

2018 FOURTH QUARTER REPORT FOR GN-CGS RANKIN INLET

QUARTER BEING REPORTED: October - December 2018

The following information is compiled pursuant to the requirements of Part B, Item 2 of Water Licence No. **3AM-GRA1624** issued to **Government of Nunavut, Department of Community and Government Services (GN-CGS)**.

- a) Tabular summaries of all data generated under the Monitoring Program; and
- b) Monthly quantities of fresh water obtained from all sources;

Below are results for Monitoring Program Stations GRA-1 and GRA-3.

Month Reported	Quantity of Water Obtained from all Sources (m ³)	Quantity of Sewage Waste Discharged (Estimated, m ³)
October	54,338.00	Same
November	57,459.00	Same
December	58,587.00	Same
QUARTER TOTAL	170,384.00	170,384.00

As per Part H, Item 5 of the Licence, below is a summary of solids removed from the Sewage Treatment Facility at Monitoring Station Number GRA-4.

Month Reported	Solids Removed from the Sewage Treatment Facility (m ³)
October	4
November	4
December	4
QUARTER TOTAL	12

- c) Quarterly sampling results from monitoring Program Station GRA-3;

Refer to attached 2019 sampling results for GRA-3 (Appendix A).

2018 FOURTH QUARTER REPORT FOR GN-CGS RANKIN INLET

- d) The current estimated volume of Nipissar Lake based on water elevation determined at Monitoring Program Station GRA-5.

As per Part H, Item 6 of the Licence, the Licensee shall record water elevation monthly, during periods of open water at Monitoring Program Station GRA-5. Please note, water elevation is a measurement taken from a datum on the shoreline; therefore a decrease in elevation measurement represents an increase in Lake water level.

An elevation reading could not be taken as there was **no open water** during December of the quarter being reported.

Month Reported	Nipissar Lake Water Elevation (in)
October	No Reading on Record
November	No Reading on Record
December	No Open Water

List of Appendices

Appendix A: Certificate of Analysis, October 11, 2018 – 18 pages

Certificate of Analysis, November 5, 2018 – 19 pages

Appendix B: Daily Record of Nipissar Lake Volumes GRA-1 – 1 page

**2018 FOURTH QUARTER REPORT
FOR GN-CGS RANKIN INLET**

**Appendix A: Certificate of Analysis, October 11, 2018
Certificate of Analysis, November 5, 2018**



Nunavut Community & Government Services - Rankin Inlet
P.O. Box 490
Rankin Inlet NU X0C 0G0
ATTN: SIMON DOIRON

Date: 26-OCT-18
PO No.:
WO No.: L2180094
Project Ref: RANKIN INLET WWTP- MONTHLY EFFLUENT
Sample ID: RANKIN INLET WWTP - EFFLUENT
Sampled By: SD
Date Collected: 11-OCT-18
Lab Sample ID: L2180094-1
Matrix: WASTE

