

HEMMERA ENVIROCHEM INC.

ATTN: Natasha Sandys 230 - 2237 2nd Avenue Whitehorse YK Y1A 0K7 Date Received: 20-MAR-15

Report Date: 30-MAR-15 16:42 (MT)

Version: FINAL

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1589940

Project P.O. #: NOT SUBMITTED

Job Reference: 1343-005.06

C of C Numbers: 1

Legal Site Desc:

Brent Mack, B.Sc. Account Manager

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L1589940 CONTD.... PAGE 2 of 14 30-MAR-15 16:42 (MT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1589940-1 Water 19-MAR-15 13:05 MW09-24	L1589940-2 Water 19-MAR-15 13:05 MW09-24 FILTERED ALK	L1589940-3 Water 19-MAR-15 10:30 MW09-06	L1589940-4 Water 19-MAR-15 15:30 MW09-02	L1589940-5 Water 19-MAR-15 15:30 MW09-02 FILTERED ALK
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	979		1910	2820	
	Hardness (as CaCO3) (mg/L)	620		1310	1580	
	pH (pH)	7.38		7.81	6.49	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	189	190	119	40.9	43.8
	Ammonia, Total (as N) (mg/L)	0.0113		0.733	14.4	
	Chloride (CI) (mg/L)	<1.0		<2.5	<10 DLA	
	Fluoride (F) (mg/L)	<0.040		0.26	0.75	
	Nitrate (as N) (mg/L)	3.28		0.192	0.50	
	Nitrite (as N) (mg/L)	<0.0020		0.0138	0.023	
	Total Kjeldahl Nitrogen (mg/L)	0.378		1.16	15.7	
	Sulfate (SO4) (mg/L)	387		1190	2020	
	Sulphide as S (mg/L)	<0.020		<0.020	<0.020	
	Anion Sum (meq/L)	12.1		27.1	43.0	
	Cation Sum (meq/L)	12.8		27.7	42.1	
	Cation - Anion Balance (%)	3.1		1.0	-1.0	
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.0050	0.0053	
	Cyanide, Total (mg/L)	0.0117		<0.0050	0.169	
	Thiocyanate (SCN) (mg/L)	<0.50		<0.50	1.28	
	Cyanide, Free (mg/L)	<0.0050		<0.0050	<0.0050	
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	37.1		21.6	3.81	
	Total Organic Carbon (mg/L)	8.74		7.27	5.71	
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					

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L1589940 CONTD.... PAGE 3 of 14 30-MAR-15 16:42 (MT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1589940-6 Water 19-MAR-15 16:20 MW09-23	L1589940-7 Water 19-MAR-15 16:20 MW09-23 FILTERED ALK	L1589940-8 Water 18-MAR-15 16:50 GSI-DC-02B	L1589940-9 Water 18-MAR-15 17:55 GSI-HA-04A	L1589940-10 Water 18-MAR-15 16:30 GSI-HA-01A
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	1260		1010		
	Hardness (as CaCO3) (mg/L)	618		632	647	657
	pH (pH)	7.33		8.10		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	365	380	295		
	Ammonia, Total (as N) (mg/L)	3.79				
	Chloride (CI) (mg/L)	<2.5		<1.0 DLA		
	Fluoride (F) (mg/L)	0.16		0.066		
	Nitrate (as N) (mg/L)	<0.025		0.778		
	Nitrite (as N) (mg/L)	0.0058		0.0102		
	Total Kjeldahl Nitrogen (mg/L)	5.73				
	Sulfate (SO4) (mg/L)	428		337		
	Sulphide as S (mg/L)	0.023				
	Anion Sum (meq/L)	16.2		13.0		
	Cation Sum (meq/L)	15.3		13.1		
	Cation - Anion Balance (%)	-3.0		0.4		
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050				
	Cyanide, Total (mg/L)	0.0376				
	Thiocyanate (SCN) (mg/L)	<0.50				
	Cyanide, Free (mg/L)	<0.0050				
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	76.6				
	Total Organic Carbon (mg/L)	25.6				
Total Metals	Aluminum (AI)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					

