



September 4, 2015

Project: SJN-00215494-A0

Edinburgh Group Limited  
36 Cabot Avenue  
St. John's, Newfoundland and Labrador  
A1A 1B7

Attention: Mr. Albert Williams, P.Eng.

Dear Sirs:

**RE: Baseline Surface Water Sampling Program  
Proposed Cottage Lot Development  
Ocean Pond, Newfoundland and Labrador**

As a follow-up to the *Baseline Surface Water Sampling Program* submitted to the Department of Environment and Conservation on August 24<sup>th</sup>, 2015, the following continuation of baseline sampling of surface waters in Ocean Pond and Inner Pond (no name) will be completed.

1. Surface water samples will be collected/analyzed per the locations as noted on the attached *Figure 1: Baseline Surface Water Sampling Program*. In addition, an additional background surface water sample will be collected, the exact location to be determined. The proposed background site will be located in the populated area of Ocean Pond.
2. Surface water samples will be analyzed for the following parameters:
  - General Chemistry and RCap-MS – Maxxam Analytics (refer to attached Maxxam 'Certificate of Analysis' for the initial surface water sampling event, indicating the testing parameters);
  - Bacteriological Analysis – *petroforma* Laboratories (refer to attached *petroforma* 'Results of Microbiological Analysis' for the initial surface water sampling event, indicating the testing parameters);
  - Field – water temperature, pH, conductivity, total dissolved solids, DO, and turbidity.

### 3. Surface Water Sampling Schedule

- May/June 2015 (this sampling event completed)
- September 2015
- December 2015
- February 2016

The September sampling event has been scheduled for the week of September 7<sup>th</sup>, 2015.

We trust the enclosed information meets your present requirements. If you have any questions regarding this report, please do not hesitate to contact our office.

Yours very truly,

**exp Services Inc.**



William G. Melendy, M.A.Sc., P.Eng.  
Group Manager,  
Geotechnical/Environmental Engineering

WGM:dgn

Attachments: Figure 1: Proposed Cabin Lot Layout Plan  
Water Chemical and Microbiological Analytical Results

Copies: Mr. Bas Cleary – DOEC (clearyb@gov.nl.ca)  
Mr. Paul A. Carter – DOEC (pcarter@gov.nl.ca)  
Mr. Martin Goebel – DOEC (mgoebel@gov.nl.ca)

**NOTES:**  
 -LOT No.38, LOT No.39, LOT No.40, LOT No.41 AND LOT No.42 WILL NOT BE DEVELOPED DUE TO EXISTING SURFACE WATER/BOG CONDITIONS (NOTED AS RED LINES ON SKETCH BELOW).



No.	Issue	Date	
No.	Revision	Ckd By	Date

**LEGEND**  
 ▲ SURFACE WATER SAMPLE LOCATION

	Const. North
	Drawn By: R.J.B.
	Dwg. Standards Ckd By: R.J.B.
	Designed By: W.G.M.
Date Printed: 13-AUG-2015	Dwg. Design Ckd By: W.G.M.

exp Services Inc.  
 L: +1 709 579 2886 | F: +1 709 738 1596  
 60 Pippy Place, Suite 200  
 St. John's, NL A1B 4H7  
 CANADA  
 www.exp.com



Project Title	
PROPOSED CABIN LOT DEVELOPMENT OCEAN POND PROPERTY	
Dwg Title	
BASELINE SURFACE WATER SAMPLING PROGRAM	
Project No.	SJN-00215494-A0
Dwg No.	FIGURE 1
Scale	1:7,500
This drawing is not to be scaled	

Your Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Your C.O.C. #: B 143111

**Attention: Bill Melendy**

exp Services Inc  
60 Pippy Pl  
Suite 200  
St. John's, NL  
A1B 4H7

**Incoming Data/Product (Procedure #5)**

Supplied by: Maxxam

Project No: SJN-215494-AO

Received by: ATL & PCB

Date Reviewed: May 29/15

Report Date: 2015/05/25  
Report #: R3439931  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B590907**

Received: 2015/05/15, 09:46

Sample Matrix: Water  
# Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide (1)	4	N/A	2015/05/22	N/A	SM 22 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide (1)	5	N/A	2015/05/24	N/A	SM 22 4500-CO2 D
Alkalinity (1)	9	N/A	2015/05/22	ATL SOP 00013	EPA 310.2 R1974 m
Chloride (1)	9	N/A	2015/05/22	ATL SOP 00014	SM 22 4500-Cl- E m
Colour (1)	9	N/A	2015/05/21	ATL SOP 00020	SM 22 2120C m
Conductance - water (1)	4	N/A	2015/05/21	ATL SOP 00004	SM 22 2510B m
Conductance - water (1)	5	N/A	2015/05/24	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3) (1)	9	N/A	2015/05/25	ATL SOP 00048	SM 22 2340 B
Metals Water Diss. MS (as rec'd) (1)	9	N/A	2015/05/22	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference) (1)	9	N/A	2015/05/25		Auto Calc.
Anion and Cation Sum (1)	9	N/A	2015/05/25		Auto Calc.
Nitrogen Ammonia - water (1)	6	N/A	2015/05/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen Ammonia - water (1)	3	N/A	2015/05/22	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	9	N/A	2015/05/22	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite (1)	9	N/A	2015/05/21	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	9	N/A	2015/05/22	ATL SOP 00018	ASTM D3867
pH (1, 2)	4	N/A	2015/05/22	ATL SOP 00003	SM 22 4500-H+ B m
pH (1, 2)	5	N/A	2015/05/24	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho (1)	9	N/A	2015/05/22	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C) (1)	9	N/A	2015/05/25	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	9	N/A	2015/05/25	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	9	N/A	2015/05/22	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	9	N/A	2015/05/22	ATL SOP 00023	EPA 375.4 R1978 m
Total Dissolved Solids (TDS calc) (1)	9	N/A	2015/05/25		Auto Calc.
Organic carbon - Total (TOC) (1, 3)	9	N/A	2015/05/22	ATL SOP 00037	SM 22 5310C m
Turbidity (1)	9	N/A	2015/05/25	ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Your C.O.C. #: B 143111

Attention: Bill Melendy

exp Services Inc  
60 Pippy Pl  
Suite 200  
St. John's, NL  
A1B 4H7

Report Date: 2015/05/25  
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**MAXXAM JOB #: B590907**

Received: 2015/05/15, 09:46

(1) This test was performed by Maxxam Bedford

(2) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

(3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key



Rachael Mansfield

25 May 2015 16:02:36 -03:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager

Avery Withrow, Project Manager

Email: AWithrow@maxxam.ca

Phone# (902)420-0203 Ext-233

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page

**AT. RCAP-MS DISSOLVED (FIELDFIL) IN W**

Maxxam ID		AGY759		AGY760	AGY761	AGY762	AGY762	AGY763		
Sampling Date		2015/05/14		2015/05/14	2015/05/14	2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111		B 143111	B 143111	B 143111	B 143111	B 143111		
	Units	WELL #1	QC Batch	WELL #2	WELL #3	WELL #4	WELL #4 Lab-Dup	WELL #5	RDL	QC Batch

**Calculated Parameters**

Anion Sum	me/L	0.480	4030814	0.470	0.560	0.480		0.350	N/A	4030814
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	4030810	8.8	6.4	9.3		5.6	1.0	4030810
Calculated TDS	mg/L	36	4030820	36	40	38		23	1.0	4030820
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	4030810	ND	ND	ND		ND	1.0	4030810
Cation Sum	me/L	0.440	4030814	0.440	0.560	0.450		0.310	N/A	4030814
Hardness (CaCO3)	mg/L	10	4030812	7.4	11	7.7		6.3	1.0	4030812
Ion Balance (% Difference)	%	4.35	4030813	3.30	0.00	3.23		6.06	N/A	4030813
Langelier Index (@ 20C)	N/A	-3.57	4030818	-3.02	-4.11	-3.34		-4.03		4030818
Langelier Index (@ 4C)	N/A	-3.82	4030819	-3.27	-4.36	-3.60		-4.28		4030819
Nitrate (N)	mg/L	ND	4030815	ND	ND	ND		ND	0.050	4030815
Saturation pH (@ 20C)	N/A	9.93	4030818	10.1	10.2	10.0		10.5		4030818
Saturation pH (@ 4C)	N/A	10.2	4030819	10.4	10.5	10.3		10.7		4030819

**Inorganics**

Total Alkalinity (Total as CaCO3)	mg/L	11	4031482	8.8	6.4	9.3		5.6	5.0	4031482
Dissolved Chloride (Cl)	mg/L	7.3	4031485	8.4	13	8.8		5.7	1.0	4031485
Colour	TCU	ND	4031501	ND	19	ND		ND	5.0	4031501
Nitrate + Nitrite	mg/L	ND	4031535	ND	ND	ND		ND	0.050	4031535
Nitrite (N)	mg/L	ND	4031536	ND	ND	ND		ND	0.010	4031536
Nitrogen (Ammonia Nitrogen)	mg/L	0.13	4030955	0.075	0.17	0.062		0.076	0.050	4030955
Total Organic Carbon (C)	mg/L	1.9	4032925	1.9	6.8	3.5		1.9	0.50	4032925
Orthophosphate (P)	mg/L	ND	4031504	ND	ND	0.011		ND	0.010	4031504
pH	pH	6.36	4035267	7.08	6.12	6.66		6.44	N/A	4029090
Reactive Silica (SiO2)	mg/L	10	4031499	9.8	7.8	11		4.1	0.50	4031499
Dissolved Sulphate (SO4)	mg/L	2.8	4031496	3.0	2.9	2.4		3.7	2.0	4031496
Turbidity	NTU	2.7	4036003	4.4	4.1	1.6	1.6	0.71	0.10	4036003
Conductivity	uS/cm	44	4035269	48	64	48		35	1.0	4029102

**Metals**

Dissolved Aluminum (Al)	ug/L	94	4032736	89	620	95		130	5.0	4032736
Dissolved Antimony (Sb)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Arsenic (As)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Barium (Ba)	ug/L	4.6	4032736	3.2	11	2.0		6.5	1.0	4032736

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 Lab-Dup = Laboratory Initiated Duplicate  
 N/A = Not Applicable  
 ND = Not detected

**AT. RCAP-MS DISSOLVED (FIELDFILTR) IN W**

Maxxam ID		AGY759		AGY760	AGY761	AGY762	AGY762	AGY763		
Sampling Date		2015/05/14		2015/05/14	2015/05/14	2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111		B 143111	B 143111	B 143111	B 143111	B 143111		
	Units	WELL #1	QC Batch	WELL #2	WELL #3	WELL #4	WELL #4 Lab-Dup	WELL #5	RDL	QC Batch
Dissolved Beryllium (Be)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Bismuth (Bi)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Boron (B)	ug/L	ND	4032736	ND	ND	ND		ND	50	4032736
Dissolved Cadmium (Cd)	ug/L	0.013	4032736	0.019	0.026	0.024		0.023	0.010	4032736
Dissolved Calcium (Ca)	ug/L	2200	4032736	1800	1800	2100		1200	100	4032736
Dissolved Chromium (Cr)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Cobalt (Co)	ug/L	ND	4032736	ND	4.0	ND		ND	0.40	4032736
Dissolved Copper (Cu)	ug/L	6.3	4032736	2.3	8.6	5.1		3.0	2.0	4032736
Dissolved Iron (Fe)	ug/L	ND	4032736	ND	320	ND		ND	50	4032736
Dissolved Lead (Pb)	ug/L	ND	4032736	ND	ND	ND		ND	0.50	4032736
Dissolved Magnesium (Mg)	ug/L	1200	4032736	710	1500	580		810	100	4032736
Dissolved Manganese (Mn)	ug/L	35	4032736	62	310	21		41	2.0	4032736
Dissolved Molybdenum (Mo)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Nickel (Ni)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Phosphorus (P)	ug/L	110	4032736	ND	ND	ND		ND	100	4032736
Dissolved Potassium (K)	ug/L	290	4032736	520	660	360		620	100	4032736
Dissolved Selenium (Se)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Silver (Ag)	ug/L	ND	4032736	ND	ND	ND		ND	0.10	4032736
Dissolved Sodium (Na)	ug/L	5100	4032736	6400	7200	6400		3700	100	4032736
Dissolved Strontium (Sr)	ug/L	9.6	4032736	8.7	16	9.8		10	2.0	4032736
Dissolved Thallium (Tl)	ug/L	ND	4032736	ND	ND	ND		ND	0.10	4032736
Dissolved Tin (Sn)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Titanium (Ti)	ug/L	6.1	4032736	6.5	9.9	3.1		ND	2.0	4032736
Dissolved Uranium (U)	ug/L	ND	4032736	ND	ND	ND		ND	0.10	4032736
Dissolved Vanadium (V)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Zinc (Zn)	ug/L	ND	4032736	ND	15	ND		5.4	5.0	4032736

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
ND = Not detected

**AT. RCAP-MS DISSOLVED (FIELDFIL) IN W**

Maxxam ID		AGY764	AGY764		AGY765	AGY765	AGY766		
Sampling Date		2015/05/14	2015/05/14		2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		B 143111	B 143111	B 143111		
	Units	OP1-01	OP1-01 Lab-Dup	QC Batch	OP1-02	OP1-02 Lab-Dup	IP1-01	RDL	QC Batch
<b>Calculated Parameters</b>									
Anion Sum	me/L	0.210		4030814	0.200		0.210	N/A	4030814
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	ND		4030810	ND		ND	1.0	4030810
Calculated TDS	mg/L	16		4030820	15		16	1.0	4030820
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND		4030810	ND		ND	1.0	4030810
Cation Sum	me/L	0.320		4030814	0.320		0.340	N/A	4030814
Hardness (CaCO3)	mg/L	5.6		4030812	5.7		7.0	1.0	4030812
Ion Balance (% Difference)	%	20.8		4030813	23.1		23.6	N/A	4030813
Langelier Index (@ 20C)	N/A	NC		4030818	NC		NC		4030818
Langelier Index (@ 4C)	N/A	NC		4030819	NC		NC		4030819
Nitrate (N)	mg/L	ND		4030815	ND		ND	0.050	4030815
Saturation pH (@ 20C)	N/A	NC		4030818	NC		NC		4030818
Saturation pH (@ 4C)	N/A	NC		4030819	NC		NC		4030819
<b>Inorganics</b>									
Total Alkalinity (Total as CaCO3)	mg/L	ND		4031482	ND		ND	5.0	4031482
Dissolved Chloride (Cl)	mg/L	7.6		4031485	7.1		7.4	1.0	4031485
Colour	TCU	25		4031501	48		48	5.0	4031501
Nitrate + Nitrite	mg/L	ND		4031535	ND		ND	0.050	4031535
Nitrite (N)	mg/L	ND		4031536	ND		ND	0.010	4031536
Nitrogen (Ammonia Nitrogen)	mg/L	0.17		4030955	0.17		0.077	0.050	4030955
Total Organic Carbon (C)	mg/L	3.5	3.6	4032925	5.0		4.7	0.50	4032925
Orthophosphate (P)	mg/L	ND		4031504	ND		ND	0.010	4031504
pH	pH	6.50		4035267	6.29	6.28	6.54	N/A	4035267
Reactive Silica (SiO2)	mg/L	1.5		4031499	1.7		1.9	0.50	4031499
Dissolved Sulphate (SO4)	mg/L	ND		4031496	ND		ND	2.0	4031496
Turbidity	NTU	0.72		4036003	1.0		1.3	0.10	4036040
Conductivity	uS/cm	34		4035269	33	33	33	1.0	4035269
<b>Metals</b>									
Dissolved Aluminum (Al)	ug/L	61		4032736	75		78	5.0	4032736
Dissolved Antimony (Sb)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Arsenic (As)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Barium (Ba)	ug/L	1.8		4032736	1.6		1.1	1.0	4032736
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable ND = Not detected									



