EDI ENVIRONMENTAL DYNAMICS INC.
ATTN: Lyndsay Doetzel
2195 - 2nd Ave
Whitehorse YT Y1A 3T8

Date Received: 08-SEP-16
Report Date: 22-SEP-16 17:21 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1826331

Project P.O. #: NOT SUBMITTED
Job Reference: MOUNT NANSEN 16-Y-0089
C of C Numbers: 1
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1826331-1 Water 06-SEP-16 17:00 WQ-DC-R	L1826331-2 Water 07-SEP-16 09:35 WQ-VC-U	L1826331-3 Water 06-SEP-16 15:00 WQ-VC-R	L1826331-4 Water 07-SEP-16 09:10 WQ-VC-DBC	L1826331-5 Water 06-SEP-16 15:35 WQ-VC-UMN
WATER						
Physical Tests	Conductivity (uS/cm)	898	162	188	175	208
	Hardness (as CaCO3) (mg/L)	507	79.8	89.5	85.5	101
	pH (pH)	7.93	7.91	7.95	7.91	7.99
	Total Suspended Solids (mg/L)	3.1	<3.0	3.2	22.2	5.1
	TDS (Calculated) (mg/L)	639	88.7	105	97.0	118
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	157	73.7	71.1	74.9	78.8
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	157	73.7	71.1	74.9	78.8
	Ammonia, Total (as N) (mg/L)	0.0705	<0.0050	0.0055	0.0169	<0.0050
	Bromide (Br) (mg/L)		<0.050		<0.050	
	Chloride (Cl) (mg/L)	0.57	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.096	0.051	0.059	0.052	0.057
	Nitrate (as N) (mg/L)	0.537	0.0678	0.0600	0.0697	0.0707
	Nitrite (as N) (mg/L)	0.0065	<0.0010	<0.0010	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	358	13.6	28.1	19.0	32.3
	Anion Sum (meq/L)	10.6	1.76	2.01	1.90	2.25
	Cation Sum (meq/L)	10.7	1.72	1.93	1.84	2.15
	Cation - Anion Balance (%)	0.2	-1.3	-2.2	-1.7	-2.3
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanate (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0383	0.0453	0.118	0.444	0.142
	Antimony (Sb)-Total (mg/L)	0.00118	<0.00010	0.00020	0.00028	0.00021
	Arsenic (As)-Total (mg/L)	0.0136	0.00037	0.00148	0.00278	0.00165
	Barium (Ba)-Total (mg/L)	0.0441	0.0596	0.0586	0.0686	0.0612
	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)	0.016	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000379	0.0000212	0.0000309	0.0000562	0.0000333
	Calcium (Ca)-Total (mg/L)	133	21.3	25.1	23.4	29.2
	Chromium (Cr)-Total (mg/L)	0.00029	0.00015	0.00028	0.00063	0.00033
	Cobalt (Co)-Total (mg/L)	0.00086	<0.00010	0.00018	0.00033	0.00018
	Copper (Cu)-Total (mg/L)	0.00131	0.00148	0.00210	0.00227	0.00177
	Iron (Fe)-Total (mg/L)	1.35	0.120	0.325	0.707	0.253
	Lead (Pb)-Total (mg/L)	0.000143	<0.000050	0.000393	0.00144	0.000424