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L1589940 CONTD.... PAGE 4 of 14 30-MAR-15 16:42 (MT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1589940-11 Water 18-MAR-15 17:00 FB-1	L1589940-12 Water 18-MAR-15 17:00 FB-1 FILTERED ALK	L1589940-13 Water 19-MAR-15 18:00 FB-2	L1589940-14 Water 19-MAR-15 18:00 FB-2 FILTERED ALK	L1589940-15 Water 20-MAR-15 TRIP BLANK
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0		<2.0		<2.0
	Hardness (as CaCO3) (mg/L)	<0.50		<0.50		<0.50
	pH (pH)	5.45		5.98		5.23
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Ammonia, Total (as N) (mg/L)	<0.0050		<0.0050		0.0167
	Chloride (CI) (mg/L)	<0.50		<0.50		<0.50
	Fluoride (F) (mg/L)	<0.020		<0.020		<0.020
	Nitrate (as N) (mg/L)	<0.0050		<0.0050		<0.0050
	Nitrite (as N) (mg/L)	<0.0010		<0.0010		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	< 0.050		<0.050		<0.050
	Sulfate (SO4) (mg/L)	<0.30		<0.30		<0.30
	Sulphide as S (mg/L)	<0.020		<0.020		<0.020
	Anion Sum (meq/L)	<0.10		<0.10		<0.10
	Cation Sum (meq/L)	<0.10		<0.10		<0.10
	Cation - Anion Balance (%)	0.0		0.0		0.0
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.0050		<0.0050
	Cyanide, Total (mg/L)	<0.0050		<0.0050		<0.0050
	Thiocyanate (SCN) (mg/L)	<0.50		<0.50		<0.50
	Cyanide, Free (mg/L)	<0.0050		<0.0050		<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	<0.50		<0.50		<0.50
	Total Organic Carbon (mg/L)	<0.50		<0.50		<0.50
Total Metals	Aluminum (Al)-Total (mg/L)					<0.0030
	Antimony (Sb)-Total (mg/L)					<0.00010
	Arsenic (As)-Total (mg/L)					<0.00010
	Barium (Ba)-Total (mg/L)					<0.000050
	Beryllium (Be)-Total (mg/L)					<0.00010
	Bismuth (Bi)-Total (mg/L)					<0.00050
	Boron (B)-Total (mg/L)					<0.010
	Cadmium (Cd)-Total (mg/L)					<0.000010
	Calcium (Ca)-Total (mg/L)					<0.050
	Chromium (Cr)-Total (mg/L)					0.00025
	Cobalt (Co)-Total (mg/L)					<0.00010
	Copper (Cu)-Total (mg/L)					<0.00050
	Iron (Fe)-Total (mg/L)					<0.010
	Lead (Pb)-Total (mg/L)					<0.000050
	Lithium (Li)-Total (mg/L)					<0.00050

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L1589940 CONTD.... PAGE 5 of 14 30-MAR-15 16:42 (MT)

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Grouping	Analyte					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (TI)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	
	Aluminum (AI)-Dissolved (mg/L)	0.0012		0.0020	<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	0.00018		0.213	0.00508	
	Arsenic (As)-Dissolved (mg/L)	0.00165		0.197	19.2	
	Barium (Ba)-Dissolved (mg/L)	0.205		0.00762	0.00896	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010		<0.00020	<0.00050	
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050		<0.0010	<0.0025	
	Boron (B)-Dissolved (mg/L)	0.015		0.116	0.058	
	Cadmium (Cd)-Dissolved (mg/L)	0.000058		0.00557	0.000707	
	Calcium (Ca)-Dissolved (mg/L)	169		443	487	
	Chromium (Cr)-Dissolved (mg/L)	0.00031		<0.00020	<0.00050	
	Cobalt (Co)-Dissolved (mg/L)	0.00053		0.00151	0.0115	
	Copper (Cu)-Dissolved (mg/L)	0.00769		0.00670	<0.0010	
	Iron (Fe)-Dissolved (mg/L)	0.010		<0.010	46.7	
	Lead (Pb)-Dissolved (mg/L)	<0.000050		0.00045	<0.00025	
	Lithium (Li)-Dissolved (mg/L)	0.00120		0.0089	0.0284	
	Magnesium (Mg)-Dissolved (mg/L)	48.3		50.4	87.8	

