> </tr> <tr> <td></td> <td>R</td> <td></td> <td></td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td></td> <td>R</td> <td>7</td> </tr> </table>												Low Level Diss. Met (incl. Hg) and Hardness	Low Level Tot. Met (incl. Hg) and Hardness	Chromium Speciation (III/VI) - Total	Chromium Speciation (III/VI) - Dissolved	Ammonia - N	Dissolved Organic Carbon (DOC)	Nitrate-N	Nitrite - N	Total Phosphorus	Sulphate	pH, Conductivity	Asbestos-TEM-AD	Total Suspended Solids	Number of Containers	R	R			R	R	R	R	R	R	R		R	10	R	R			R	R	R	R	R	R	R		R	10		R			R	R	R	R	R	R	R		R	7
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	TRAVEL BLANK					Water		R			R	R	R	R	R	R	R	R	R	7																																																				
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