PAGE 1 of 5

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
BTEX plus F1-F4						
Xylenes (Total)	<0.00064		mg/L	0.09	0.02	17-OCT-18
CCME Total Hydrocarbons						
F1-BTEX	<0.10		mg/L			26-OCT-18
F2-Naphth	0.39		mg/L			26-OCT-18
F3-PAH	5.99		mg/L			26-OCT-18
Total Hydrocarbons (C6-C50)	8.92		mg/L			26-OCT-18
CCME PHC F2-F4 in Water						
F2 (C10-C16)	0.39		mg/L			17-OCT-18
F3 (C16-C34)	5.99		mg/L			17-OCT-18
F4 (C34-C50)	2.54		mg/L			17-OCT-18
Surr: 2-Bromobenzotrifluoride	94.2		%			17-OCT-18
BTX plus F1 by GCMS						
Benzene	<0.00050		mg/L	0.005		16-OCT-18
Toluene	0.0011		mg/L	0.06	0.024	16-OCT-18
Ethyl benzene	<0.00050		mg/L	0.14	0.0016	16-OCT-18
o-Xylene	<0.00050		mg/L			16-OCT-18
m+p-Xylenes	<0.00040		mg/L			16-OCT-18
F1 (C6-C10)	<0.10		mg/L			16-OCT-18
Surr: 4-Bromofluorobenzene (SS)	104.5		%			16-OCT-18
Nunavut WW Group 1						
Phosphorus, Total						
Phosphorus (P)-Total	1.36		mg/L			22-OCT-18
Mercury Total						
Mercury (Hg)-Total	0.0000090		mg/L	0.001		17-OCT-18
Bicarbonate (HCO3)	84.9		mg/L			15-OCT-18
Carbonate (CO3)	<0.60		mg/L			15-OCT-18
Hydroxide (OH)	<0.34		mg/L			15-OCT-18
*Nitrate and Nitrite as N	<0.070		mg/L	10		16-OCT-18
pH						
pH	7.06		pH units			12-OCT-18
Total Suspended Solids						
Total Suspended Solids	54.7		mg/L			18-OCT-18
Total Organic Carbon by Combustion						
Total Organic Carbon	48.5		mg/L			19-OCT-18
Total Metals in Water by CRC ICPMS						
Aluminum (Al)-Total	0.167		mg/L		0.1	17-OCT-18
Antimony (Sb)-Total	0.00016		mg/L	0.006		17-OCT-18
Arsenic (As)-Total	0.00079		mg/L	0.01		17-OCT-18

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P.O. Box 490
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ATTN: SIMON DOIRON

Date: 26-OCT-18
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WO No.: L2180094
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Sample ID: RANKIN INLET WWTP - EFFLUENT
Sampled By: SD
Date Collected: 11-OCT-18
Lab Sample ID: L2180094-1
Matrix: WASTE

PAGE 2 of 5

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Total Metals in Water by CRC ICPMS						
Barium (Ba)-Total	0.0203		mg/L	1		17-OCT-18
Beryllium (Be)-Total	<0.00010		mg/L			17-OCT-18
Bismuth (Bi)-Total	0.00337		mg/L			17-OCT-18
Boron (B)-Total	0.050		mg/L	5		17-OCT-18
Cadmium (Cd)-Total	0.0000485		mg/L	0.005		17-OCT-18
Calcium (Ca)-Total	18.3		mg/L			17-OCT-18
Cesium (Cs)-Total	0.000051		mg/L			17-OCT-18
Chromium (Cr)-Total	0.00106		mg/L	0.05		17-OCT-18
Cobalt (Co)-Total	0.00023		mg/L			17-OCT-18
Copper (Cu)-Total	0.118		mg/L	2.0	1.0	17-OCT-18
Iron (Fe)-Total	0.313		mg/L		0.3	17-OCT-18
Lead (Pb)-Total	0.00228		mg/L	0.01		17-OCT-18
Lithium (Li)-Total	0.0026		mg/L			17-OCT-18
Magnesium (Mg)-Total	3.96		mg/L			17-OCT-18
Manganese (Mn)-Total	0.0365		mg/L		0.05	17-OCT-18
Molybdenum (Mo)-Total	0.000933		mg/L			17-OCT-18
Nickel (Ni)-Total	0.00385		mg/L			17-OCT-18
Potassium (K)-Total	5.32		mg/L			17-OCT-18
Phosphorus (P)-Total	1.81		mg/L			17-OCT-18
Rubidium (Rb)-Total	0.00596		mg/L			17-OCT-18
Selenium (Se)-Total	0.000195		mg/L	0.05		17-OCT-18
Silicon (Si)-Total	0.38		mg/L			17-OCT-18
Silver (Ag)-Total	0.000029		mg/L			17-OCT-18
Sodium (Na)-Total	21.5		mg/L		200	17-OCT-18
Strontium (Sr)-Total	0.0928		mg/L			17-OCT-18
Sulfur (S)-Total	8.70		mg/L			17-OCT-18
Tellurium (Te)-Total	<0.00020		mg/L			17-OCT-18
Thallium (Tl)-Total	<0.000010		mg/L			17-OCT-18
Thorium (Th)-Total	<0.00010		mg/L			17-OCT-18
Tin (Sn)-Total	0.00085		mg/L			17-OCT-18
Titanium (Ti)-Total	0.00337		mg/L			17-OCT-18
Tungsten (W)-Total	<0.00010		mg/L			17-OCT-18
Uranium (U)-Total	0.000155		mg/L	0.02		17-OCT-18
Vanadium (V)-Total	<0.00050		mg/L			17-OCT-18
Zinc (Zn)-Total	0.0652		mg/L		5.0	17-OCT-18
Zirconium (Zr)-Total	0.000349		mg/L			17-OCT-18
Sulfate in Water by IC						
Sulfate (SO4)	19.2		mg/L		500	12-OCT-18
Phenol (4AAP)						
Phenols (4AAP)	0.0089	DLM	mg/L			24-OCT-18
Oil & Grease - Gravimetric						
Oil and Grease	17.8		mg/L			18-OCT-18