**AT. RCAP-MS DISSOLVED (FIELDFIL) IN W**

Maxxam ID		AGY764	AGY764		AGY765	AGY765	AGY766		
Sampling Date		2015/05/14	2015/05/14		2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		B 143111	B 143111	B 143111		
	Units	OP1-01	OP1-01 Lab-Dup	QC Batch	OP1-02	OP1-02 Lab-Dup	IP1-01	RDL	QC Batch
Dissolved Beryllium (Be)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Bismuth (Bi)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Boron (B)	ug/L	ND		4032736	ND		ND	50	4032736
Dissolved Cadmium (Cd)	ug/L	ND		4032736	ND		ND	0.010	4032736
Dissolved Calcium (Ca)	ug/L	1200		4032736	1200		1600	100	4032736
Dissolved Chromium (Cr)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Cobalt (Co)	ug/L	ND		4032736	ND		ND	0.40	4032736
Dissolved Copper (Cu)	ug/L	3.3		4032736	2.7		4.2	2.0	4032736
Dissolved Iron (Fe)	ug/L	ND		4032736	95		100	50	4032736
Dissolved Lead (Pb)	ug/L	ND		4032736	ND		ND	0.50	4032736
Dissolved Magnesium (Mg)	ug/L	630		4032736	660		760	100	4032736
Dissolved Manganese (Mn)	ug/L	9.8		4032736	19		35	2.0	4032736
Dissolved Molybdenum (Mo)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Nickel (Ni)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Phosphorus (P)	ug/L	ND		4032736	ND		ND	100	4032736
Dissolved Potassium (K)	ug/L	270		4032736	230		290	100	4032736
Dissolved Selenium (Se)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Silver (Ag)	ug/L	ND		4032736	ND		ND	0.10	4032736
Dissolved Sodium (Na)	ug/L	4400		4032736	4200		4200	100	4032736
Dissolved Strontium (Sr)	ug/L	6.4		4032736	6.0		6.2	2.0	4032736
Dissolved Thallium (Tl)	ug/L	ND		4032736	ND		ND	0.10	4032736
Dissolved Tin (Sn)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Titanium (Ti)	ug/L	ND		4032736	ND		2.5	2.0	4032736
Dissolved Uranium (U)	ug/L	ND		4032736	ND		ND	0.10	4032736
Dissolved Vanadium (V)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Zinc (Zn)	ug/L	ND		4032736	ND		ND	5.0	4032736

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
ND = Not detected

Maxxam Job #: B590907  
Report Date: 2015/05/25

exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFILT) IN W**

Maxxam ID		AGY767	AGY767		
Sampling Date		2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		
	Units	IP1-02	IP1-02 Lab-Dup	RDL	QC Batch
<b>Calculated Parameters</b>					
Anion Sum	me/L	0.210		N/A	4030814
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	ND		1.0	4030810
Calculated TDS	mg/L	16		1.0	4030820
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND		1.0	4030810
Cation Sum	me/L	0.330		N/A	4030814
Hardness (CaCO3)	mg/L	6.6		1.0	4030812
Ion Balance (% Difference)	%	22.2		N/A	4030813
Langelier Index (@ 20C)	N/A	NC			4030818
Langelier Index (@ 4C)	N/A	NC			4030819
Nitrate (N)	mg/L	ND		0.050	4030815
Saturation pH (@ 20C)	N/A	NC			4030818
Saturation pH (@ 4C)	N/A	NC			4030819
<b>Inorganics</b>					
Total Alkalinity (Total as CaCO3)	mg/L	ND	5.0	5.0	4031482
Dissolved Chloride (Cl)	mg/L	7.4	7.5	1.0	4031485
Colour	TCU	49	48	25	4031501
Nitrate + Nitrite	mg/L	ND	ND	0.050	4031535
Nitrite (N)	mg/L	ND	ND	0.010	4031536
Nitrogen (Ammonia Nitrogen)	mg/L	0.085		0.050	4030955
Total Organic Carbon (C)	mg/L	4.9		0.50	4032925
Orthophosphate (P)	mg/L	ND	ND	0.010	4031504
pH	pH	6.50		N/A	4035267
Reactive Silica (SiO2)	mg/L	1.8	1.8	0.50	4031499
Dissolved Sulphate (SO4)	mg/L	ND	ND	2.0	4031496
Turbidity	NTU	0.82		0.10	4036040
Conductivity	uS/cm	33		1.0	4035269
<b>Metals</b>					
Dissolved Aluminum (Al)	ug/L	89		5.0	4032736
Dissolved Antimony (Sb)	ug/L	ND		1.0	4032736
Dissolved Arsenic (As)	ug/L	ND		1.0	4032736
Dissolved Barium (Ba)	ug/L	1.1		1.0	4032736
Dissolved Beryllium (Be)	ug/L	ND		1.0	4032736
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected					

Maxxam Job #: B590907  
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exp Services Inc  
Client Project #: SIN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFILTR) IN W**

Maxxam ID		AGY767	AGY767		
Sampling Date		2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		
	Units	IP1-02	IP1-02 Lab-Dup	RDL	QC Batch
Dissolved Bismuth (Bi)	ug/L	ND		2.0	4032736
Dissolved Boron (B)	ug/L	ND		50	4032736
Dissolved Cadmium (Cd)	ug/L	ND		0.010	4032736
Dissolved Calcium (Ca)	ug/L	1400		100	4032736
Dissolved Chromium (Cr)	ug/L	ND		1.0	4032736
Dissolved Cobalt (Co)	ug/L	ND		0.40	4032736
Dissolved Copper (Cu)	ug/L	2.7		2.0	4032736
Dissolved Iron (Fe)	ug/L	120		50	4032736
Dissolved Lead (Pb)	ug/L	ND		0.50	4032736
Dissolved Magnesium (Mg)	ug/L	730		100	4032736
Dissolved Manganese (Mn)	ug/L	33		2.0	4032736
Dissolved Molybdenum (Mo)	ug/L	ND		2.0	4032736
Dissolved Nickel (Ni)	ug/L	ND		2.0	4032736
Dissolved Phosphorus (P)	ug/L	ND		100	4032736
Dissolved Potassium (K)	ug/L	300		100	4032736
Dissolved Selenium (Se)	ug/L	ND		1.0	4032736
Dissolved Silver (Ag)	ug/L	ND		0.10	4032736
Dissolved Sodium (Na)	ug/L	4000		100	4032736
Dissolved Strontium (Sr)	ug/L	6.0		2.0	4032736
Dissolved Thallium (Tl)	ug/L	ND		0.10	4032736
Dissolved Tin (Sn)	ug/L	ND		2.0	4032736
Dissolved Titanium (Ti)	ug/L	2.5		2.0	4032736
Dissolved Uranium (U)	ug/L	ND		0.10	4032736
Dissolved Vanadium (V)	ug/L	ND		2.0	4032736
Dissolved Zinc (Zn)	ug/L	ND		5.0	4032736
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Lab-Dup = Laboratory Initiated Duplicate					
ND = Not detected					

Maxxam Job #: B590907  
Report Date: 2015/05/25

exp Services Inc  
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Site Location: ENVIRO SERVICES  
Sampler Initials: RH

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.9°C
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Sample AGY763-01 : RCAP Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY764-01 : RCAP Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY765-01 : RCAP Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY766-01 : RCAP Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY767-01 : RCAP Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
4029090	KMC	Spiked Blank	pH	2015/05/22		100	%	N/A
4029090	KMC	RPD	pH	2015/05/22	0.94		%	N/A
4029102	KMC	Spiked Blank	Conductivity	2015/05/21		103	%	80 - 120
4029102	KMC	Method Blank	Conductivity	2015/05/21	1.2, RDL=1.0		uS/cm	
4029102	KMC	RPD	Conductivity	2015/05/21	0.0014		%	25
4030955	ARS	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2015/05/22		99	%	80 - 120
4030955	ARS	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2015/05/21		99	%	80 - 120
4030955	ARS	Method Blank	Nitrogen (Ammonia Nitrogen)	2015/05/21	ND, RDL=0.050		mg/L	
4030955	ARS	RPD	Nitrogen (Ammonia Nitrogen)	2015/05/22	NC		%	25
4031482	MCN	Matrix Spike [AGY767-01]	Total Alkalinity (Total as CaCO3)	2015/05/22		104	%	80 - 120
4031482	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2015/05/22		102	%	80 - 120
4031482	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2015/05/22	ND, RDL=5.0		mg/L	
4031482	MCN	RPD [AGY767-01]	Total Alkalinity (Total as CaCO3)	2015/05/22	NC		%	25
4031485	MCN	Matrix Spike [AGY767-01]	Dissolved Chloride (Cl)	2015/05/22		104	%	80 - 120
4031485	MCN	QC Standard	Dissolved Chloride (Cl)	2015/05/22		104	%	80 - 120
4031485	MCN	Spiked Blank	Dissolved Chloride (Cl)	2015/05/22		107	%	80 - 120
4031485	MCN	Method Blank	Dissolved Chloride (Cl)	2015/05/22	ND, RDL=1.0		mg/L	
4031485	MCN	RPD [AGY767-01]	Dissolved Chloride (Cl)	2015/05/22	1.5		%	25
4031496	ARS	Matrix Spike [AGY767-01]	Dissolved Sulphate (SO4)	2015/05/22		94	%	80 - 120
4031496	ARS	Spiked Blank	Dissolved Sulphate (SO4)	2015/05/22		92	%	80 - 120
4031496	ARS	Method Blank	Dissolved Sulphate (SO4)	2015/05/22	ND, RDL=2.0		mg/L	
4031496	ARS	RPD [AGY767-01]	Dissolved Sulphate (SO4)	2015/05/22	NC		%	25
4031499	ARS	Matrix Spike [AGY767-01]	Reactive Silica (SiO2)	2015/05/22		97	%	80 - 120
4031499	ARS	Spiked Blank	Reactive Silica (SiO2)	2015/05/22		102	%	80 - 120
4031499	ARS	Method Blank	Reactive Silica (SiO2)	2015/05/22	ND, RDL=0.50		mg/L	
4031499	ARS	RPD [AGY767-01]	Reactive Silica (SiO2)	2015/05/22	NC		%	25
4031501	NRG	Spiked Blank	Colour	2015/05/21		98	%	80 - 120
4031501	NRG	Method Blank	Colour	2015/05/21	ND, RDL=5.0		TCU	
4031501	NRG	RPD [AGY767-01]	Colour	2015/05/21	NC		%	25
4031504	MCN	Matrix Spike [AGY767-01]	Orthophosphate (P)	2015/05/22		99	%	80 - 120
4031504	MCN	Spiked Blank	Orthophosphate (P)	2015/05/22		104	%	80 - 120
4031504	MCN	Method Blank	Orthophosphate (P)	2015/05/22	ND, RDL=0.010		mg/L	
4031504	MCN	RPD [AGY767-01]	Orthophosphate (P)	2015/05/22	NC		%	25
4031535	ARS	Matrix Spike [AGY767-01]	Nitrate + Nitrite	2015/05/22		97	%	80 - 120
4031535	ARS	Spiked Blank	Nitrate + Nitrite	2015/05/22		102	%	80 - 120
4031535	ARS	Method Blank	Nitrate + Nitrite	2015/05/22	ND, RDL=0.050		mg/L	
4031535	ARS	RPD [AGY767-01]	Nitrate + Nitrite	2015/05/22	NC		%	25
4031536	NRG	Matrix Spike [AGY767-01]	Nitrite (N)	2015/05/21		101	%	80 - 120
4031536	NRG	Spiked Blank	Nitrite (N)	2015/05/21		103	%	80 - 120
4031536	NRG	Method Blank	Nitrite (N)	2015/05/21	ND, RDL=0.010		mg/L	
4031536	NRG	RPD [AGY767-01]	Nitrite (N)	2015/05/21	NC		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
4032736	MLB	Matrix Spike	Dissolved Aluminum (Al)	2015/05/22		106	%	80 - 120	
			Dissolved Antimony (Sb)	2015/05/22		106	%	80 - 120	
			Dissolved Arsenic (As)	2015/05/22		100	%	80 - 120	
			Dissolved Barium (Ba)	2015/05/22		NC	%	80 - 120	
			Dissolved Beryllium (Be)	2015/05/22		100	%	80 - 120	
			Dissolved Bismuth (Bi)	2015/05/22		99	%	80 - 120	
			Dissolved Boron (B)	2015/05/22		96	%	80 - 120	
			Dissolved Cadmium (Cd)	2015/05/22		99	%	80 - 120	
			Dissolved Calcium (Ca)	2015/05/22		NC	%	80 - 120	
			Dissolved Chromium (Cr)	2015/05/22		97	%	80 - 120	
			Dissolved Cobalt (Co)	2015/05/22		96	%	80 - 120	
			Dissolved Copper (Cu)	2015/05/22		95	%	80 - 120	
			Dissolved Iron (Fe)	2015/05/22		104	%	80 - 120	
			Dissolved Lead (Pb)	2015/05/22		98	%	80 - 120	
			Dissolved Magnesium (Mg)	2015/05/22		NC	%	80 - 120	
			Dissolved Manganese (Mn)	2015/05/22		NC	%	80 - 120	
			Dissolved Molybdenum (Mo)	2015/05/22		104	%	80 - 120	
			Dissolved Nickel (Ni)	2015/05/22		96	%	80 - 120	
			Dissolved Phosphorus (P)	2015/05/22		110	%	80 - 120	
			Dissolved Potassium (K)	2015/05/22		104	%	80 - 120	
			Dissolved Selenium (Se)	2015/05/22		100	%	80 - 120	
			Dissolved Silver (Ag)	2015/05/22		102	%	80 - 120	
			Dissolved Sodium (Na)	2015/05/22		NC	%	80 - 120	
			Dissolved Strontium (Sr)	2015/05/22		NC	%	80 - 120	
			Dissolved Thallium (Tl)	2015/05/22		102	%	80 - 120	
			Dissolved Tin (Sn)	2015/05/22		106	%	80 - 120	
			Dissolved Titanium (Ti)	2015/05/22		102	%	80 - 120	
			Dissolved Uranium (U)	2015/05/22		109	%	80 - 120	
			Dissolved Vanadium (V)	2015/05/22		100	%	80 - 120	
			Dissolved Zinc (Zn)	2015/05/22		98	%	80 - 120	
			4032736	MLB	Spiked Blank	Dissolved Aluminum (Al)	2015/05/22		106
Dissolved Antimony (Sb)	2015/05/22					101	%	80 - 120	
Dissolved Arsenic (As)	2015/05/22					99	%	80 - 120	
Dissolved Barium (Ba)	2015/05/22					97	%	80 - 120	
Dissolved Beryllium (Be)	2015/05/22					98	%	80 - 120	
Dissolved Bismuth (Bi)	2015/05/22					103	%	80 - 120	
Dissolved Boron (B)	2015/05/22					95	%	80 - 120	
Dissolved Cadmium (Cd)	2015/05/22					99	%	80 - 120	
Dissolved Calcium (Ca)	2015/05/22					97	%	80 - 120	
Dissolved Chromium (Cr)	2015/05/22					98	%	80 - 120	
Dissolved Cobalt (Co)	2015/05/22					97	%	80 - 120	
Dissolved Copper (Cu)	2015/05/22					99	%	80 - 120	
Dissolved Iron (Fe)	2015/05/22					105	%	80 - 120	
Dissolved Lead (Pb)	2015/05/22					100	%	80 - 120	
Dissolved Magnesium (Mg)	2015/05/22					108	%	80 - 120	
Dissolved Manganese (Mn)	2015/05/22					103	%	80 - 120	
Dissolved Molybdenum (Mo)	2015/05/22					99	%	80 - 120	
Dissolved Nickel (Ni)	2015/05/22					99	%	80 - 120	
Dissolved Phosphorus (P)	2015/05/22					110	%	80 - 120	
Dissolved Potassium (K)	2015/05/22					106	%	80 - 120	
Dissolved Selenium (Se)	2015/05/22		99	%	80 - 120				
Dissolved Silver (Ag)	2015/05/22		103	%	80 - 120				