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1826331-6	L1826331-7			
	Description	Water	Water			
	Sampled Date	07-SEP-16	07-SEP-16			
	Sampled Time	10:35	12:25			
	Client ID	WQ-BC	WQ-PC-U			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	300	494			
	Hardness (as CaCO3) (mg/L)	151	232			
	pH (pH)	7.88	7.38			
	Total Suspended Solids (mg/L)	676	352			
	TDS (Calculated) (mg/L)	186	326			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	83.8	51.9			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	83.8	51.9			
	Ammonia, Total (as N) (mg/L)	0.190	2.08			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	<0.50	0.71			
	Fluoride (F) (mg/L)	0.076	0.075			
	Nitrate (as N) (mg/L)	0.139	0.0663			
	Nitrite (as N) (mg/L)	0.0029	0.0051			
	Sulfate (SO4) (mg/L)	75.6	200			
	Anion Sum (meq/L)	3.26	5.23			
	Cation Sum (meq/L)	3.25	5.14			
	Cation - Anion Balance (%)	-0.1	-0.8			
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050			
	Cyanide, Total (mg/L)	<0.0050	<0.0050			
	Cyanate (mg/L)	<0.20	<0.20			
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	12.8	11.2			
	Antimony (Sb)-Total (mg/L)	0.00271	0.00928			
	Arsenic (As)-Total (mg/L)	0.0668	0.173			
	Barium (Ba)-Total (mg/L)	0.282	0.375			
	Beryllium (Be)-Total (mg/L)	0.000472	0.000500			
	Bismuth (Bi)-Total (mg/L)	0.000801	0.00141			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.00188	0.00184			
	Calcium (Ca)-Total (mg/L)	52.7	77.0			
	Chromium (Cr)-Total (mg/L)	0.0178	0.0134			
	Cobalt (Co)-Total (mg/L)	0.00912	0.00779			
	Copper (Cu)-Total (mg/L)	0.0314	0.0383			
	Iron (Fe)-Total (mg/L)	22.9	21.3			
	Lead (Pb)-Total (mg/L)	0.0584	0.0738			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1826331-1	L1826331-2	L1826331-3	L1826331-4	L1826331-5
Description	Water	Water	Water	Water	Water
Sampled Date	06-SEP-16	07-SEP-16	06-SEP-16	07-SEP-16	06-SEP-16
Sampled Time	17:00	09:35	15:00	09:10	15:35
Client ID	WQ-DC-R	WQ-VC-U	WQ-VC-R	WQ-VC-DBC	WQ-VC-UMN
Grouping / **Analyte**					
WATER					
Total Metals Lithium (Li)-Total (mg/L)	0.0020	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	48.4	6.97	8.17	7.44	8.78
Manganese (Mn)-Total (mg/L)	0.494	0.0276	0.0566	0.0710	0.0638
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000333	0.000341	0.000383	0.000398	0.000418
Nickel (Ni)-Total (mg/L)	0.00106	<0.00050	0.00076	0.00080	0.00059
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	2.85	0.55	0.72	0.69	0.68
Selenium (Se)-Total (mg/L)	0.000067	<0.000050	0.000052	0.000050	<0.000050
Silicon (Si)-Total (mg/L)	6.66	6.52	6.92	7.28	6.50
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000027	<0.000010
Sodium (Na)-Total (mg/L)	10.1	2.30	2.60	2.44	2.90
Strontium (Sr)-Total (mg/L)	0.414	0.239	0.228	0.239	0.261
Sulfur (S)-Total (mg/L)	123	4.77	9.52	6.71	11.3
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	0.00136	0.00068	0.00339	0.0155	0.00437
Uranium (U)-Total (mg/L)	0.00134	0.000383	0.000462	0.000483	0.000490
Vanadium (V)-Total (mg/L)	0.00054	<0.00050	0.00057	0.00147	0.00079
Zinc (Zn)-Total (mg/L)	0.0054	<0.0030	<0.0030	0.0059	0.0047
Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0173	0.0294	0.0352	0.0280	0.0256
Antimony (Sb)-Dissolved (mg/L)	0.00113	<0.00010	0.00016	0.00014	0.00017
Arsenic (As)-Dissolved (mg/L)	0.00787	0.00038	0.00094	0.00072	0.00092
Barium (Ba)-Dissolved (mg/L)	0.0458	0.0642	0.0586	0.0601	0.0603
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)	0.014	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	0.0000286	0.0000175	0.0000202	0.0000240	0.0000209
Calcium (Ca)-Dissolved (mg/L)	122	20.8	23.7	22.6	26.5
Chromium (Cr)-Dissolved (mg/L)	0.00025	0.00013	0.00017	0.00013	<0.00010
Cobalt (Co)-Dissolved (mg/L)	0.00085	<0.00010	0.00013	0.00010	0.00010
Copper (Cu)-Dissolved (mg/L)	0.00121	0.00144	0.00153	0.00146	0.00137
Iron (Fe)-Dissolved (mg/L)	0.419	0.066	0.110	0.067	0.060
Lead (Pb)-Dissolved (mg/L)	0.000051	<0.000050	<0.000050	<0.000050	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1826331-6	L1826331-7			
	Description	Water	Water			
	Sampled Date	07-SEP-16	07-SEP-16			