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Nitrite in Water by IC						
*Nitrite (as N)	<0.010		mg/L	1		12-OCT-18
Nitrate in Water by IC						
*Nitrate (as N)	0.024		mg/L	10		12-OCT-18
Hardness Calculated						
Hardness (as CaCO ₃)	62.0	HTC	mg/L		500	19-OCT-18
Conductivity						
Conductivity	312		umhos/cm			12-OCT-18
Chloride in Water by IC						
Chloride (Cl)	39.2		mg/L		250	12-OCT-18
Carbonaceous BOD						
BOD Carbonaceous	45		mg/L			12-OCT-18
Biochemical Oxygen Demand (BOD)						
Biochemical Oxygen Demand	179		mg/L			12-OCT-18
Ammonia by colour						
Ammonia, Total (as N)	4.31		mg/L			16-OCT-18
Alkalinity, Total (as CaCO₃)						
Alkalinity, Total (as CaCO ₃)	69.6		mg/L			12-OCT-18
Fecal Coliforms	>2420		MPN/100mL			12-OCT-18
Fluoride (F)	0.161		mg/L	1.5		12-OCT-18
Total Coliform and E.coli by MPN QT97						
Total Coliforms	>2420		MPN/100mL	0		12-OCT-18
Escherichia Coli	>2420		MPN/100mL	0		12-OCT-18
Polyaromatic Hydrocarbons (PAHs)						
1-Methyl Naphthalene	0.000029		mg/L			24-OCT-18
2-Methyl Naphthalene	0.000036		mg/L			24-OCT-18
Acenaphthene	<0.000020		mg/L			24-OCT-18
Acenaphthylene	<0.000020		mg/L			24-OCT-18
Anthracene	<0.000010		mg/L			24-OCT-18
Acridine	<0.000020		mg/L			24-OCT-18
Benzo(a)anthracene	<0.000010		mg/L			24-OCT-18
Benzo(a)pyrene	<0.0000050		mg/L	0.00004		24-OCT-18
Benzo(b&j)fluoranthene	<0.000010		mg/L			24-OCT-18
Benzo(g,h,i)perylene	<0.000020		mg/L			24-OCT-18
Benzo(k)fluoranthene	<0.000010		mg/L			24-OCT-18
Chrysene	<0.000020		mg/L			24-OCT-18
Dibenzo(a,h)anthracene	<0.0000050		mg/L			24-OCT-18