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Sodium (Na)	2015/05/22		107	%	80 - 120
			Dissolved Strontium (Sr)	2015/05/22		102	%	80 - 120
			Dissolved Thallium (Tl)	2015/05/22		103	%	80 - 120
			Dissolved Tin (Sn)	2015/05/22		103	%	80 - 120
			Dissolved Titanium (Ti)	2015/05/22		101	%	80 - 120
			Dissolved Uranium (U)	2015/05/22		108	%	80 - 120
			Dissolved Vanadium (V)	2015/05/22		98	%	80 - 120
			Dissolved Zinc (Zn)	2015/05/22		100	%	80 - 120
4032736	MLB	Method Blank	Dissolved Aluminum (Al)	2015/05/22	ND, RDL=5.0		ug/L	
			Dissolved Antimony (Sb)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Arsenic (As)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Barium (Ba)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Beryllium (Be)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Bismuth (Bi)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Boron (B)	2015/05/22	ND, RDL=50		ug/L	
			Dissolved Cadmium (Cd)	2015/05/22	ND, RDL=0.010		ug/L	
			Dissolved Calcium (Ca)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Chromium (Cr)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Cobalt (Co)	2015/05/22	ND, RDL=0.40		ug/L	
			Dissolved Copper (Cu)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Iron (Fe)	2015/05/22	ND, RDL=50		ug/L	
			Dissolved Lead (Pb)	2015/05/22	ND, RDL=0.50		ug/L	
			Dissolved Magnesium (Mg)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Manganese (Mn)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Molybdenum (Mo)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Nickel (Ni)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Phosphorus (P)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Potassium (K)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Selenium (Se)	2015/05/22	ND, RDL=1.0		ug/L	

Maxxam Job #: B590907  
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exp Services Inc  
Client Project #: SJN-00215494-AO  
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Sampler Initials: RH

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
				Dissolved Silver (Ag)	2015/05/22	ND, RDL=0.10		ug/L	
				Dissolved Sodium (Na)	2015/05/22	ND, RDL=100		ug/L	
				Dissolved Strontium (Sr)	2015/05/22	ND, RDL=2.0		ug/L	
				Dissolved Thallium (Tl)	2015/05/22	ND, RDL=0.10		ug/L	
				Dissolved Tin (Sn)	2015/05/22	ND, RDL=2.0		ug/L	
				Dissolved Titanium (Ti)	2015/05/22	ND, RDL=2.0		ug/L	
				Dissolved Uranium (U)	2015/05/22	ND, RDL=0.10		ug/L	
				Dissolved Vanadium (V)	2015/05/22	ND, RDL=2.0		ug/L	
				Dissolved Zinc (Zn)	2015/05/22	ND, RDL=5.0		ug/L	
4032736	MLB	RPD		Dissolved Aluminum (Al)	2015/05/22	NC		%	20
				Dissolved Antimony (Sb)	2015/05/22	NC		%	20
				Dissolved Arsenic (As)	2015/05/22	NC		%	20
				Dissolved Barium (Ba)	2015/05/22	0.51		%	20
				Dissolved Beryllium (Be)	2015/05/22	NC		%	20
				Dissolved Bismuth (Bi)	2015/05/22	NC		%	20
				Dissolved Boron (B)	2015/05/22	NC		%	20
				Dissolved Cadmium (Cd)	2015/05/22	5.6		%	20
				Dissolved Calcium (Ca)	2015/05/22	0.10		%	20
				Dissolved Chromium (Cr)	2015/05/22	NC		%	20
				Dissolved Cobalt (Co)	2015/05/22	NC		%	20
				Dissolved Copper (Cu)	2015/05/22	NC		%	20
				Dissolved Iron (Fe)	2015/05/22	NC		%	20
				Dissolved Lead (Pb)	2015/05/22	NC		%	20
				Dissolved Magnesium (Mg)	2015/05/22	0.67		%	20
				Dissolved Manganese (Mn)	2015/05/22	1.6		%	20
				Dissolved Molybdenum (Mo)	2015/05/22	NC		%	20
				Dissolved Nickel (Ni)	2015/05/22	NC		%	20
				Dissolved Phosphorus (P)	2015/05/22	NC		%	20
				Dissolved Potassium (K)	2015/05/22	0.77		%	20
				Dissolved Selenium (Se)	2015/05/22	NC		%	20
				Dissolved Silver (Ag)	2015/05/22	NC		%	20
				Dissolved Sodium (Na)	2015/05/22	0.96		%	20
				Dissolved Strontium (Sr)	2015/05/22	0.21		%	20
				Dissolved Thallium (Tl)	2015/05/22	NC		%	20
				Dissolved Tin (Sn)	2015/05/22	NC		%	20
				Dissolved Titanium (Ti)	2015/05/22	NC		%	20
				Dissolved Uranium (U)	2015/05/22	NC		%	20
				Dissolved Vanadium (V)	2015/05/22	NC		%	20
				Dissolved Zinc (Zn)	2015/05/22	NC		%	20
4032925	MCY	Matrix Spike [AGY765-01]		Total Organic Carbon (C)	2015/05/22		NC	%	80 - 120
4032925	MCY	Spiked Blank		Total Organic Carbon (C)	2015/05/22		98	%	80 - 120



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
4032925	MCY	Method Blank	Total Organic Carbon (C)	2015/05/22	ND, RDL=0.50		mg/L	
4032925	MCY	RPD [AGY764-01]	Total Organic Carbon (C)	2015/05/22	1.4		%	20
4035267	KMC	QC Standard	pH	2015/05/24		100	%	97 - 103
4035267	KMC	RPD [AGY765-01]	pH	2015/05/24	0.17		%	N/A
4035269	KMC	Spiked Blank	Conductivity	2015/05/24		101	%	80 - 120
4035269	KMC	Method Blank	Conductivity	2015/05/24	ND, RDL=1.0		uS/cm	
4035269	KMC	RPD [AGY765-01]	Conductivity	2015/05/24	0.59		%	25
4036003	KSR	QC Standard	Turbidity	2015/05/25		101	%	80 - 120
4036003	KSR	Method Blank	Turbidity	2015/05/25	ND, RDL=0.10		NTU	
4036003	KSR	RPD [AGY762-01]	Turbidity	2015/05/25	2.5		%	25
4036040	KSR	QC Standard	Turbidity	2015/05/25		95	%	80 - 120
4036040	KSR	Method Blank	Turbidity	2015/05/25	ND, RDL=0.10		NTU	
4036040	KSR	RPD	Turbidity	2015/05/25	8.3		%	25

N/A = Not Applicable

**Duplicate:** Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

**QC Standard:** A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

**Spiked Blank:** A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

**Method Blank:** A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

**NC (Matrix Spike):** The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

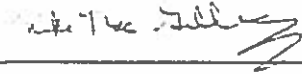
**NC (Duplicate RPD):** The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: 8590907  
Report Date: 2015/05/25

exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Mike MacGillivray, Scientific Specialist (Inorganics)

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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MAXXAM Chain of Custody Record  
 COC #: B 143111

This column for lab use only!

Client Code	Maxxam Job #	Sal Pres	Sal Int	Temp	Temp	Temp	Temp	Temp
0390007				0.9	0.9	0.9	0.9	0.9

REPORT INFORMATION (if differs from invoice):

Company Name: SAHIC  
 Contact Name: C. R. Hayes  
 Address: 60 RPPY PLACE.  
 ST. JULIUS NY  
 Postal Code: 14155

TURNAROUND TIME

Standard   
 1D day   
 10 RUSH Specify Date

Charge for #  
 Jars used for  
 not submitted

Sampled by: Red Hayes

Task Order #

Project # / Name #

Project Name / Site Location

Client Name

Site #

Task Order #

Guideline Requirements / Detection Limits / Special Instructions

Specify Matrix: Surface/Soil/Groundwater/Sewage/Effluent/  
 Portable/Non-Portable/Issue/Soil/Sediment/Metal/Semimetal

Field Sample Identification	Matrix	Date/Time Sampled	# & Type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-MS Total or Diss Metals	RCAP-30 Total or Diss Metals	Metals Water	Metals	Mobile Soil	Hydrocarbons	PAHs	PAHs with Acids Ochrone
1 WELL #1	H2O	MAY 15 12:00	1-50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2 WELL #2	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3 WELL #3	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4 WELL #4	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5 WELL #5	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6 OPERATOR	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7 OPI-02	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8 IPT-01	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9 IPT-02	"	"	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10													

SHIPPED FROM  
 14-09-2015  
 MAXXAM NY



13590907

RELEASED BY: (Signature/Print)

Date

Time

RECEIVED BY: (Signature/Print)

Date

Time

Time

Red Hayes MAY 14 12:52

Sharon Pini 2015/05/14 1:52pm

Sue Harmon Saen Mason

Maxxam

Maxxam

Yellow Max

ALL FGD 00149 / Revision 10

### Results of Microbiological Analyses

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 9 sample(s)  
**Date Received:** 14-May-15  
**Date Started:** 14-May-15  
**Date Reported:** 28-May-15  
**Project No:** 11048  
**Report ID:** 44333

Sample Description	Water	Water	Water	Water
Sample ID (Date/Code)	Well #1, May 14/15 @ 10:15 AM	Well #2, May 14/15 @ 10:30 AM	Well #3, May 14/15 @ 7:30 AM	Well #4, May 14/15 @ 8:15 AM
Lab Refer. No.	M-77301-08	M-77302-08	M-77303-08	M-77304-08
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	<1 CFU/100ml	<1 CFU/100ml	6 CFU/100ml	<1 CFU/100ml
Fecal Coliform (MF)	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml
E. coli (MF)	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml

Incoming Data Product (Procedure #5)  
 Supplied by: Petroforma  
 Project No: SIW-215494-A0  
 Received by: [Signature]  
 Date Reviewed: May 28/2015

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For the list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 1.5°C. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer: Lana Cameron  
 (Print Name/Signature)

Senior Reviewer: Stacey Penney  
 (Print Name/Signature)

Date: May 28/15

## Results of Microbiological Analyses

**Testing Facility**  
 petroforma Laboratories  
 422 Logy Bay Road  
 St. John's, Newfoundland  
 A1A 5C6  
 Tel: (709) 726-9345  
 Fax: (709) 237-0741

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 9 sample(s)  
**Date Received:** 14-May-15  
**Date Started:** 14-May-15  
**Date Reported:** 28-May-15  
**Project No:** 11048  
**Report ID:** 44333

Sample Description	Water	Water	Water	Water
Sample ID (Date/Code)	Well #5, May 14/15 @ 9:20 AM	OPI-01, May 14/15 @ 7:45 AM	OPI-02, May 14/15 @ 9:00 AM	IPI-01, May 14/15 @ 8:25 AM
Lab Refer. No.	M-77305-08	M-77306-08	M-77307-08	M-77308-08
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	9 CFU/100ml	22 CFU/100ml	>200 CFU/100ml	>200 CFU/100ml
Fecal Coliform (MF)	<1 CFU/100ml	<1 CFU/100ml	27 CFU/100ml	<1 CFU/100ml
E. coli (MF)	<1 CFU/100ml	<1 CFU/100ml	27 CFU/100ml	<1 CFU/100ml

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For a list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 1.5°C. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer:

*Lana Cameron / [Signature]*  
 (Print Name/Signature)

Senior Reviewer:

*Stacey Penney / Penney*  
 (Print Name/Signature)

Date:

*May 28/15*

### Results of Microbiological Analyses

**Testing Facility**  
 petroforma Laboratories  
 422 Logy Bay Road  
 St. John's, Newfoundland  
 A1A 5C6  
 Tel: (709) 726-9345  
 Fax: (709) 237-0741

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 9 sample(s)  
**Date Received:** 14-May-15  
**Date Started:** 14-May-15  
**Date Reported:** 28-May-15  
**Project No:** 11048  
**Report ID:** 44333

Sample Description	Water			
Sample ID (Date/Code)	IP1-02, May 14/15 @ 9.45 AM			
Lab Refer. No.	M-77309-08			
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	>200 CFU/100ml			
Fecal Coliform (MF)	<1 CFU/100ml			
E. coli (MF)	<1 CFU/100ml			

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For a list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 1.5°C. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer:

*Lana Cameron*  
 (Print Name/Signature)

Senior Reviewer:

*Stacy Penney*  
 (Print Name/Signature)

Date:

*May 28/15*

Tables

Table 1. Microbiological Parameters

In general, the highest priority guidelines are those dealing with microbiological contaminants, such as bacteria, protozoa and viruses. As a result of challenges with routine analysis of harmful microorganisms that could potentially be present in inadequately treated drinking water, the microbiological guidelines focus on indicators (*E. coli*, total coliforms) and treatment goals. The use of a multi-barrier approach that includes source water protection, adequate treatment, including disinfection, and a well maintained distribution system can reduce microorganisms to levels that have not been associated with illness, as well as meet the guidelines outlined below.