	Sampled Time	10:35	12:25			
	Client ID	WQ-BC	WQ-PC-U			
Grouping	**Analyte**					
WATER						
Total Metals	Lithium (Li)-Total (mg/L)	0.0100	0.0089			
	Magnesium (Mg)-Total (mg/L)	16.2	20.1			
	Manganese (Mn)-Total (mg/L)	1.07	1.71			
	Mercury (Hg)-Total (mg/L)	0.000065	0.000076			
	Molybdenum (Mo)-Total (mg/L)	0.00156	0.00117			
	Nickel (Ni)-Total (mg/L)	0.0125	0.0103			
	Phosphorus (P)-Total (mg/L)	0.569	0.365			
	Potassium (K)-Total (mg/L)	3.28	3.24			
	Selenium (Se)-Total (mg/L)	0.000269	0.000257			
	Silicon (Si)-Total (mg/L)	30.4	27.6			
	Silver (Ag)-Total (mg/L)	0.00115	0.00203			
	Sodium (Na)-Total (mg/L)	4.61	6.78			
	Strontium (Sr)-Total (mg/L)	0.321	0.380			
	Sulfur (S)-Total (mg/L)	27.1	70.4			
	Thallium (Tl)-Total (mg/L)	0.000240	0.000187			
	Tin (Sn)-Total (mg/L)	0.00021	0.00015			
	Titanium (Ti)-Total (mg/L)	0.495	0.273			
	Uranium (U)-Total (mg/L)	0.00341	0.00139			
	Vanadium (V)-Total (mg/L)	0.0416	0.0339			
	Zinc (Zn)-Total (mg/L)	0.141	0.201			
	Zirconium (Zr)-Total (mg/L)	0.00092	0.00052			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0324	0.0128			
	Antimony (Sb)-Dissolved (mg/L)	0.00063	0.00352			
	Arsenic (As)-Dissolved (mg/L)	0.00404	0.0144			
	Barium (Ba)-Dissolved (mg/L)	0.0625	0.120			
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000805	0.0000767			
	Calcium (Ca)-Dissolved (mg/L)	43.2	67.1			
	Chromium (Cr)-Dissolved (mg/L)	0.00031	0.00011			
	Cobalt (Co)-Dissolved (mg/L)	0.00030	0.00109			
	Copper (Cu)-Dissolved (mg/L)	0.00207	0.00110			
	Iron (Fe)-Dissolved (mg/L)	0.101	0.046			
	Lead (Pb)-Dissolved (mg/L)	0.000393	0.000219			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1826331-1	L1826331-2	L1826331-3	L1826331-4	L1826331-5
Description	Water	Water	Water	Water	Water
Sampled Date	06-SEP-16	07-SEP-16	06-SEP-16	07-SEP-16	06-SEP-16
Sampled Time	17:00	09:35	15:00	09:10	15:35
Client ID	WQ-DC-R	WQ-VC-U	WQ-VC-R	WQ-VC-DBC	WQ-VC-UMN
Grouping / **Analyte**					
WATER					
Dissolved Metals Lithium (Li)-Dissolved (mg/L)	0.0021	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	49.1	6.75	7.35	7.05	8.38
Manganese (Mn)-Dissolved (mg/L)	0.523	0.0258	0.0513	0.0613	0.0537
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000299	0.000317	0.000345	0.000375	0.000377
Nickel (Ni)-Dissolved (mg/L)	0.00106	<0.00050	0.00065	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	2.50	0.53	0.59	0.58	0.62
Selenium (Se)-Dissolved (mg/L)	0.000098	<0.000050	0.000059	0.000063	<0.000050
Silicon (Si)-Dissolved (mg/L)	6.10	6.22	6.20	6.21	5.99
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	10.1	2.35	2.52	2.36	2.65
Strontium (Sr)-Dissolved (mg/L)	0.405	0.233	0.222	0.238	0.246
Sulfur (S)-Dissolved (mg/L)	128	4.86	9.83	7.20	11.4
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	0.00058	<0.00030	0.00036	<0.00030	<0.00030
Uranium (U)-Dissolved (mg/L)	0.00124	0.000342	0.000405	0.000426	0.000467
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	0.0100	0.0012	0.0024	0.0018	0.0017
Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1826331-6	L1826331-7			
	Description	Water	Water			
	Sampled Date	07-SEP-16	07-SEP-16			
	Sampled Time	10:35	12:25			
	Client ID	WQ-BC	WQ-PC-U			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)	0.0012	0.0025			
	Magnesium (Mg)-Dissolved (mg/L)	10.6	15.8			
	Manganese (Mn)-Dissolved (mg/L)	0.382	1.29			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.00104	0.000861			
	Nickel (Ni)-Dissolved (mg/L)	0.00071	0.00086			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	1.06	1.49			
	Selenium (Se)-Dissolved (mg/L)	0.000064	0.000114			
	Silicon (Si)-Dissolved (mg/L)	7.19	5.62			
	Silver (Ag)-Dissolved (mg/L)	0.000013	0.000029			
	Sodium (Na)-Dissolved (mg/L)	3.84	6.00			
	Strontium (Sr)-Dissolved (mg/L)	0.276	0.392			
	Sulfur (S)-Dissolved (mg/L)	27.1	70.2			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	0.00105	0.00058			
	Uranium (U)-Dissolved (mg/L)	0.00140	0.000576			
	Vanadium (V)-Dissolved (mg/L)	0.00089	0.00055			
	Zinc (Zn)-Dissolved (mg/L)	0.0016	0.0102			
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030			