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Polyaromatic Hydrocarbons (PAHs)						
Fluoranthene	<0.000020		mg/L			24-OCT-18
Fluorene	<0.000020		mg/L			24-OCT-18
Indeno(1,2,3-cd)pyrene	0.000072		mg/L			24-OCT-18
Naphthalene	<0.000050		mg/L			24-OCT-18
Phenanthrene	<0.000050		mg/L			24-OCT-18
Pyrene	<0.000010		mg/L			24-OCT-18
Quinoline	<0.000020		mg/L			24-OCT-18
B(a)P Total Potency Equivalent	<0.000030		mg/L			24-OCT-18
Surr: Acenaphthene d10	114.1		%			24-OCT-18
Surr: Acridine d9	119.4		%			24-OCT-18
Surr: Chrysene d12	122.1		%			24-OCT-18
Surr: Naphthalene d8	127.8		%			24-OCT-18
Surr: Phenanthrene d10	122.0		%			24-OCT-18
CDWQG = Health Canada Guideline Limits updated MAY 2018 * CDWQG for Nitrate+Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/ or Aesthetic Objective.						
Approved by 						
Hua Wo Account Manager						

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Guidelines & Objectives

Sample Parameter Qualifier key listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Health Canada MAC Health Related Criteria Limits

Nitrate/Nitrite-N*	Criteria limit is 10 mg/L (1.0 mg/L if present as all Nitrite-N). High concentrations may contribute to blue baby syndrome in infants.
Lead*	A cumulative body poison, uncommon in naturally occurring hard waters.
Fluoride*	Present in fluoridated water supplies at 0.8 mg/L to reduce dental caries. Elevated levels causes fluorosis (mottling of teeth).
Total Coliforms*	Criteria is 0 CFU/100mL. Adverse health effects.
E. Coli*	Criteria is 0 CFU/100 mL. Certain E. Coli bacteria can be life threatening.

*Health Canada Canadian Drinking Water Quality Guidelines (MAC limit)

Aesthetic Objective Concentration Levels

Alkalinity	Acid neutralizing capacity. Usually a measure of carbonate and bicarbonates and calculated and reported as calcium carbonate.
Balance	Quality control parameter ratioing cations to anions
Bicarbonate	See Alkalinity. Report as the anion HCO ₃ -1
Carbonate	See Alkalinity. Reported at the anion CO ₃ -2
Calcium	See Hardness. Common major cation of water chemistry.
Chloride	Common major anion of water chemistry.
Conductance	Physical test measuring water salinity (dissolved ions or solids)
Hardness	Classical measure of capacity of water to precipitate soap (chiefly calcium and magnesium ions). Causes scaling tendency in water if carbonates/bicarbonates are present (if >200 mg/L). For drinking water purposes waters with results <200 mg/L are considered acceptable, results >200 mg/L are considered poor but can be tolerated. Results >500 mg/L are unacceptable.
Hydroxide	See alkalinity
Magnesium	See hardness. Common major cation of water chemistry. Elevated levels (>125 mg/L) may exert a cathartic or diuretic action.
pH	Measure of water acidity/alkalinity. Normal range is 7.0-8.5.
Potassium	Common major cation of water chemistry.
Sodium	Common major cation of water chemistry. Measure of salinity (saltiness).The aesthetic objective (not related to health) for sodium in drinking water is 200 mg/L. However, where sodium concentration of the drinking water exceeds 20 mg/L, it is recommended that any person on a sodium restricted diet consult with his/her physician or Medical Officer of Health concerning the use of that water.
Sulphate	Common major anion of water chemistry. Elevated levels may exert a cathartic or diuretic action.
Total Dissolved Solids	A measure of water salinity.
Iron	Causes staining to laundry and porcelain and astringent taste. Oxidizes to red-brown precipitate on exposure to air.
Manganese	Elevated levels may cause staining of laundry and porcelain.
Heterotrophic	
Plate Count	Criteria is 500 cfu/mL Measure of heterotrophic bacteria present.