Parameter	Guidelines	Human health effects	Applying the guidelines
<p><b>Enteric viruses (2011)</b></p> <p>Treatment goal: Minimum 4 log reduction (removal and/or inactivation) of enteric viruses</p>	<p>Human faeces</p>	<p>Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); less common health effects can include respiratory symptoms, central nervous system infections, liver infections and muscular syndromes.</p>	<p>Routine monitoring for viruses is not practical; characterize source water to determine if greater than a 4 log removal or inactivation is necessary.</p>
<p><b>Escherichia coli (E. coli) (2012)</b></p> <p>MAC: None detectable per 100 mL</p>	<p>Human and animal faeces</p>	<p>The presence of <i>E. coli</i> indicates recent faecal contamination and the potential presence of microorganisms capable of causing gastrointestinal illnesses; pathogens in human and animal faeces pose the most immediate danger to public health.</p>	<p><i>E. coli</i> is used as an indicator of the microbiological safety of drinking water; if detected, enteric pathogens may also be present. <i>E. coli</i> monitoring should be used, in conjunction with other indicators as part of a multi-barrier approach to protecting drinking water of an acceptable quality.</p>

Health considerations	
<p><b>Total coliforms (2012)</b></p>	<p>MAF of home detectable/100 mL in water leaving a treatment plant and in non-disinfected groundwater leaving the well</p> <p>Human and animal faeces; naturally occurring in water, soil and vegetation</p> <p>Total coliforms are not used as indicators of potential health effects from pathogenic microorganisms; they are used as a tool to determine how well the drinking water treatment system is operating and to indicate water quality changes in the distribution system.</p> <p>Detection of total coliforms from consecutive samples from the same site or from more than 10% of the samples collected in a given sampling period should be investigated.</p>
<p><b>Turbidity (2012)</b></p>	<p>Treatment limits for individual filters or units:</p> <ul style="list-style-type: none"> <li>- Conventional and direct filtration: <math>\leq 0.3</math> NTU<sup>1</sup></li> <li>- slow sand and discontinuous earth filtration: <math>\leq 1.0</math> NTU<sup>2</sup></li> <li>- membrane filtration: <math>\leq 0.1</math> NTU<sup>3</sup></li> </ul> <p>Naturally occurring particles:</p> <ul style="list-style-type: none"> <li>- Inorganic: clays, silts, metal precipitates</li> <li>- Organic: decomposed plant &amp; animal debris, microorganisms</li> </ul> <p>Filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU. Particles can harbor microorganisms, protect them from disinfection, and can entrap heavy metals and pesticides, elevated or fluctuating turbidity in filtered water can indicate a problem with the water treatment process and a potential increased risk of pathogens in treated water.</p>
<p>Total coliforms should be monitored in the distribution system because they are used to indicate changes in water quality.</p> <p>In water leaving a treatment plant, total coliforms should be measured in conjunction with other indicators to assess water quality; the presence of total coliforms indicates a serious breach in treatment.</p> <p>In a distribution and storage system, detection of total coliforms can indicate regrowth of the bacteria in biofilms or intrusion of untreated water.</p> <p>In non-disinfected groundwater, the presence of total coliforms may indicate that the system is vulnerable to contamination, or it may be a sign of bacterial regrowth.</p>	<p>Guidelines apply to individual filter turbidity for systems using surface water or groundwater under the direct influence of surface water. The decision to exempt a waterworks from filtration should be made by the appropriate authority based on site-specific considerations, including historical and ongoing monitoring data. To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of <math>\leq 1.0</math> NTU, or less. For systems that use groundwater, turbidity should generally be below 1.0 NTU.</p>

<sup>1</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 1.0 NTU.

<sup>2</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 3.0 NTU.

<sup>3</sup> in at least 99% of measurements per operational filter period or per month. Measurements greater than 0.1 NTU for a period greater than 15 minutes from an individual membrane unit should immediately trigger an investigation of the membrane unit integrity.





## APPENDIX

### References for Microbiological Analyses

Test Title	CALA Accredited Methods
Total Coliforms (MF) and/or Fecal Coliforms (MF)	9222. Membrane filter technique for members of the coliform group. 2005. Standard Methods For The Examination of Water and Wastewater. 21 <sup>st</sup> Edition.
Fecal Coliforms (A-1 MPN Method)	9221E. Fecal Coliform Procedure.2. Fecal Coliform Direct Test (A-1 Medium) 2005 Standard Methods for the Examination of Water and Wastewater. 21 <sup>st</sup> Edition.
Total Coliforms and E.coli (Coli-ert Method)	AOAC Official Method 991.15. Determination of Total Coliforms and E.coli using the (Coli-ert) Method
Standard Plate Count	<i>Determination of Aerobic Colony Count in Foods. MFHPB –18. October, 2001. Compendium of Analytical Methods: Volume 2.</i>
Total Coliforms (MPN Method), Fecal Coliforms (MPN Method), and/or E.coli (MPN Method)	<i>Enumeration of Coliforms, Fecal Coliforms and of E. coli in Foods Using The MPN Method. MFHPB –19. April 2002. Compendium of Analytical Methods: Volume 2.</i>
Salmonella Species	<i>Isolation and identification of Salmonella from Foods and Environmental Samples. MFHPB-20. March 2009. Compendium of Analytical Methods: Volume 2.</i>
Staphylococcus aureus Coagulase (+)	<i>Enumeration of Staphylococcus aureus In Foods. MFHPB –21. September, 2005. Compendium of Analytical Methods: Volume 2.</i>
Listeria monocytogenes	<i>Isolation of Listeria monocytogenes and other Listeria spp. from foods and environmental samples. MFHPB-30. February 2011. Compendium of Analytical Methods Volume 2.</i>
Standard Plate Count (Petrifilm)	<i>Enumeration of Total Aerobic Bacteria In Food Products and Food Ingredients using 3M Petrifilm Aerobic Count Plates. MFHPB-33. February 2001. Compendium of Analytical Methods: Volume 2.</i>
Total Coliforms and E.coli (Petrifilm)	<i>Enumeration of E.coli and Coliforms In Food Products and Food Ingredients using 3M Petrifilm E. coli Count Plates. MFHPB-34. February 2001. Compendium of Analytical Methods: Volume 2. Supplement to the Method MFHPB-34. January, 2006. Compendium of Analytical Methods: Volume 2</i>
Enterobacteriaceae species (Petrifilm)	<i>Enumeration of Enterobacteriaceae species in Food and Environmental Samples using 3M Petrifilm Enterobacteriaceae Count Plates (modified to add shrimp tasting). MFLP-09. June 2007. Compendium of Analytical Methods: Volume 3.</i>
Listeria monocytogenes enumeration	<i>Enumeration of Listeria monocytogenes species in Foods. MFLP-74. April 2002. Compendium of Analytical Methods: Volume 3. Supplement to the Method MFLP-74. April, 2004. Compendium of Analytical Methods: Volume 3</i>

#### Non-Accredited Methods

1. pH
2. Salt Content
3. Enumeration of *Enterococcus* species: Colony Count Technique
4. *Vibrio* Detection (Presence/Absence)(MPN Method)
5. Anaerobes Sporulative/Anaerobes Vegetative
6. Yeasts and Molds

**Legend for symbols:**

<	Less than the lowest detection limit for the test
>	Greater than the highest detection limit for the test
MPN	Most Probable Number (testing conducted using the MPN test tube method)
CFU	Colony Forming Unit
Negative	Not detected
MF	Membrane filtration
%	Percent
g	Gram
ml	Millilitre

### Results of Microbiological Analyses

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 1 sample(s)  
**Date Received:** 01-Jun-15  
**Date Started:** 01-Jun-15  
**Date Reported:** 08-Jun-15  
**Project No:** 11048  
**Report ID:** 44517

Sample Description	Water	OP2-01	June 1st/15	
Sample ID (Date/Code)	#1 Ocean Pond, June 01/15 @ 10:00 AM			
Lab Refer. No.	M-78000-08			
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	>200 CFU/100ml			
Fecal Coliform (MF)	2 CFU/100ml			
E. coli (MF)	2 CFU/100ml			

Incoming Data/Product (Procedure #)  
 Supplied by: Petroforma  
 Project No: SN-215494-A0  
 Received by: [Signature]  
 Date Reviewed: June 8/2015

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For the list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 17.3°C which was reflective of the temperature upon collection. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer: Suzette Winter  
 (Print Name/Signature)

Senior Reviewer: Stacy Penney  
 (Print Name/Signature)

Date: June 8/15

Tables

Table 1. Microbiological Parameters

In general, the highest priority guidelines are those dealing with microbiological contaminants, such as bacteria, protozoa and viruses. As a result of challenges with routine analysis of harmful microorganisms that could potentially be present in inadequately treated drinking water, the microbiological guidelines focus on indicators (*E. coli*, total coliforms) and treatment goals. The use of a multi-barrier approach that includes source water protection, adequate treatment, including disinfection, and a well maintained distribution system can reduce microorganisms to levels that have not been associated with illness, as well as meet the guidelines outlined below.

Parameter	Guideline	Health consequences	Applying the guideline
<p><b>Bacteria</b></p> <p>Indicator group: <i>Giardia</i> and <i>Cryptosporidium</i> spp. commonly associated with gastrointestinal upset (nausea, vomiting, diarrhea). Less common health effects vary. <i>Giardia</i> infections may include prolonged gastrointestinal upset, malaise, and malabsorption. <i>Cryptosporidium</i> infections, in immunocompromised individuals, can occur outside the gastrointestinal tract including in the lungs, middle ear, and pancreas.</p> <p><b>Protozoa</b></p> <p><i>Giardia</i> and <i>Cryptosporidium</i> spp. commonly associated with gastrointestinal upset (nausea, vomiting, diarrhea). Less common health effects vary. <i>Giardia</i> infections may include prolonged gastrointestinal upset, malaise, and malabsorption. <i>Cryptosporidium</i> infections, in immunocompromised individuals, can occur outside the gastrointestinal tract including in the lungs, middle ear, and pancreas.</p>	<p>Human and animal faeces</p> <p>Treatment goal: Minimum 4 log removal and/or inactivation of cysts and oocysts</p>	<p>Monitoring for <i>Cryptosporidium</i> and <i>Giardia</i> in source water will provide valuable information for risk-based assessment of treatment requirements.</p> <p>Depending on the source water quality, a greater log removal and/or inactivation may be required.</p>	<p>Monitoring for <i>Cryptosporidium</i> and <i>Giardia</i> in source water will provide valuable information for risk-based assessment of treatment requirements.</p> <p>Depending on the source water quality, a greater log removal and/or inactivation may be required.</p>
<p><b>Enteric viruses</b></p> <p>(2011)</p> <p>Treatment goal: Minimum 4 log reduction (removal and/or inactivation) of enteric viruses</p>	Human faeces	Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); less common health effects can include respiratory symptoms, central nervous system infections, liver infections and muscular syndromes.	Routine monitoring for viruses is not practical; characterize source water to determine if greater than a 4 log removal or inactivation is necessary.
<p><b><i>Escherichia coli</i> (E. coli)</b></p> <p>(2012)</p> <p>MAC: None detectable per 100 mL</p>	Human and animal faeces	The presence of <i>E. coli</i> indicates recent faecal contamination and the potential presence of microorganisms capable of causing gastrointestinal illnesses; pathogens in human and animal faeces pose the most immediate danger to public health.	<i>E. coli</i> is used as an indicator of the microbiological safety of drinking water; if detected, enteric pathogens may also be present. <i>E. coli</i> monitoring should be used, in conjunction with other indicators as part of a multi-barrier approach to producing drinking water of an acceptable quality.

Total coliforms (2012)	
<p>MA C of feces detectable/100 mL in water leaving a treatment plant and in non-disinfected groundwater leaving the well</p>	<p>Human and animal faeces; naturally occurring in water, soil and vegetation</p>
<p>Total coliforms are not used as indicators of potential health effects from pathogenic microorganisms; they are used as a tool to determine how well the drinking water treatment system is operating and to indicate water quality changes in the distribution system.</p> <p>Detection of total coliforms from consecutive samples from the same site or from more than 10% of the samples collected in a given sampling period should be investigated.</p>	<p>Total coliforms should be monitored in the distribution system because they are used to indicate changes in water quality.</p> <p>In water leaving a treatment plant, total coliforms should be measured in conjunction with other indicators to assess water quality; the presence of total coliforms indicates a serious breach in treatment.</p> <p>In a distribution and storage system, detection of total coliforms can indicate regrowth of the bacteria in biofilms or intrusion of untreated water.</p> <p>In non-disinfected groundwater, the presence of total coliforms may indicate that the system is vulnerable to contamination, or it may be a sign of bacterial regrowth.</p>
<p>Treatment limits for individual filters or units:</p> <ul style="list-style-type: none"> <li>- Conventional and direct filtration: <math>\leq 0.3</math> NTU<sup>1</sup></li> <li>- slow sand and diatomaceous earth filtration: <math>\leq 1.0</math> NTU<sup>2</sup></li> <li>- membrane filtration: <math>\leq 0.1</math> NTU<sup>3</sup></li> </ul>	<p>Naturally occurring particles:</p> <ul style="list-style-type: none"> <li>Inorganic: clays, silt, metal precipitates</li> <li>Organic: decomposed plant &amp; animal debris, microorganisms</li> </ul>
<p>Filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU.</p> <p>Particles can harbor microorganisms, protecting them from disinfection, and can entrain heavy metals and byproducts (elevated or fluctuating turbidity in filtered water can indicate a problem with the water treatment process and a potential increased risk of pathogens in treated water.</p>	<p>Filtration systems should be monitored in the distribution system because they are used to indicate changes in water quality.</p> <p>In water leaving a treatment plant, total coliforms should be measured in conjunction with other indicators to assess water quality; the presence of total coliforms indicates a serious breach in treatment.</p> <p>In a distribution and storage system, detection of total coliforms can indicate regrowth of the bacteria in biofilms or intrusion of untreated water.</p> <p>In non-disinfected groundwater, the presence of total coliforms may indicate that the system is vulnerable to contamination, or it may be a sign of bacterial regrowth.</p>
<p>Chlorides apply to individual filter turbidity for systems using surface water or groundwater under the direct influence of surface water. The decision to exempt a waterworks from filtration should be made by the appropriate authority based on site-specific considerations, including historical and ongoing monitoring data. To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of <math>\leq 1.0</math> NTU or less. For systems that use groundwater, turbidity should generally be below 1.0 NTU.</p>	<p>Chlorides apply to individual filter turbidity for systems using surface water or groundwater under the direct influence of surface water. The decision to exempt a waterworks from filtration should be made by the appropriate authority based on site-specific considerations, including historical and ongoing monitoring data. To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of <math>\leq 1.0</math> NTU or less. For systems that use groundwater, turbidity should generally be below 1.0 NTU.</p>

<sup>1</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 1.0 NTU.