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L1589940 CONTD.... PAGE 6 of 14 30-MAR-15 16:42 (MT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1589940-6 Water 19-MAR-15 16:20 MW09-23	L1589940-7 Water 19-MAR-15 16:20 MW09-23 FILTERED ALK	L1589940-8 Water 18-MAR-15 16:50 GSI-DC-02B	L1589940-9 Water 18-MAR-15 17:55 GSI-HA-04A	L1589940-10 Water 18-MAR-15 16:30 GSI-HA-01A
Grouping	Analyte					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (TI)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	FIELD
	Aluminum (AI)-Dissolved (mg/L)	0.0182		0.0017	0.0042	0.0038
	Antimony (Sb)-Dissolved (mg/L)	0.00032		0.00051	0.00141	0.00047
	Arsenic (As)-Dissolved (mg/L)	0.0168		0.00298	0.00517	0.0147
	Barium (Ba)-Dissolved (mg/L)	0.0375		0.103	0.116	0.175
	Beryllium (Be)-Dissolved (mg/L)	<0.00020		<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	O.0010		<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	0.169		<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000025		0.000059	0.000017	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	159		166	166	172
	Chromium (Cr)-Dissolved (mg/L)	0.00022		0.00017	<0.00010	0.00015
	Cobalt (Co)-Dissolved (mg/L)	0.0192		0.00169	0.00040	0.00018
	Copper (Cu)-Dissolved (mg/L)	O.00040		0.00208	0.00046	0.00128
	Iron (Fe)-Dissolved (mg/L)	5.83		0.331	1.55	4.00
	Lead (Pb)-Dissolved (mg/L)	<0.00010		0.000078	0.000056	0.000085
	Lithium (Li)-Dissolved (mg/L)	O.0010		0.00262	0.00491	0.00686
	Magnesium (Mg)-Dissolved (mg/L)	53.8		52.8	56.4	55.5

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L1589940 CONTD.... PAGE 7 of 14 30-MAR-15 16:42 (MT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1589940-11 Water 18-MAR-15 17:00 FB-1	L1589940-12 Water 18-MAR-15 17:00 FB-1 FILTERED ALK	L1589940-13 Water 19-MAR-15 18:00 FB-2	L1589940-14 Water 19-MAR-15 18:00 FB-2 FILTERED ALK	L1589940-15 Water 20-MAR-15 TRIP BLANK
Grouping	Analyte					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					<0.10
	Manganese (Mn)-Total (mg/L)					<0.000050
	Mercury (Hg)-Total (mg/L)					<0.000010
	Molybdenum (Mo)-Total (mg/L)					<0.000050
	Nickel (Ni)-Total (mg/L)					<0.00050
	Phosphorus (P)-Total (mg/L)					<0.050
	Potassium (K)-Total (mg/L)					<0.10
	Selenium (Se)-Total (mg/L)					<0.00010
	Silicon (Si)-Total (mg/L)					<0.050
	Silver (Ag)-Total (mg/L)					<0.000010
	Sodium (Na)-Total (mg/L)					<0.050
	Strontium (Sr)-Total (mg/L)					<0.00020
	Sulfur (S)-Total (mg/L)					<0.50
	Thallium (TI)-Total (mg/L)					<0.000010
	Tin (Sn)-Total (mg/L)					<0.00010
	Titanium (Ti)-Total (mg/L)					<0.010
	Uranium (U)-Total (mg/L)					<0.000010
	Vanadium (V)-Total (mg/L)					<0.0010
	Zinc (Zn)-Total (mg/L)					<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD		
	Dissolved Metals Filtration Location	FIELD		FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0010		<0.0010		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		
	Arsenic (As)-Dissolved (mg/L)	<0.00010		<0.00010		
	Barium (Ba)-Dissolved (mg/L)	<0.000050		<0.000050		
	Beryllium (Be)-Dissolved (mg/L)	<0.00010		<0.00010		
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050		<0.00050		
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010		<0.000010		
	Calcium (Ca)-Dissolved (mg/L)	<0.050		<0.050		
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		
	Cobalt (Co)-Dissolved (mg/L)	<0.00010		<0.00010		
	Copper (Cu)-Dissolved (mg/L)	<0.00020		<0.00020		
	Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		
	Lithium (Li)-Dissolved (mg/L)	<0.00050		<0.00050		
	Magnesium (Mg)-Dissolved (mg/L)	<0.10		<0.10		