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

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

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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

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

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

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

Quality Control Report

Workorder: L2180094

Report Date: 26-OCT-18

Page 1 of 11

Client: Nunavut Community & Government Services - Rankin Inlet

P.O. Box 490

Rankin Inlet NU X0C 0G0

Contact: SIMON DOIRON

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-WP								
Water								
Batch	R4277661							
WG2903515-20 DUP		L2180094-1						
Alkalinity, Total (as CaCO ₃)		69.6	67.7		mg/L	2.8	20	12-OCT-18
WG2903515-19 LCS								
Alkalinity, Total (as CaCO ₃)			101.2		%		85-115	12-OCT-18
WG2903515-16 MB								
Alkalinity, Total (as CaCO ₃)			<1.0		mg/L		1	12-OCT-18
BOD-CBOD-WP								
Water								
Batch	R4287928							
WG2901635-12 LCS								
BOD Carbonaceous			101.1		%		85-115	12-OCT-18
WG2901635-11 MB								
BOD Carbonaceous			<2.0		mg/L		2	12-OCT-18
BOD-WP								
Water								
Batch	R4287928							
WG2901635-12 LCS								
Biochemical Oxygen Demand			95.1		%		85-115	12-OCT-18
WG2901635-11 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	12-OCT-18
BTEXS+F1-HSMS-WP								
Water								
Batch	R4283108							
WG2904716-4 DUP		L2180094-1						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-18
Toluene		0.0011	0.0011		mg/L	4.1	30	16-OCT-18
Ethyl benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-18
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-18
m+p-Xylenes		<0.00040	<0.00040	RPD-NA	mg/L	N/A	30	16-OCT-18
F1 (C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	16-OCT-18
WG2904716-2 LCS								
Benzene			96.9		%		70-130	16-OCT-18
Toluene			99.4		%		70-130	16-OCT-18
Ethyl benzene			108.4		%		70-130	16-OCT-18
o-Xylene			111.5		%		70-130	16-OCT-18
m+p-Xylenes			97.9		%		70-130	16-OCT-18
WG2904716-3 LCS								
F1 (C6-C10)			99.6		%		70-130	16-OCT-18
WG2904716-1 MB								
Benzene			<0.00050		mg/L		0.0005	16-OCT-18



Workorder: L2180094

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTEXS+F1-HSMS-WP		Water						
Batch	R4283108							
WG2904716-1	MB							
Toluene			<0.0010		mg/L		0.001	16-OCT-18
Ethyl benzene			<0.00050		mg/L		0.0005	16-OCT-18
o-Xylene			<0.00030		mg/L		0.0003	16-OCT-18
m+p-Xylenes			<0.00040		mg/L		0.0004	16-OCT-18
F1 (C6-C10)			<0.10		mg/L		0.1	16-OCT-18
Surrogate: 4-Bromofluorobenzene (SS)			96.3		%		70-130	16-OCT-18
C-TOC-HTC-WP		Water						
Batch	R4290973							
WG2910152-2	LCS							
Total Organic Carbon			95.5		%		80-120	19-OCT-18
WG2910152-1	MB							
Total Organic Carbon			<0.50		mg/L		0.5	19-OCT-18
CL-IC-N-WP		Water						
Batch	R4278708							
WG2902239-10	LCS							
Chloride (Cl)			98.8		%		90-110	12-OCT-18
WG2902239-9	MB							
Chloride (Cl)			<0.50		mg/L		0.5	12-OCT-18
EC-WP		Water						
Batch	R4277661							
WG2903515-20	DUP	L2180094-1						
Conductivity			312		umhos/cm	0.3	10	12-OCT-18
WG2903515-18	LCS							
Conductivity			99.9		%		90-110	12-OCT-18
WG2903515-16	MB							
Conductivity			<1.0		umhos/cm		1	12-OCT-18
F-IC-N-WP		Water						
Batch	R4278708							
WG2902239-10	LCS							
Fluoride (F)			101.4		%		90-110	12-OCT-18
WG2902239-9	MB							
Fluoride (F)			<0.020		mg/L		0.02	12-OCT-18
F2-F4-FID-WP		Water						