<sup>2</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 3.0 NTU.

<sup>3</sup> in at least 99% of measurements per operational filter period or per month. Measurements greater than 0.1 NTU for a period greater than 15 minutes from an individual membrane unit should immediately trigger an investigation of the membrane unit integrity.



## APPENDIX

### References for Microbiological Analyses

<b>Test Title</b>	<b>CALA Accredited Methods</b>
Total Coliforms (MF) and/or Fecal Coliforms (MF)	9222. Membrane filter technique for members of the coliform group. 2005. Standard Methods For The Examination of Water and Wastewater. 21 <sup>st</sup> Edition.
Fecal Coliforms (A-1 MPN Method)	9221E. Fecal Coliform Procedure.2. Fecal Coliform Direct Test (A-1 Medium) 2005 Standard Methods for the Examination of Water and Wastewater. 21 <sup>st</sup> Edition.
Total Coliforms and E.coli (Colliert Method)	AOAC Official Method 991.15. Determination of Total Coliforms and E.coli using the (Colliert) Method
Standard Plate Count	<i>Determination of Aerobic Colony Count In Foods. MFHPB -18. October, 2001. Compendium of Analytical Methods: Volume 2.</i>
Total Coliforms (MPN Method), Fecal Coliforms (MPN Method), and/or E.coli (MPN Method)	<i>Enumeration of Coliforms, Fecal Coliforms and of E. coli in Foods Using The MPN Method. MFHPB -19. April 2002. Compendium of Analytical Methods: Volume 2.</i>
Salmonella Species	<i>Isolation and Identification of Salmonella from Foods and Environmental Samples. MFHPB-20. March 2009. Compendium of Analytical Methods: Volume 2.</i>
Staphylococcus aureus Coagulase (+)	<i>Enumeration of Staphylococcus aureus In Foods. MFHPB -21. September, 2006. Compendium of Analytical Methods: Volume 2.</i>
Listeria monocytogenes	<i>Isolation of Listeria monocytogenes and other Listeria spp. from foods and environmental samples. MFHPB-30. February 2011. Compendium of Analytical Methods Volume 2.</i>
Standard Plate Count (Petrifilm)	<i>Enumeration of Total Aerobic Bacteria In Food Products and Food Ingredients using 3M Petrifilm Aerobic Count Plates. MFHPB-33. February 2001. Compendium of Analytical Methods: Volume 2.</i>
Total Coliforms and E.coli (Petrifilm)	<i>Enumeration of E.coli and Coliforms In Food Products and Food Ingredients using 3M Petrifilm E. coli Count Plates. MFHPB-34. February 2001. Compendium of Analytical Methods: Volume 2. Supplement to the Method MFHPB-34. January, 2006. Compendium of Analytical Methods: Volume 2</i>
Enterobacteriaceae species (Petrifilm)	<i>Enumeration of Enterobacteriaceae species In Food and Environmental Samples using 3M Petrifilm Enterobacteriaceae Count Plates (modified to add shrimp testing). MFLP-09. June 2007. Compendium of Analytical Methods: Volume 3.</i>
Listeria monocytogenes enumeration	<i>Enumeration of Listeria monocytogenes species In Foods. MFLP-74. April 2002. Compendium of Analytical Methods: Volume 3. Supplement to the Method MFLP-74. April, 2004. Compendium of Analytical Methods: Volume 3</i>

#### Non-Accredited Methods

1. pH
2. Salt Content
3. Enumeration of *Enterococcus* species: Colony Count Technique
4. *Vibrio* Detection (Presence/Absence)(MPN Method)
5. Anaerobes Sporulative/Anaerobes Vegetative
6. Yeasts and Molds

**Legend for symbols:**

<	Less than the lowest detection limit for the test
>	Greater than the highest detection limit for the test
MPN	Most Probable Number (testing conducted using the MPN test tube method)
CFU	Colony Forming Unit
Negative	Not detected
MF	Membrane filtration
%	Percent
g	Gram
ml	Millilitre



## **APPENDIX C**

**Water Chemical and  
Microbiological Analytical Results**



Your Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Your C.O.C. #: B 143111

**Attention: Bill Melendy**

exp Services Inc  
60 Pippy Pl  
Suite 200  
St. John's, NL  
A1B 4H7

Incoming Data/Product (Procedure #5)  
Supplied by: Maxxam  
Project No. SJN-215494-AO  
Reviewed by: SM & FCB  
Date Reviewed: May 29/15

Report Date: 2015/05/25  
Report #: R3439931  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

MAXXAM JOB #: B590907

Received: 2015/05/15, 09:46

Sample Matrix: Water  
# Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide (1)	4	N/A	2015/05/22	N/A	SM 22 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide (1)	5	N/A	2015/05/24	N/A	SM 22 4500-CO2 D
Alkalinity (1)	9	N/A	2015/05/22	ATL SOP 00013	EPA 310.2 R1974 m
Chloride (1)	9	N/A	2015/05/22	ATL SOP 00014	SM 22 4500-Cl- E m
Colour (1)	9	N/A	2015/05/21	ATL SOP 00020	SM 22 2120C m
Conductance - water (1)	4	N/A	2015/05/21	ATL SOP 00004	SM 22 2510B m
Conductance - water (1)	5	N/A	2015/05/24	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3) (1)	9	N/A	2015/05/25	ATL SOP 00048	SM 22 2340 B
Metals Water Diss. MS (as rec'd) (1)	9	N/A	2015/05/22	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference) (1)	9	N/A	2015/05/25		Auto Calc.
Anion and Cation Sum (1)	9	N/A	2015/05/25		Auto Calc.
Nitrogen Ammonia - water (1)	6	N/A	2015/05/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen Ammonia - water (1)	3	N/A	2015/05/22	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	9	N/A	2015/05/22	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite (1)	9	N/A	2015/05/21	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	9	N/A	2015/05/22	ATL SOP 00018	ASTM D3867
pH (1, 2)	4	N/A	2015/05/22	ATL SOP 00003	SM 22 4500-H+ B m
pH (1, 2)	5	N/A	2015/05/24	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho (1)	9	N/A	2015/05/22	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C) (1)	9	N/A	2015/05/25	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	9	N/A	2015/05/25	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	9	N/A	2015/05/22	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	9	N/A	2015/05/22	ATL SOP 00023	EPA 375.4 R1978 m
Total Dissolved Solids (TDS calc) (1)	9	N/A	2015/05/25		Auto Calc.
Organic carbon - Total (TOC) (1, 3)	9	N/A	2015/05/22	ATL SOP 00037	SM 22 5310C m
Turbidity (1)	9	N/A	2015/05/25	ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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- (1) This test was performed by Maxxam Bedford
- (2) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
- (3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key



Rachael Mansfield  
25 May 2015 16:02:36 -03:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Avery Withrow, Project Manager

Email: AWithrow@maxxam.ca

Phone# (902)420-0203 Ext:233

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B590907  
Report Date: 2015/05/25

exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFIL) IN W**

Maxxam ID		AGY759		AGY760	AGY761	AGY762	AGY762	AGY763		
Sampling Date		2015/05/14		2015/05/14	2015/05/14	2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111		B 143111	B 143111	B 143111	B 143111	B 143111		
	Units	WELL #1	QC Batch	WELL #2	WELL #3	WELL #4	WELL #4 Lab-Dup	WELL #5	RDL	QC Batch

**Calculated Parameters**

Anion Sum	me/L	0.480	4030814	0.470	0.560	0.480		0.350	N/A	4030814
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	4030810	8.8	6.4	9.3		5.6	1.0	4030810
Calculated TDS	mg/L	36	4030820	36	40	38		23	1.0	4030820
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	4030810	ND	ND	ND		ND	1.0	4030810
Cation Sum	me/L	0.440	4030814	0.440	0.560	0.450		0.310	N/A	4030814
Hardness (CaCO3)	mg/L	10	4030812	7.4	11	7.7		6.3	1.0	4030812
Ion Balance (% Difference)	%	4.35	4030813	3.30	0.00	3.23		6.06	N/A	4030813
Langelier Index (@ 20C)	N/A	-3.57	4030818	-3.02	-4.11	-3.34		-4.03		4030818
Langelier Index (@ 4C)	N/A	-3.82	4030819	-3.27	-4.36	-3.60		-4.28		4030819
Nitrate (N)	mg/L	ND	4030815	ND	ND	ND		ND	0.050	4030815
Saturation pH (@ 20C)	N/A	9.93	4030818	10.1	10.2	10.0		10.5		4030818
Saturation pH (@ 4C)	N/A	10.2	4030819	10.4	10.5	10.3		10.7		4030819

**Inorganics**

Total Alkalinity (Total as CaCO3)	mg/L	11	4031482	8.8	6.4	9.3		5.6	5.0	4031482
Dissolved Chloride (Cl)	mg/L	7.3	4031485	8.4	13	8.8		5.7	1.0	4031485
Colour	TCU	ND	4031501	ND	19	ND		ND	5.0	4031501
Nitrate + Nitrite	mg/L	ND	4031535	ND	ND	ND		ND	0.050	4031535
Nitrite (N)	mg/L	ND	4031536	ND	ND	ND		ND	0.010	4031536
Nitrogen (Ammonia Nitrogen)	mg/L	0.13	4030955	0.075	0.17	0.062		0.076	0.050	4030955
Total Organic Carbon (C)	mg/L	1.9	4032925	1.9	6.8	3.5		1.9	0.50	4032925
Orthophosphate (P)	mg/L	ND	4031504	ND	ND	0.011		ND	0.010	4031504
pH	pH	6.36	4035267	7.08	6.12	6.66		6.44	N/A	4029090
Reactive Silica (SiO2)	mg/L	10	4031499	9.8	7.8	11		4.1	0.50	4031499
Dissolved Sulphate (SO4)	mg/L	2.8	4031496	3.0	2.9	2.4		3.7	2.0	4031496
Turbidity	NTU	2.7	4036003	4.4	4.1	1.6	1.6	0.71	0.10	4036003
Conductivity	uS/cm	44	4035269	48	64	48		35	1.0	4029102

**Metals**

Dissolved Aluminum (Al)	ug/L	94	4032736	89	620	95		130	5.0	4032736
Dissolved Antimony (Sb)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Arsenic (As)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Barium (Ba)	ug/L	4.6	4032736	3.2	11	2.0		6.5	1.0	4032736

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
N/A = Not Applicable  
ND = Not detected

Maxxam Job #: B590907  
Report Date: 2015/05/25

exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFIL) IN W**

Maxxam ID		AGY759		AGY760	AGY761	AGY762	AGY762	AGY763		
Sampling Date		2015/05/14		2015/05/14	2015/05/14	2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111		B 143111	B 143111	B 143111	B 143111	B 143111		
	Units	WELL #1	QC Batch	WELL #2	WELL #3	WELL #4	WELL #4 Lab-Dup	WELL #5	RDL	QC Batch
Dissolved Beryllium (Be)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Bismuth (Bi)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Boron (B)	ug/L	ND	4032736	ND	ND	ND		ND	50	4032736
Dissolved Cadmium (Cd)	ug/L	0.013	4032736	0.019	0.026	0.024		0.023	0.010	4032736
Dissolved Calcium (Ca)	ug/L	2200	4032736	1800	1800	2100		1200	100	4032736
Dissolved Chromium (Cr)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Cobalt (Co)	ug/L	ND	4032736	ND	4.0	ND		ND	0.40	4032736
Dissolved Copper (Cu)	ug/L	6.3	4032736	2.3	8.6	5.1		3.0	2.0	4032736
Dissolved Iron (Fe)	ug/L	ND	4032736	ND	320	ND		ND	50	4032736
Dissolved Lead (Pb)	ug/L	ND	4032736	ND	ND	ND		ND	0.50	4032736
Dissolved Magnesium (Mg)	ug/L	1200	4032736	710	1500	580		810	100	4032736
Dissolved Manganese (Mn)	ug/L	35	4032736	62	310	21		41	2.0	4032736
Dissolved Molybdenum (Mo)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Nickel (Ni)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Phosphorus (P)	ug/L	110	4032736	ND	ND	ND		ND	100	4032736
Dissolved Potassium (K)	ug/L	290	4032736	520	660	360		620	100	4032736
Dissolved Selenium (Se)	ug/L	ND	4032736	ND	ND	ND		ND	1.0	4032736
Dissolved Silver (Ag)	ug/L	ND	4032736	ND	ND	ND		ND	0.10	4032736
Dissolved Sodium (Na)	ug/L	5100	4032736	6400	7200	6400		3700	100	4032736
Dissolved Strontium (Sr)	ug/L	9.6	4032736	8.7	16	9.8		10	2.0	4032736
Dissolved Thallium (Tl)	ug/L	ND	4032736	ND	ND	ND		ND	0.10	4032736
Dissolved Tin (Sn)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Titanium (Ti)	ug/L	6.1	4032736	6.5	9.9	3.1		ND	2.0	4032736
Dissolved Uranium (U)	ug/L	ND	4032736	ND	ND	ND		ND	0.10	4032736
Dissolved Vanadium (V)	ug/L	ND	4032736	ND	ND	ND		ND	2.0	4032736
Dissolved Zinc (Zn)	ug/L	ND	4032736	ND	15	ND		5.4	5.0	4032736

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
ND = Not detected

Maxxam Job #: BS90907  
Report Date: 2015/05/25

exp Services Inc  
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Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFIL) IN W**