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Boron (B)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Total	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Total	MS-B	L1826331-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Nitrate (as N)	MS-B	L1826331-2, -4, -6, -7

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	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.

BE-T-L-CCMS-VA	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.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

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

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

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

CL-IC-N-WR	Water	Chloride in Water by IC	EPA 300.1 (mod)

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

CN-CNO-WT	Water	Cyanate	APHA 4500-CN-L

This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode

CN-SCN-VA	Water	Thiocyanate by Colour	APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method.

CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002

Reference Information

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide 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 (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.

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.

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

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

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-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.

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 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-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	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.

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	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

Reference Information

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-VA 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.

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-VA 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.

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.

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.

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.

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

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

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.

TDS-CALC-VA Water TDS (Calculated) APHA 1030E (20TH EDITION)

This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses".
The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Reference Information

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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

B

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1826331-COFC

COC Number: 14 -

Page ___ of ___

Report To	
Company:	EDI
Contact:	Lyndsay Doetzel
Address:	2195 - 2nd Avenue Whitehorse, YT Y1A 3T8
Phone:	867-393-4882

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☐ Yes ☐ No
☐ Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ldoetzel@edynamics.com
Email 2	Emilie.Hamm@gov.yk.ca
Email 3	erik.pit@gov.yk.ca

Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)	
R	☑ Regular (Standard TAT if received by 3 pm - business days)
P	☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
E	☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
E2	☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Specify Date Required for E2,E or P:	

Invoice To	
Same as Report To	☑ Yes ☑ No
Copy of Invoice with Report	☑ Yes ☐ No
Company:	EDI
Contact:	S Jenner

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	sjenner@edynamics.com
Email 2	ldoetzel@edynamics.com

Project Information	
ALS Quote #:	Q55559
Job #:	MOUNT NANSEN 16-Y-0089
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
Approver ID:	Cost Center:
GL Account:	Routing Code:
Activity Code:	
Location:	

ALS Lab Work Order # (lab use only): L1826331

ALS Contact: Craig Flaherty

Sampler: DH, AM.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA,EC-PCT-VA,PH-PCT-VA	ANIONS-ALL-IC-WR,TSS-MAN-WR	CN-WAD-CFA-VA,CN-T-CFA-VA (P)	CN-CNO-WT (P)	CN-SCN-VA (P)	NH3-F-VA (P)	MET-T-BCMDG-VA (P)	MET-D-BCMDG-VA (F/P)	IONBALANC-VA, TDS-CALC-VA					Number of Containers
[redacted]	WQ-DC-R	06-Sep-16	17:00	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-U	07-Sep-16	09:35	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-R	06-Sep-16	15:00	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-DBC	07-Sep-16	09:10	Water	R	R	R	R	R	R	R	R	R					9
[redacted]	WQ-VC-OMN	06-Sep-16	15:35	Water	R	R	R	R	R	R	R	R	R					9
	WQ-BC	07-Sep-16	10:35	Water	R	R	R	R	R	R	R	R	R					9
	WQ-PC-U	07-Sep-16	12:25	Water	R	R	R	R	R	R	R	R	R					9

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ Yes ☑ No

Are samples for human drinking water use?
☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			2	1	1

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: [signature]	Date: 08 Sept. 2016	Time: 08:10	Received by: [redacted]	Date: [redacted]	Time: [redacted]	Received by: JC	Date: SEP - 9 2016	Time: 8:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION   WHITE - LABORATORY COPY   YELLOW - CLIENT COPY

NA-FM-0326e v09 Front/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.