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L1589940 CONTD.... PAGE 8 of 14 30-MAR-15 16:42 (MT)

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	Sample ID Description Sampled Date Sampled Time Client ID	L1589940-1 Water 19-MAR-15 13:05 MW09-24	L1589940-2 Water 19-MAR-15 13:05 MW09-24 FILTERED ALK	L1589940-3 Water 19-MAR-15 10:30 MW09-06	L1589940-4 Water 19-MAR-15 15:30 MW09-02	L1589940-5 Water 19-MAR-15 15:30 MW09-02 FILTERED ALK
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.000515		6.31	35.2	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000203		0.00564	0.00515	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050		0.0023	0.0030	
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	1.98		15.4	92.8	
	Selenium (Se)-Dissolved (mg/L)	0.00048		<0.00020	<0.00050	
	Silicon (Si)-Dissolved (mg/L)	6.12		6.81	6.61	
	Silver (Ag)-Dissolved (mg/L)	<0.000010		0.000029	<0.000050	
	Sodium (Na)-Dissolved (mg/L)	9.09		17.4	77.1	
	Strontium (Sr)-Dissolved (mg/L)	0.686		0.696	0.998	
	Sulfur (S)-Dissolved (mg/L)	139		404	632	
	Thallium (TI)-Dissolved (mg/L)	<0.000010		0.000360	0.000238	
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00020	<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.020	<0.050	
	Uranium (U)-Dissolved (mg/L)	0.00324		0.00159	0.000380	
	Vanadium (V)-Dissolved (mg/L)	<0.0010		<0.0020	<0.0050	
	Zinc (Zn)-Dissolved (mg/L)	0.0014		0.0939	0.299	

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L1589940 CONTD.... PAGE 9 of 14 30-MAR-15 16:42 (MT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1589940-6 Water 19-MAR-15 16:20 MW09-23	L1589940-7 Water 19-MAR-15 16:20 MW09-23 FILTERED ALK	L1589940-8 Water 18-MAR-15 16:50 GSI-DC-02B	L1589940-9 Water 18-MAR-15 17:55 GSI-HA-04A	L1589940-10 Water 18-MAR-15 16:30 GSI-HA-01A
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	11.2		2.85	0.321	0.206
	Mercury (Hg)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.00375		0.00487	0.000531	0.000739
	Nickel (Ni)-Dissolved (mg/L)	0.0015		0.0152	0.00155	0.00423
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	7.28		3.67	2.95	3.66
	Selenium (Se)-Dissolved (mg/L)	OLA <0.00020		<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	4.98		6.25	5.12	6.09
	Silver (Ag)-Dissolved (mg/L)	OLA <0.000020		<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	40.1		5.54	4.65	5.76
	Strontium (Sr)-Dissolved (mg/L)	0.392		0.353	0.399	0.385
	Sulfur (S)-Dissolved (mg/L)	129		114	145	132
	Thallium (TI)-Dissolved (mg/L)	<0.000020		<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	O.00020		<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.020		<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00182		0.000625	0.000615	0.000080
	Vanadium (V)-Dissolved (mg/L)	O.0020		<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0051		0.0077	0.0043	0.0057

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

L1589940 CONTD.... PAGE 10 of 14 30-MAR-15 16:42 (MT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID		L1589940-12 Water 18-MAR-15 17:00 FB-1 FILTERED ALK	L1589940-13 Water 19-MAR-15 18:00 FB-2	L1589940-14 Water 19-MAR-15 18:00 FB-2 FILTERED ALK	L1589940-15 Water 20-MAR-15 TRIP BLANK
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	<0.000050		<0.000050		
	Mercury (Hg)-Dissolved (mg/L)	<0.000010		<0.000010		
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050		<0.000050		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050		
	Potassium (K)-Dissolved (mg/L)	0.16		0.14		
	Selenium (Se)-Dissolved (mg/L)	<0.00010		<0.00010		
	Silicon (Si)-Dissolved (mg/L)	<0.050		<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		
	Sodium (Na)-Dissolved (mg/L)	<0.050		<0.050		
	Strontium (Sr)-Dissolved (mg/L)	<0.00020		<0.00020		
	Sulfur (S)-Dissolved (mg/L)	<0.50		<0.50		
	Thallium (TI)-Dissolved (mg/L)	<0.000010		<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		
	Uranium (U)-Dissolved (mg/L)	<0.000010		<0.000010		
	Vanadium (V)-Dissolved (mg/L)	<0.0010		<0.0010		
	Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		

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

L1589940 CONTD....