Maxxam ID		AGY764	AGY764		AGY765	AGY765	AGY766		
Sampling Date		2015/05/14	2015/05/14		2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		B 143111	B 143111	B 143111		
	Units	OP1-01	OP1-01 Lab-Dup	QC Batch	OP1-02	OP1-02 Lab-Dup	IP1-01	RDL	QC Batch
<b>Calculated Parameters</b>									
Anion Sum	me/L	0.210		4030814	0.200		0.210	N/A	4030814
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	ND		4030810	ND		ND	1.0	4030810
Calculated TDS	mg/L	16		4030820	15		16	1.0	4030820
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND		4030810	ND		ND	1.0	4030810
Cation Sum	me/L	0.320		4030814	0.320		0.340	N/A	4030814
Hardness (CaCO3)	mg/L	5.6		4030812	5.7		7.0	1.0	4030812
Ion Balance (% Difference)	%	20.8		4030813	23.1		23.6	N/A	4030813
Langelier Index (@ 20C)	N/A	NC		4030818	NC		NC		4030818
Langelier Index (@ 4C)	N/A	NC		4030819	NC		NC		4030819
Nitrate (N)	mg/L	ND		4030815	ND		ND	0.050	4030815
Saturation pH (@ 20C)	N/A	NC		4030818	NC		NC		4030818
Saturation pH (@ 4C)	N/A	NC		4030819	NC		NC		4030819
<b>Inorganics</b>									
Total Alkalinity (Total as CaCO3)	mg/L	ND		4031482	ND		ND	5.0	4031482
Dissolved Chloride (Cl)	mg/L	7.6		4031485	7.1		7.4	1.0	4031485
Colour	TCU	25		4031501	48		48	5.0	4031501
Nitrate + Nitrite	mg/L	ND		4031535	ND		ND	0.050	4031535
Nitrite (N)	mg/L	ND		4031536	ND		ND	0.010	4031536
Nitrogen (Ammonia Nitrogen)	mg/L	0.17		4030955	0.17		0.077	0.050	4030955
Total Organic Carbon (C)	mg/L	3.5	3.6	4032925	5.0		4.7	0.50	4032925
Orthophosphate (P)	mg/L	ND		4031504	ND		ND	0.010	4031504
pH	pH	6.50		4035267	6.29	6.28	6.54	N/A	4035267
Reactive Silica (SiO2)	mg/L	1.5		4031499	1.7		1.9	0.50	4031499
Dissolved Sulphate (SO4)	mg/L	ND		4031496	ND		ND	2.0	4031496
Turbidity	NTU	0.72		4036003	1.0		1.3	0.10	4036040
Conductivity	uS/cm	34		4035269	33	33	33	1.0	4035269
<b>Metals</b>									
Dissolved Aluminum (Al)	ug/L	61		4032736	75		78	5.0	4032736
Dissolved Antimony (Sb)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Arsenic (As)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Barium (Ba)	ug/L	1.8		4032736	1.6		1.1	1.0	4032736
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable ND = Not detected									

Maxxam Job #: B590907  
Report Date: 2015/05/25

exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFIL) IN W**

Maxxam ID		AGY764	AGY764		AGY765	AGY765	AGY766		
Sampling Date		2015/05/14	2015/05/14		2015/05/14	2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		B 143111	B 143111	B 143111		
	Units	OP1-01	OP1-01 Lab-Dup	QC Batch	OP1-02	OP1-02 Lab-Dup	IP1-01	RDL	QC Batch
Dissolved Beryllium (Be)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Bismuth (Bi)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Boron (B)	ug/L	ND		4032736	ND		ND	50	4032736
Dissolved Cadmium (Cd)	ug/L	ND		4032736	ND		ND	0.010	4032736
Dissolved Calcium (Ca)	ug/L	1200		4032736	1200		1600	100	4032736
Dissolved Chromium (Cr)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Cobalt (Co)	ug/L	ND		4032736	ND		ND	0.40	4032736
Dissolved Copper (Cu)	ug/L	3.3		4032736	2.7		4.2	2.0	4032736
Dissolved Iron (Fe)	ug/L	ND		4032736	95		100	50	4032736
Dissolved Lead (Pb)	ug/L	ND		4032736	ND		ND	0.50	4032736
Dissolved Magnesium (Mg)	ug/L	630		4032736	660		760	100	4032736
Dissolved Manganese (Mn)	ug/L	9.8		4032736	19		35	2.0	4032736
Dissolved Molybdenum (Mo)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Nickel (Ni)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Phosphorus (P)	ug/L	ND		4032736	ND		ND	100	4032736
Dissolved Potassium (K)	ug/L	270		4032736	230		290	100	4032736
Dissolved Selenium (Se)	ug/L	ND		4032736	ND		ND	1.0	4032736
Dissolved Silver (Ag)	ug/L	ND		4032736	ND		ND	0.10	4032736
Dissolved Sodium (Na)	ug/L	4400		4032736	4200		4200	100	4032736
Dissolved Strontium (Sr)	ug/L	6.4		4032736	6.0		6.2	2.0	4032736
Dissolved Thallium (Tl)	ug/L	ND		4032736	ND		ND	0.10	4032736
Dissolved Tin (Sn)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Titanium (Ti)	ug/L	ND		4032736	ND		2.5	2.0	4032736
Dissolved Uranium (U)	ug/L	ND		4032736	ND		ND	0.10	4032736
Dissolved Vanadium (V)	ug/L	ND		4032736	ND		ND	2.0	4032736
Dissolved Zinc (Zn)	ug/L	ND		4032736	ND		ND	5.0	4032736

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
ND = Not detected

Maxxam Job #: B590907  
Report Date: 2015/05/25

exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFILT) IN W**

Maxxam ID		AGY767	AGY767		
Sampling Date		2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		
	Units	IP1-02	IP1-02 Lab-Dup	RDL	QC Batch
<b>Calculated Parameters</b>					
Anion Sum	me/L	0.210		N/A	4030814
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	ND		1.0	4030810
Calculated TDS	mg/L	16		1.0	4030820
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND		1.0	4030810
Cation Sum	me/L	0.330		N/A	4030814
Hardness (CaCO3)	mg/L	6.6		1.0	4030812
Ion Balance (% Difference)	%	22.2		N/A	4030813
Langelier Index (@ 20C)	N/A	NC			4030818
Langelier Index (@ 4C)	N/A	NC			4030819
Nitrate (N)	mg/L	ND		0.050	4030815
Saturation pH (@ 20C)	N/A	NC			4030818
Saturation pH (@ 4C)	N/A	NC			4030819
<b>Inorganics</b>					
Total Alkalinity (Total as CaCO3)	mg/L	ND	5.0	5.0	4031482
Dissolved Chloride (Cl)	mg/L	7.4	7.5	1.0	4031485
Colour	TCU	49	48	25	4031501
Nitrate + Nitrite	mg/L	ND	ND	0.050	4031535
Nitrite (N)	mg/L	ND	ND	0.010	4031536
Nitrogen (Ammonia Nitrogen)	mg/L	0.085		0.050	4030955
Total Organic Carbon (C)	mg/L	4.9		0.50	4032925
Orthophosphate (P)	mg/L	ND	ND	0.010	4031504
pH	pH	6.50		N/A	4035267
Reactive Silica (SiO2)	mg/L	1.8	1.8	0.50	4031499
Dissolved Sulphate (SO4)	mg/L	ND	ND	2.0	4031496
Turbidity	NTU	0.82		0.10	4036040
Conductivity	uS/cm	33		1.0	4035269
<b>Metals</b>					
Dissolved Aluminum (Al)	ug/L	89		5.0	4032736
Dissolved Antimony (Sb)	ug/L	ND		1.0	4032736
Dissolved Arsenic (As)	ug/L	ND		1.0	4032736
Dissolved Barium (Ba)	ug/L	1.1		1.0	4032736
Dissolved Beryllium (Be)	ug/L	ND		1.0	4032736
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected					

Maxxam Job #: 8590907  
Report Date: 2015/05/25

exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**AT. RCAP-MS DISSOLVED (FIELDFILTR) IN W**

Maxxam ID		AGY767	AGY767		
Sampling Date		2015/05/14	2015/05/14		
COC Number		B 143111	B 143111		
	Units	IP1-02	IP1-02 Lab-Dup	RDL	QC Batch
Dissolved Bismuth (Bi)	ug/L	ND		2.0	4032736
Dissolved Boron (B)	ug/L	ND		50	4032736
Dissolved Cadmium (Cd)	ug/L	ND		0.010	4032736
Dissolved Calcium (Ca)	ug/L	1400		100	4032736
Dissolved Chromium (Cr)	ug/L	ND		1.0	4032736
Dissolved Cobalt (Co)	ug/L	ND		0.40	4032736
Dissolved Copper (Cu)	ug/L	2.7		2.0	4032736
Dissolved Iron (Fe)	ug/L	120		50	4032736
Dissolved Lead (Pb)	ug/L	ND		0.50	4032736
Dissolved Magnesium (Mg)	ug/L	730		100	4032736
Dissolved Manganese (Mn)	ug/L	33		2.0	4032736
Dissolved Molybdenum (Mo)	ug/L	ND		2.0	4032736
Dissolved Nickel (Ni)	ug/L	ND		2.0	4032736
Dissolved Phosphorus (P)	ug/L	ND		100	4032736
Dissolved Potassium (K)	ug/L	300		100	4032736
Dissolved Selenium (Se)	ug/L	ND		1.0	4032736
Dissolved Silver (Ag)	ug/L	ND		0.10	4032736
Dissolved Sodium (Na)	ug/L	4000		100	4032736
Dissolved Strontium (Sr)	ug/L	6.0		2.0	4032736
Dissolved Thallium (Tl)	ug/L	ND		0.10	4032736
Dissolved Tin (Sn)	ug/L	ND		2.0	4032736
Dissolved Titanium (Ti)	ug/L	2.5		2.0	4032736
Dissolved Uranium (U)	ug/L	ND		0.10	4032736
Dissolved Vanadium (V)	ug/L	ND		2.0	4032736
Dissolved Zinc (Zn)	ug/L	ND		5.0	4032736
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected					



Maxxam Job #: B590907  
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exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.9°C
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Sample AGY763-01 : RCap Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY764-01 : RCap Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY765-01 : RCap Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY766-01 : RCap Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample AGY767-01 : RCap Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

**Results relate only to the items tested.**

Maxxam Job #: B590907  
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exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**QUALITY ASSURANCE REPORT**

QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	Units	QC Limits
4029090	KMC	Spiked Blank	pH	2015/05/22		100	%	N/A
4029090	KMC	RPD	pH	2015/05/22	0.94		%	N/A
4029102	KMC	Spiked Blank	Conductivity	2015/05/21		103	%	80 - 120
4029102	KMC	Method Blank	Conductivity	2015/05/21	1.2, RDL=1.0		uS/cm	
4029102	KMC	RPD	Conductivity	2015/05/21	0.0014		%	25
4030955	ARS	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2015/05/22		99	%	80 - 120
4030955	ARS	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2015/05/21		99	%	80 - 120
4030955	ARS	Method Blank	Nitrogen (Ammonia Nitrogen)	2015/05/21	ND, RDL=0.050		mg/L	
4030955	ARS	RPD	Nitrogen (Ammonia Nitrogen)	2015/05/22	NC		%	25
4031482	MCN	Matrix Spike [AGY767-01]	Total Alkalinity (Total as CaCO3)	2015/05/22		104	%	80 - 120
4031482	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2015/05/22		102	%	80 - 120
4031482	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2015/05/22	ND, RDL=5.0		mg/L	
4031482	MCN	RPD [AGY767-01]	Total Alkalinity (Total as CaCO3)	2015/05/22	NC		%	25
4031485	MCN	Matrix Spike [AGY767-01]	Dissolved Chloride (Cl)	2015/05/22		104	%	80 - 120
4031485	MCN	QC Standard	Dissolved Chloride (Cl)	2015/05/22		104	%	80 - 120
4031485	MCN	Spiked Blank	Dissolved Chloride (Cl)	2015/05/22		107	%	80 - 120
4031485	MCN	Method Blank	Dissolved Chloride (Cl)	2015/05/22	ND, RDL=1.0		mg/L	
4031485	MCN	RPD [AGY767-01]	Dissolved Chloride (Cl)	2015/05/22	1.5		%	25
4031496	ARS	Matrix Spike [AGY767-01]	Dissolved Sulphate (SO4)	2015/05/22		94	%	80 - 120
4031496	ARS	Spiked Blank	Dissolved Sulphate (SO4)	2015/05/22		92	%	80 - 120
4031496	ARS	Method Blank	Dissolved Sulphate (SO4)	2015/05/22	ND, RDL=2.0		mg/L	
4031496	ARS	RPD [AGY767-01]	Dissolved Sulphate (SO4)	2015/05/22	NC		%	25
4031499	ARS	Matrix Spike [AGY767-01]	Reactive Silica (SiO2)	2015/05/22		97	%	80 - 120
4031499	ARS	Spiked Blank	Reactive Silica (SiO2)	2015/05/22		102	%	80 - 120
4031499	ARS	Method Blank	Reactive Silica (SiO2)	2015/05/22	ND, RDL=0.50		mg/L	
4031499	ARS	RPD [AGY767-01]	Reactive Silica (SiO2)	2015/05/22	NC		%	25
4031501	NRG	Spiked Blank	Colour	2015/05/21		98	%	80 - 120
4031501	NRG	Method Blank	Colour	2015/05/21	ND, RDL=5.0		TCU	
4031501	NRG	RPD [AGY767-01]	Colour	2015/05/21	NC		%	25
4031504	MCN	Matrix Spike [AGY767-01]	Orthophosphate (P)	2015/05/22		99	%	80 - 120
4031504	MCN	Spiked Blank	Orthophosphate (P)	2015/05/22		104	%	80 - 120
4031504	MCN	Method Blank	Orthophosphate (P)	2015/05/22	ND, RDL=0.010		mg/L	
4031504	MCN	RPD [AGY767-01]	Orthophosphate (P)	2015/05/22	NC		%	25
4031535	ARS	Matrix Spike [AGY767-01]	Nitrate + Nitrite	2015/05/22		97	%	80 - 120
4031535	ARS	Spiked Blank	Nitrate + Nitrite	2015/05/22		102	%	80 - 120
4031535	ARS	Method Blank	Nitrate + Nitrite	2015/05/22	ND, RDL=0.050		mg/L	
4031535	ARS	RPD [AGY767-01]	Nitrate + Nitrite	2015/05/22	NC		%	25
4031536	NRG	Matrix Spike [AGY767-01]	Nitrite (N)	2015/05/21		101	%	80 - 120
4031536	NRG	Spiked Blank	Nitrite (N)	2015/05/21		103	%	80 - 120
4031536	NRG	Method Blank	Nitrite (N)	2015/05/21	ND, RDL=0.010		mg/L	
4031536	NRG	RPD [AGY767-01]	Nitrite (N)	2015/05/21	NC		%	25

Maxxam Job #: B590907  
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exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	Units	QC Limits
4032736	MLB	Matrix Spike	Dissolved Aluminum (Al)	2015/05/22		106	%	80 - 120
			Dissolved Antimony (Sb)	2015/05/22		106	%	80 - 120
			Dissolved Arsenic (As)	2015/05/22		100	%	80 - 120
			Dissolved Barium (Ba)	2015/05/22		NC	%	80 - 120
			Dissolved Beryllium (Be)	2015/05/22		100	%	80 - 120
			Dissolved Bismuth (Bi)	2015/05/22		99	%	80 - 120
			Dissolved Boron (B)	2015/05/22		96	%	80 - 120
			Dissolved Cadmium (Cd)	2015/05/22		99	%	80 - 120
			Dissolved Calcium (Ca)	2015/05/22		NC	%	80 - 120
			Dissolved Chromium (Cr)	2015/05/22		97	%	80 - 120
			Dissolved Cobalt (Co)	2015/05/22		96	%	80 - 120
			Dissolved Copper (Cu)	2015/05/22		95	%	80 - 120
			Dissolved Iron (Fe)	2015/05/22		104	%	80 - 120
			Dissolved Lead (Pb)	2015/05/22		98	%	80 - 120
			Dissolved Magnesium (Mg)	2015/05/22		NC	%	80 - 120
			Dissolved Manganese (Mn)	2015/05/22		NC	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/05/22		104	%	80 - 120
			Dissolved Nickel (Ni)	2015/05/22		96	%	80 - 120
			Dissolved Phosphorus (P)	2015/05/22		110	%	80 - 120
			Dissolved Potassium (K)	2015/05/22		104	%	80 - 120
			Dissolved Selenium (Se)	2015/05/22		100	%	80 - 120
			Dissolved Silver (Ag)	2015/05/22		102	%	80 - 120
			Dissolved Sodium (Na)	2015/05/22		NC	%	80 - 120
			Dissolved Strontium (Sr)	2015/05/22		NC	%	80 - 120
			Dissolved Thallium (Tl)	2015/05/22		102	%	80 - 120
			Dissolved Tin (Sn)	2015/05/22		106	%	80 - 120
			Dissolved Titanium (Ti)	2015/05/22		102	%	80 - 120
			Dissolved Uranium (U)	2015/05/22		109	%	80 - 120
			Dissolved Vanadium (V)	2015/05/22		100	%	80 - 120
			Dissolved Zinc (Zn)	2015/05/22		98	%	80 - 120
4032736	MLB	Spiked Blank	Dissolved Aluminum (Al)	2015/05/22		106	%	80 - 120
			Dissolved Antimony (Sb)	2015/05/22		101	%	80 - 120
			Dissolved Arsenic (As)	2015/05/22		99	%	80 - 120
			Dissolved Barium (Ba)	2015/05/22		97	%	80 - 120
			Dissolved Beryllium (Be)	2015/05/22		98	%	80 - 120
			Dissolved Bismuth (Bi)	2015/05/22		103	%	80 - 120
			Dissolved Boron (B)	2015/05/22		95	%	80 - 120
			Dissolved Cadmium (Cd)	2015/05/22		99	%	80 - 120
			Dissolved Calcium (Ca)	2015/05/22		97	%	80 - 120
			Dissolved Chromium (Cr)	2015/05/22		98	%	80 - 120
			Dissolved Cobalt (Co)	2015/05/22		97	%	80 - 120
			Dissolved Copper (Cu)	2015/05/22		99	%	80 - 120
			Dissolved Iron (Fe)	2015/05/22		105	%	80 - 120
			Dissolved Lead (Pb)	2015/05/22		100	%	80 - 120
			Dissolved Magnesium (Mg)	2015/05/22		108	%	80 - 120
			Dissolved Manganese (Mn)	2015/05/22		103	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/05/22		99	%	80 - 120
			Dissolved Nickel (Ni)	2015/05/22		99	%	80 - 120
			Dissolved Phosphorus (P)	2015/05/22		110	%	80 - 120
			Dissolved Potassium (K)	2015/05/22		106	%	80 - 120
Dissolved Selenium (Se)	2015/05/22		99	%	80 - 120			
Dissolved Silver (Ag)	2015/05/22		103	%	80 - 120			

Maxxam Job #: B590907  
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exp Services Inc  
Client Project #: SJN-00215494-AO  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Sodium (Na)	2015/05/22		107	%	80 - 120
			Dissolved Strontium (Sr)	2015/05/22		102	%	80 - 120
			Dissolved Thallium (Tl)	2015/05/22		103	%	80 - 120
			Dissolved Tin (Sn)	2015/05/22		103	%	80 - 120
			Dissolved Titanium (Ti)	2015/05/22		101	%	80 - 120
			Dissolved Uranium (U)	2015/05/22		108	%	80 - 120
			Dissolved Vanadium (V)	2015/05/22		98	%	80 - 120
			Dissolved Zinc (Zn)	2015/05/22		100	%	80 - 120
4032736	MLB	Method Blank	Dissolved Aluminum (Al)	2015/05/22	ND, RDL=5.0		ug/L	
			Dissolved Antimony (Sb)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Arsenic (As)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Barium (Ba)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Beryllium (Be)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Bismuth (Bi)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Boron (B)	2015/05/22	ND, RDL=50		ug/L	
			Dissolved Cadmium (Cd)	2015/05/22	ND, RDL=0.010		ug/L	
			Dissolved Calcium (Ca)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Chromium (Cr)	2015/05/22	ND, RDL=1.0		ug/L	
			Dissolved Cobalt (Co)	2015/05/22	ND, RDL=0.40		ug/L	
			Dissolved Copper (Cu)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Iron (Fe)	2015/05/22	ND, RDL=50		ug/L	
			Dissolved Lead (Pb)	2015/05/22	ND, RDL=0.50		ug/L	
			Dissolved Magnesium (Mg)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Manganese (Mn)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Molybdenum (Mo)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Nickel (Ni)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Phosphorus (P)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Potassium (K)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Selenium (Se)	2015/05/22	ND, RDL=1.0		ug/L	

Maxxam Job #: B590907  
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exp Services Inc  
Client Project #: SJN-00215494-AD  
Site Location: ENVIRO SERVICES  
Sampler Initials: RH

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Silver (Ag)	2015/05/22	ND, RDL=0.10		ug/L	
			Dissolved Sodium (Na)	2015/05/22	ND, RDL=100		ug/L	
			Dissolved Strontium (Sr)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Thallium (Tl)	2015/05/22	ND, RDL=0.10		ug/L	
			Dissolved Tin (Sn)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Titanium (Ti)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Uranium (U)	2015/05/22	ND, RDL=0.10		ug/L	
			Dissolved Vanadium (V)	2015/05/22	ND, RDL=2.0		ug/L	
			Dissolved Zinc (Zn)	2015/05/22	ND, RDL=5.0		ug/L	
4032736	MLB	RPD	Dissolved Aluminum (Al)	2015/05/22	NC		%	20
			Dissolved Antimony (Sb)	2015/05/22	NC		%	20
			Dissolved Arsenic (As)	2015/05/22	NC		%	20
			Dissolved Barium (Ba)	2015/05/22	0.51		%	20
			Dissolved Beryllium (Be)	2015/05/22	NC		%	20
			Dissolved Bismuth (Bi)	2015/05/22	NC		%	20
			Dissolved Boron (B)	2015/05/22	NC		%	20
			Dissolved Cadmium (Cd)	2015/05/22	5.6		%	20
			Dissolved Calcium (Ca)	2015/05/22	0.10		%	20
			Dissolved Chromium (Cr)	2015/05/22	NC		%	20
			Dissolved Cobalt (Co)	2015/05/22	NC		%	20
			Dissolved Copper (Cu)	2015/05/22	NC		%	20
			Dissolved Iron (Fe)	2015/05/22	NC		%	20
			Dissolved Lead (Pb)	2015/05/22	NC		%	20
			Dissolved Magnesium (Mg)	2015/05/22	0.67		%	20
			Dissolved Manganese (Mn)	2015/05/22	1.6		%	20
			Dissolved Molybdenum (Mo)	2015/05/22	NC		%	20
			Dissolved Nickel (Ni)	2015/05/22	NC		%	20
			Dissolved Phosphorus (P)	2015/05/22	NC		%	20
			Dissolved Potassium (K)	2015/05/22	0.77		%	20
			Dissolved Selenium (Se)	2015/05/22	NC		%	20
			Dissolved Silver (Ag)	2015/05/22	NC		%	20
			Dissolved Sodium (Na)	2015/05/22	0.96		%	20
			Dissolved Strontium (Sr)	2015/05/22	0.21		%	20
			Dissolved Thallium (Tl)	2015/05/22	NC		%	20
			Dissolved Tin (Sn)	2015/05/22	NC		%	20
			Dissolved Titanium (Ti)	2015/05/22	NC		%	20
			Dissolved Uranium (U)	2015/05/22	NC		%	20
			Dissolved Vanadium (V)	2015/05/22	NC		%	20
			Dissolved Zinc (Zn)	2015/05/22	NC		%	20
4032925	MCY	Matrix Spike [AGY765-01]	Total Organic Carbon (C)	2015/05/22		NC	%	80 - 120
4032925	MCY	Spiked Blank	Total Organic Carbon (C)	2015/05/22		98	%	80 - 120

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exp Services Inc  
Client Project #: SJN-00215494-AO  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
4032925	MCY	Method Blank	Total Organic Carbon (C)	2015/05/22	ND, RDL=0.50		mg/L	
4032925	MCY	RPD [AGY764-01]	Total Organic Carbon (C)	2015/05/22	1.4		%	20
4035267	KMC	QC Standard	pH	2015/05/24		100	%	97 - 103
4035267	KMC	RPD [AGY765-01]	pH	2015/05/24	0.17		%	N/A
4035269	KMC	Spiked Blank	Conductivity	2015/05/24		101	%	80 - 120
4035269	KMC	Method Blank	Conductivity	2015/05/24	ND, RDL=1.0		uS/cm	
4035269	KMC	RPD [AGY765-01]	Conductivity	2015/05/24	0.59		%	25
4036003	KSR	QC Standard	Turbidity	2015/05/25		101	%	80 - 120
4036003	KSR	Method Blank	Turbidity	2015/05/25	ND, RDL=0.10		NTU	
4036003	KSR	RPD [AGY762-01]	Turbidity	2015/05/25	2.5		%	25
4036040	KSR	QC Standard	Turbidity	2015/05/25		95	%	80 - 120
4036040	KSR	Method Blank	Turbidity	2015/05/25	ND, RDL=0.10		NTU	
4036040	KSR	RPD	Turbidity	2015/05/25	8.3		%	25

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

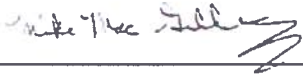
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: B590907  
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### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



---

Mike MacGillivray, Scientific Specialist (Inorganics)

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





### Results of Microbiological Analyses

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 9 sample(s)  
**Date Received:** 14-May-15  
**Date Started:** 14-May-15  
**Date Reported:** 28-May-15  
**Project No:** 11048  
**Report ID:** 44333

Sample Description	Water	Water	Water	Water
Sample ID (Date/Code)	Well #1, May 14/15 @ 10:15 AM	Well #2, May 14/15 @ 10:30 AM	Well #3, May 14/15 @ 7:30 AM	Well #4, May 14/15 @ 8:15 AM
Lab Refer. No.	M-77301-08	M-77302-08	M-77303-08	M-77304-08
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	<1 CFU/100ml	<1 CFU/100ml	6 CFU/100ml	<1 CFU/100ml
Fecal Coliform (MF)	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml
E. coli (MF)	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml	<1 CFU/100ml

Incoming Data/Product (Procedure #5)  
 Supplied by: Petroforma  
 Project No: SJW-215494-A0  
 Reviewed by: [Signature]  
 Date Reviewed: May 28/2015

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For the list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 1.5°C. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer: [Signature]  
 (Print Name/Signature)

Senior Reviewer: [Signature]  
 (Print Name/Signature)

Date: May 28/15

## Results of Microbiological Analyses

**Testing Facility**  
 petroforma Laboratories  
 422 Logy Bay Road  
 St. John's, Newfoundland  
 A1A 5C6  
 Tel: (709) 726-9345  
 Fax: (709) 237-0741

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 9 sample(s)  
**Date Received:** 14-May-15  
**Date Started:** 14-May-15  
**Date Reported:** 28-May-15  
**Project No:** 11048  
**Report ID:** 44333

Sample Description	Water	Water	Water	Water
Sample ID (Date/Code)	Well #5, May 14/15 @ 9:20 AM	OP1-01, May 14/15 @ 7.45 AM	OP1-02, May 14/15 @ 9.00 AM	IPI-01, May 14/15 @ 8:25 AM
Lab Refer. No.	M-77305-08	M-77306-08	M-77307-08	M-77308-08
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	9 CFU/100ml	22 CFU/100ml	>200 CFU/100ml	>200 CFU/100ml
Fecal Coliform (MF)	<1 CFU/100ml	<1 CFU/100ml	27 CFU/100ml	<1 CFU/100ml
E. coli (MF)	<1 CFU/100ml	<1 CFU/100ml	27 CFU/100ml	<1 CFU/100ml

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For a list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 1.5°C. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer: Lana Cameron / [Signature]  
 (Print Name/Signature)

Senior Reviewer: Stacey Penney / [Signature]  
 (Print Name/Signature)

Date: May 28/15

### Results of Microbiological Analyses

**Testing Facility**  
 petroforma Laboratories  
 422 Logy Bay Road  
 St. John's, Newfoundland  
 A1A 5C6  
 Tel: (709) 726-9345  
 Fax: (709) 237-0741

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 9 sample(s)  
**Date Received:** 14-May-15  
**Date Started:** 14-May-15  
**Date Reported:** 28-May-15  
**Project No:** 11048  
**Report ID:** 44333

Sample Description	Water			
Sample ID (Date/Code)	IPI-02, May 14/15 @ 9.45 AM			
Lab Refer. No.	M-77309-08			
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	>200 CFU/100ml			
Fecal Coliform (MF)	<1 CFU/100ml			
E. coli (MF)	<1 CFU/100ml			

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For a list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 1.5°C. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer:

*Lana Cameron* / *[Signature]*

(Print Name/Signature)

Senior Reviewer:

*Stacy Penney* / *[Signature]*

(Print Name/Signature)

Date:

*May 28/15*

Tables

Table 1. Microbiological Parameters

In general, the highest priority guidelines are those dealing with microbiological contaminants, such as bacteria, protozoa and viruses. As a result of challenges with routine analysis of harmful microorganisms that could potentially be present in inadequately treated drinking water, the microbiological guidelines focus on indicators (*E. coli*, total coliforms) and treatment goals. The use of a multi-barrier approach that includes source water protection, adequate treatment, including disinfection, and a well maintained distribution system can reduce microorganisms to levels that have not been associated with illness, as well as meet the guidelines outlined below.