PAGE 11 of 14

30-MAR-15 16:42 (MT)

Version: FINAL

Sample Number	Client Sample ID	Qualifier	Description		
L1589940-15	TRIP BLANK	LPMB	Lab-Preserved for Metals results may		Sample received with pH > 2 and preserved at the lab. sed low.
QC Samples with	Qualifiers & Comme	ents:			
QC Type Descrip	tion	Parameter		Qualifier	Applies to Sample Number(s)
Matrix Spike		Total Inorganic Ca	arbon	MS-B	L1589940-1, -11, -13, -15, -3, -4, -6
Matrix Spike		Total Organic Car	rbon	MS-B	L1589940-1, -13, -15, -3, -4
Matrix Spike		Total Organic Car	rbon	MS-B	L1589940-11, -6
Matrix Spike		Barium (Ba)-Disse	olved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Matrix Spike		Manganese (Mn)-	-Dissolved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Matrix Spike		Sodium (Na)-Diss	solved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Matrix Spike		Strontium (Sr)-Dis	ssolved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Qualifiers for Inc	dividual Parameters	Listed:			
Qualifier	Description				
DLA	Detection Limit adjust	ed for required dilution			
MS-B	Matrix Spike recovery	could not be accuratel	y calculated due to hi	gh analy	te background in sample.
RRA	Reported Result Is Th	ne Average Of 2 Or Moi	re Analyses		
RRV	Reported Result Verif	ied By Repeat Analysis	3		
est Method Ref	erences:				
ALS Test Code	Matrix	Test Description			Method Reference**
ALK-COL-VA	Water	Alkalinity by Colouring	metric (Automated)		EPA 310.2
This analysis is colourimetric me	0.	edures adapted from EF	PA Method 310.2 "Alk	alinity". ⁻	Total Alkalinity is determined using the methyl orange
ALK-PCT-VA	Water	Alkalinity by Auto. T	itration		APHA 2320 "Alkalinity"
					Total alkalinity is determined by potentiometric titration to liphthalein alkalinity and total alkalinity values.
ALK-PCT-VA	Water	Alkalinity by Auto. T	itration		APHA 2320 Alkalinity
					Total alkalinity is determined by potentiometric titration to lphthalein alkalinity and total alkalinity values.
CARBONS-TIC-V	A Water	Total inorganic carbo	on by CO2 purge		APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is o	carried out using proce	edures adapted from AF	PHA Method 5310 "To	otal Orga	nic Carbon (TOC)".
CARBONS-TOC-V	/A Water	Total organic carbor	n by combustion		APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is o	carried out using proce	edures adapted from AF	PHA Method 5310 "To	otal Orga	
CL-IC-N-WR	Water	Chloride in Water by	/ IC		EPA 300.1 (mod)
Inorganic anions	are analyzed by Ion C	chromatography with co		detection	
CN-FREE-CFA-V	\ Water	Free Cyanide in wat	er by CFA		ASTM 7237
This analysis is o	carried out using proce	edures adapted from AS	STM Method 7237 "Fr	ee Cyan	ide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion at pH 6 with final determination by colourimetric analysis
CN-SCN-VA	Water	Thiocyanate by Cold	-		APHA 4500-CN CYANIDE
This analysis is colourimetric me	0 1	edures adapted from AF	PHA Method 4500-CN	I- M "Thi	ocyanate" Thiocyanate is determined by the ferric nitrate
CN-T-CFA-VA	Water	Total Cyanide in wat	ter by CFA		ISO 14403:2002
CFA)". Total or si colourimetric ana	trong acid dissociable llysis. Method Limitati	(SAD) cyanide is deter	rmined by in-line UV o sceptible to interference	digestion be from t	mination of Total Cyanide using Flow Analysis (FIA and along with sample distillation and final determination by hiocyanate (SCN). If SCN is present in the sample, there as low as zero.
N-WAD-CFA-VA			anide in water by CFA		APHA 4500-CN CYANIDE
					

This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable

APHA 2510 Auto. Conduc.

(WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.

Conductivity (Automated)

Water

EC-PCT-VA

L1589940 CONTD....

PAGE 12 of 14

30-MAR-15 16:42 (MT)

Version: FINAL

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

F-IC-N-WR Water Fluoride in Water by IC EPA 300.1 (mod)

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

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.

HG-DIS-LOW-CVAFS-VA Water Dissolved Mercury in Water by CVAFS(Low) EPA SW-846 3005A & EPA 245.7

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 filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA Water Total Mercury in Water by CVAFS(Low) EPA 245.7

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 procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

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-DIS-LOW-ICP-VA Water Dissolved Metals in Water by ICPOES EPA 3005A/6010B

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 procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma optical emission spectrophotometry (EPA Method 6010B).

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).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

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 (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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)

L1589940 CONTD....

PAGE 13 of 14

30-MAR-15 16:42 (MT)

Version: FINAL

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

PH-PCT-VA Water pH by Meter (Automated)

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

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.

S-DIS-ICP-VA

Water

Dissolved Sulfur in Water by ICPOES

EPA SW-846 3005A/6010B

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 - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA

Water

Total Sulfur in Water by ICPOES

EPA SW-846 3005A/6010B

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 - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S2-T-COL-VA

Water

Total Sulphide by Colorimetric

APHA 4500-S2 Sulphide

This analysis is carried out using procedures adapted from APHA Method 4500-S2 "Sulphide". Sulphide is determined using the methlyene blue

colourimetric method.

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.

TKN-F-VA

Water

TKN in Water by Fluorescence

APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence 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
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

L1589940 CONTD....

PAGE 14 of 14

30-MAR-15 16:42 (MT)

Version: FINAL

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 (COC) / Analytical Request Form

L1589940-COFC

COC Number: 1 -

Page <u>1</u> of ___1

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Phone:	867-335-3235		Email 1 or Fax	nsandys@hemme	ra.com, rmartini	(a@hemmera.coi	Spec	Specify Date Required for E2,E or P:												
			Email 2	chris@elr.ca			Analysis Request													
Invoice To	Same as Report To ✓ Yes	,		Invoice Di			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below													
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ALS Lab Wo	rk Order# (lab use only)		ALS Contact:		Sampler:	RM,TJ,AN,JL	Dissolved Metals,	Dissolved Mercury	Nitrite,	CI, FI, Suffate, conductivity, pH,	Sum, Cal	- Weak Acid	ia N (total),	Thiocyanate (SCN)	s as S	Total Inorganic	ed Alkalinity			_
ALS Sample #	Sample Identificat	on and/or Coordinates		Date	Time	Sample Type	Ì	Ì	ate,	E. S.	S	Cyanide	Ammonia	<u>%</u>	Sulphide	<u> </u>	Dissolved	:	, 1	
(lab use only) (This description will appear on the report)				(dd-mmm-yy)	(hh:mm)	Sample Type	iš	Dis	Z II	(cl,	Anion	گ	Ę.	Ĕ	 	Į oř	Ş		. 1	
	MW09-24			19-Mar-15	13:05	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-06			19-Mar-15	10:30	Water	R	R	R	R	R	R	R	R	R	R				8
	MW09-02			19-Mar-15	15:30	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MVV09-23			19-Mar-15	16:20	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-DC-02B			18-Mar-15	16:50	Water	R	R	R	R	R									3
	GSI-HA-04A			18-Mar-15	17:55	Water	R	R												2
	GSI-HA-01A	t Holding	Time	18-Mar-15	16:30	Water	R	R												2
	FB-1 SNOT	(),0	_	18-Mar-15	17:00	Water	R	R	R	R	R	R	R	R	R	R	Ŕ			9
	FB-2	Rush Processi	ng	19 -M ar-15	18:00	Water	R	R	R	R	R	R	R	R	R	R	R		, T	9
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	ken from a Regulated DW System?	Can attached accompt	an alaasi faa fall w					acks			No		Cust	ody s	eat In	tact	Yes		No	
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