Parameter	Guideline	Common sources	Health considerations	Applying the guideline
<p>Enteric viruses (2011)</p> <p><i>Giardia</i> and <i>Cryptosporidium</i> (2012)</p>	<p>Treatment goal: Minimum 3 log reduction and/or inactivation of cysts and oocysts</p>	<p>Human and animal faeces</p>	<p><i>Giardia</i> and <i>Cryptosporidium</i> are commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea). Less common health effects vary. <i>Giardia</i> infections may include prolonged gastrointestinal upset, malaise and malabsorption. <i>Cryptosporidium</i> infections in immunocompromised individuals, can occur outside the gastrointestinal tract including in the lungs, middle ear, and pancreas.</p>	<p>Monitoring for <i>Cryptosporidium</i> and <i>Giardia</i> in source waters will provide valuable information for a risk based assessment of treatment requirements. Depending on the source water quality, a greater log removal and/or inactivation may be required.</p>
<p>Enteric viruses (2011)</p>	<p>Treatment goal: Minimum 4 log reduction (removal and/or inactivation) of enteric viruses</p>	<p>Human faeces</p>	<p>Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); less common health effects can include respiratory symptoms, central nervous system infections, liver infections and muscular syndromes.</p>	<p>Routine monitoring for viruses is not practical; characterize source water to determine if greater than a 4 log removal or inactivation is necessary.</p>
<p><i>Escherichia coli</i> (E. coli) (2012)</p>	<p>MAC: None detectable per 100 mL</p>	<p>Human and animal faeces</p>	<p>The presence of <i>E. coli</i> indicates recent faecal contamination and the potential presence of microorganisms capable of causing gastrointestinal illnesses; pathogens in human and animal faeces pose the most immediate danger to public health.</p>	<p><i>E. coli</i> is used as an indicator of the microbiological safety of drinking water; if detected, enteric pathogens may also be present. <i>E. coli</i> monitoring should be used, in conjunction with other indicators as part of a multi-barrier approach to producing drinking water of an acceptable quality.</p>

Health considerations

<p><b>Total coliforms (2012)</b></p>	<p>MA C of home detectable/100 mL in water leaving a treatment plant and in non-disinfected groundwater leaving the well</p>	<p>Human and animal faeces; naturally occurring in water, soil and vegetation</p>	<p>Total coliforms are not used as indicators of potential health effects from pathogenic microorganisms; they are used as a tool to determine how well the drinking water treatment system is operating and to indicate water quality changes in the distribution system.</p> <p>Detection of total coliforms from consecutive samples from the same site or from more than 10% of the samples collected in a given sampling period should be investigated.</p>
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<p><b>Turbidity (2012)</b></p>	<p>Treatment limits for individual filters or units:</p> <ul style="list-style-type: none"> <li>- Conventional and direct filtration: <math>\leq 0.3</math> NTU<sup>1</sup></li> <li>- slow sand and diatomaceous earth filtration: <math>\leq 1.0</math> NTU<sup>2</sup></li> <li>- membrane filtration: <math>\leq 0.1</math> NTU<sup>3</sup></li> </ul>	<p>Naturally occurring particles:</p> <ul style="list-style-type: none"> <li><i>Inorganic:</i> clays, silts, metal precipitates</li> <li><i>Organic:</i> decomposed plant &amp; animal debris, microorganisms</li> </ul>	<p>Filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU.</p> <p>Particles can harbor microorganisms, protecting them from disinfection, and can entrap heavy metals and biofilms; elevated or fluctuating turbidity in filtered water can indicate a problem with the water treatment process and a potential increased risk of pathogens in treated water.</p>
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<p><b>Total coliforms</b></p>	<p>Total coliforms should be monitored in the distribution system because they are used to indicate changes in water quality.</p> <p>In water leaving a treatment plant, total coliforms should be measured in conjunction with other indicators to assess water quality; the presence of total coliforms indicates a serious breach in treatment.</p> <p>In a distribution and storage system, detection of total coliforms can indicate regrowth of the bacteria in biofilms or intrusion of untreated water.</p> <p>In non-disinfected groundwater, the presence of total coliforms may indicate that the system is vulnerable to contamination, or it may be a sign of bacterial regrowth.</p>	<p>Guidelines apply to individual filter turbidity for systems using surface water or groundwater under the direct influence of surface water. The decision to exempt a water works from filtration should be made by the appropriate authority based on site-specific considerations, including historical and ongoing monitoring data. To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of <math>\leq 1.0</math> NTU or less.</p> <p>For systems that use groundwater, turbidity should generally be below 1.0 NTU.</p>	<p>Guidelines apply to individual filter turbidity for systems using surface water or groundwater under the direct influence of surface water. The decision to exempt a water works from filtration should be made by the appropriate authority based on site-specific considerations, including historical and ongoing monitoring data. To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of <math>\leq 1.0</math> NTU or less.</p> <p>For systems that use groundwater, turbidity should generally be below 1.0 NTU.</p>
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<sup>1</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 1.0 NTU.

<sup>2</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 3.0 NTU.

<sup>3</sup> in at least 95% of measurements per operational filter period or per month. Measurements greater than 0.1 NTU for a period greater than 15 minutes from an individual membrane unit should immediately trigger an investigation of the membrane unit integrity.



## APPENDIX

### References for Microbiological Analyses

<b>Test Title</b>	<b>CALA Accredited Methods</b>
Total Coliforms (MF) and/or Fecal Coliforms (MF)	9222. Membrane filter technique for members of the coliform group. 2005. Standard Methods For The Examination of Water and Wastewater. 21 <sup>st</sup> Edition.
Fecal Coliforms (A-1 MPN Method)	9221E. Fecal Coliform Procedure.2. Fecal Coliform Direct Test (A-1 Medium) 2005 Standard Methods for the Examination of Water and Wastewater. 21 <sup>st</sup> Edition.
Total Coliforms and E.coli (Colilert Method)	AOAC Official Method 991.15. Determination of Total Coliforms and E.coli using the (Colilert) Method
<b>Standard Plate Count</b>	<b>Determination of Aerobic Colony Count In Foods. MFHPB -18. October, 2001. Compendium of Analytical Methods: Volume 2.</b>
<b>Total Coliforms (MPN Method), Fecal Coliforms (MPN Method), and/or E.coli (MPN Method)</b>	<b>Enumeration of Coliforms, Fecal Coliforms and of E. coli In Foods Using The MPN Method. MFHPB -19. April 2002. Compendium of Analytical Methods: Volume 2.</b>
<b>Salmonella Species</b>	<b>Isolation and Identification of Salmonella from Foods and Environmental Samples. MFHPB-20. March 2009. Compendium of Analytical Methods: Volume 2.</b>
<b>Staphylococcus aureus Coagulase (+)</b>	<b>Enumeration of Staphylococcus aureus In Foods. MFHPB -21. September, 2005. Compendium of Analytical Methods: Volume 2.</b>
<b>Listeria monocytogenes</b>	<b>Isolation of Listeria monocytogenes and other Listeria spp. from foods and environmental samples. MFHPB-30. February 2011. Compendium of Analytical Methods Volume 2.</b>
<b>Standard Plate Count (Petrifilm)</b>	<b>Enumeration of Total Aerobic Bacteria In Food Products and Food Ingredients using 3M Petrifilm Aerobic Count Plates. MFHPB-33. February 2001. Compendium of Analytical Methods: Volume 2.</b>
<b>Total Coliforms and E.coli (Petrifilm)</b>	<b>Enumeration of E.coli and Coliforms In Food Products and Food Ingredients using 3M Petrifilm E. coli Count Plates. MFHPB-34. February 2001. Compendium of Analytical Methods: Volume 2. Supplement to the Method MFHPB-34. January, 2006. Compendium of Analytical Methods: Volume 2</b>
<b>Enterobacteriaceae species (Petrifilm)</b>	<b>Enumeration of Enterobacteriaceae species In Food and Environmental Samples using 3M Petrifilm Enterobacteriaceae Count Plates (modified to add shrimp testing). MFLP-09. June 2007. Compendium of Analytical Methods: Volume 3.</b>
<b>Listeria monocytogenes enumeration</b>	<b>Enumeration of Listeria monocytogenes species In Foods. MFLP-74. April 2002. Compendium of Analytical Methods: Volume 3. Supplement to the Method MFLP-74. April, 2004. Compendium of Analytical Methods: Volume 3</b>

#### Non-Accredited Methods

1. pH
2. Salt Content
3. Enumeration of *Enterococcus* species: Colony Count Technique
4. *Vibrio* Detection (Presence/Absence)(MPN Method)
5. Anaerobes Sporulative/Anaerobes Vegetative
6. Yeasts and Molds

**Legend for symbols:**

<	Less than the lowest detection limit for the test
>	Greater than the highest detection limit for the test
MPN	Most Probable Number (testing conducted using the MPN test tube method)
CFU	Colony Forming Unit
Negative	Not detected
MF	Membrane filtration
%	Percent
g	Gram
ml	Millilitre



**Results of Microbiological Analyses**

**Customer:** Cyril Pumphrey  
 EXP Services  
 60 Pippy Place, Suite 200  
 St. John's, NL  
 A1B 4H7  
 (709) 579-2027 (P)  
 (709) 579-7115 (F)

**Sample:** Water - 1 sample(s)  
**Date Received:** 01-Jun-15  
**Date Started:** 01-Jun-15  
**Date Reported:** 08-Jun-15  
**Project No:** 11048  
**Report ID:** 44517

Sample Description	Water	OP2-01	June 1 <sup>st</sup> /15	
Sample ID (Date/Code)	#1 Ocean Pond, June 01/15 @ 10:00 AM			
Lab Refer. No.	M-78000-08			
<b>Bacteriological Analyses</b>				
Total Coliform (MF)	>200 CFU/100ml			
Fecal Coliform (MF)	2 CFU/100ml			
E. coli (MF)	2 CFU/100ml			

Incoming Data/Product (Procedure #)  
 Supplied by: Petroforma  
 Project No: SN-215494-A0  
 Received by: [Signature]  
 Date Reviewed: June 8/2015

Comments: The above analyses were conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm. For the list of test methods, please refer to the attached 'Appendix - References for Microbiological Analyses'. The arrival temperature was 17.3°C which was reflective of the temperature upon collection. Please see the attached Guidelines for Canadian Drinking Water Quality.

Technical Reviewer: Suzette Winter [Signature]  
 (Print Name/Signature)

Senior Reviewer: Stacey Penney [Signature]  
 (Print Name/Signature)

Date: June 8/15



Tables

Table 1. Microbiological Parameters

In general, the highest priority guidelines are those dealing with microbiological contaminants, such as bacteria, protozoa and viruses. As a result of challenges with routine analysis of harmful microorganisms that could potentially be present in inadequately treated drinking water, the microbiological guidelines focus on indicators (*E. coli*, total coliforms) and treatment goals. The use of a multi-barrier approach that includes source water protection, adequate treatment, including disinfection, and a well maintained distribution system can reduce microorganisms to levels that have not been associated with illness, as well as meet the guidelines outlined below.

Parameter	Guideline	Health considerations	Applying the guidelines
<p>Bacteria                      protozoa  <i>Cryptosporidium</i>                      (2012)</p>	<p>Treatment goal:                      Minimum 3 log                      removal and/or                      inactivation of cysts                      and oocysts</p>	<p>Human and                      animal faeces</p> <p><i>Giardia</i> and <i>Cryptosporidium</i> are commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea). Less common health effects vary. <i>Giardia</i> infections may include prolonged gastrointestinal upset, malaise, and malabsorption. <i>Cryptosporidium</i> infections, in immunocompromised individuals, can occur outside the gastrointestinal tract including in the lungs, middle ear, and pancreas.</p>	<p>Monitoring for <i>Cryptosporidium</i> and <i>Giardia</i> in source water will provide valuable information for a risk-based assessment of treatment requirements.</p> <p>Depending on the source water quality, a greater log removal and/or inactivation may be required.</p>
<p>Enteric viruses                      (2011)</p>	<p>Treatment goal:                      Minimum 4 log                      reduction (removal                      and/or inactivation)                      of enteric viruses</p>	<p>Human faeces</p> <p>Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); less common health effects can include respiratory symptoms, central nervous system infections, liver infections and muscular syndromes.</p> <p>The presence of <i>E. coli</i> indicates recent faecal contamination and the potential presence of microorganisms capable of causing gastrointestinal illnesses; pathogens in human and animal faeces pose the most immediate danger to public health.</p>	<p>Routine monitoring for viruses is not practical; characterize source water to determine if greater than a 4 log removal or inactivation is necessary.</p>
<p><i>Escherichia coli</i>                      (<i>E. coli</i>)                      (2012)</p>	<p>MAC:                      None detectable per                      100 mL</p>	<p>Human and                      animal faeces</p>	<p><i>E. coli</i> is used as an indicator of the microbiological safety of drinking water; if detected, enteric pathogens may also be present. <i>E. coli</i> monitoring should be used, in conjunction with other indicators, as part of a multi-barrier approach to producing drinking water of an acceptable quality.</p>

Total coliforms (2012)	MFC of faeces detectable/100 mL in water leaving a treatment plant and in non-disinfected groundwater leaving the well	Human and animal faeces; naturally occurring in water, soil and vegetation	<p>                     Total coliforms are not used as indicators of potential health effects from pathogenic microorganisms; they are used as a tool to determine how well the drinking water treatment system is operating and to indicate water quality changes in the distribution system.                      Detection of total coliforms from consecutive samples from the same site or from more than 10% of the samples collected in a given sampling period should be investigated.                 </p>
Turbidity (2012)	<p>                     Treatment limits for individual filters or units:                      - Conventional and direct filtration: <math>\leq 0.3</math> NTU<sup>1</sup>                      - slow sand and diatomaceous earth filtration: <math>\leq 1.0</math> NTU<sup>2</sup>                      - membrane filtration: <math>\leq 0.1</math> NTU<sup>3</sup> </p>	<p>                     Naturally occurring particles:  <i>Inorganic:</i> clays, silts, metal precipitates  <i>Organic:</i> decomposed plant &amp; animal debris, microorganisms                 </p>	<p>                     Filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU. Particles can harbour microorganisms, protecting them from disinfection, and can carry heavy metals and biocides; elevated or fluctuating turbidity in filtered water can indicate a problem with the water treatment process and a potential increased risk of pathogens in treated water.                 </p>
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5. Anaerobes Sporulative/Anaerobes Vegetative
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**Legend for symbols:**

<	Less than the lowest detection limit for the test
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CFU	Colony Forming Unit
Negative	Not detected
MF	Membrane filtration
%	Percent
g	Gram
ml	Millilitre



## **APPENDIX D**

### **Dug Well Construction Recommendations**