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-FID-WP								
Water								
Batch R4277499								
WG2904671-2 LCS								
F2 (C10-C16)			100.6		%		70-130	17-OCT-18
F3 (C16-C34)			100.6		%		70-130	17-OCT-18
F4 (C34-C50)			91.8		%		70-130	17-OCT-18
WG2904671-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	17-OCT-18
F3 (C16-C34)			<0.25		mg/L		0.25	17-OCT-18
F4 (C34-C50)			<0.25		mg/L		0.25	17-OCT-18
Surrogate: 2-Bromobenzotrifluoride			84.7		%		60-140	17-OCT-18
FC-QT97-WP								
Water								
Batch R4277709								
WG2902295-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	12-OCT-18
HG-T-CVAA-WP								
Water								
Batch R4287910								
WG2908395-2 LCS								
Mercury (Hg)-Total			103.0		%		80-120	17-OCT-18
WG2908395-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	17-OCT-18
MET-T-CCMS-WP								
Water								
Batch R4287630								
WG2905797-2 LCS								
Aluminum (Al)-Total			97.3		%		80-120	17-OCT-18
Antimony (Sb)-Total			99.7		%		80-120	17-OCT-18
Arsenic (As)-Total			100.5		%		80-120	17-OCT-18
Barium (Ba)-Total			98.1		%		80-120	17-OCT-18
Beryllium (Be)-Total			103.1		%		80-120	17-OCT-18
Bismuth (Bi)-Total			100.4		%		80-120	17-OCT-18
Boron (B)-Total			90.2		%		80-120	17-OCT-18
Cadmium (Cd)-Total			100.4		%		80-120	17-OCT-18
Calcium (Ca)-Total			99.1		%		80-120	17-OCT-18
Cesium (Cs)-Total			101.3		%		80-120	17-OCT-18
Chromium (Cr)-Total			100.1		%		80-120	17-OCT-18
Cobalt (Co)-Total			98.2		%		80-120	17-OCT-18
Copper (Cu)-Total			103.3		%		80-120	17-OCT-18

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4287630							
WG2905797-2	LCS							
Iron (Fe)-Total			101.1		%		80-120	17-OCT-18
Lead (Pb)-Total			99.4		%		80-120	17-OCT-18
Lithium (Li)-Total			108.5		%		80-120	17-OCT-18
Magnesium (Mg)-Total			98.5		%		80-120	17-OCT-18
Manganese (Mn)-Total			99.2		%		80-120	17-OCT-18
Molybdenum (Mo)-Total			101.7		%		80-120	17-OCT-18
Nickel (Ni)-Total			101.3		%		80-120	17-OCT-18
Potassium (K)-Total			101.9		%		80-120	17-OCT-18
Phosphorus (P)-Total			105.5		%		80-120	17-OCT-18
Rubidium (Rb)-Total			99.6		%		80-120	17-OCT-18
Selenium (Se)-Total			100.9		%		80-120	17-OCT-18
Silicon (Si)-Total			105.7		%		80-120	17-OCT-18
Silver (Ag)-Total			99.2		%		80-120	17-OCT-18
Sodium (Na)-Total			97.0		%		80-120	17-OCT-18
Strontium (Sr)-Total			101.9		%		80-120	17-OCT-18
Sulfur (S)-Total			104.6		%		80-120	17-OCT-18
Tellurium (Te)-Total			101.4		%		80-120	17-OCT-18
Thallium (Tl)-Total			98.8		%		80-120	17-OCT-18
Thorium (Th)-Total			94.9		%		80-120	17-OCT-18
Tin (Sn)-Total			100.8		%		80-120	17-OCT-18
Titanium (Ti)-Total			98.4		%		80-120	17-OCT-18
Tungsten (W)-Total			99.6		%		80-120	17-OCT-18
Uranium (U)-Total			100.8		%		80-120	17-OCT-18
Vanadium (V)-Total			101.1		%		80-120	17-OCT-18
Zinc (Zn)-Total			102.9		%		80-120	17-OCT-18
Zirconium (Zr)-Total			103.5		%		80-120	17-OCT-18
WG2905797-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	17-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	17-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	17-OCT-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4287630							
WG2905797-1 MB								
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	17-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	17-OCT-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	17-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	17-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	17-OCT-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	17-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	17-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	17-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	17-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	17-OCT-18
Potassium (K)-Total			<0.050		mg/L		0.05	17-OCT-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	17-OCT-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	17-OCT-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	17-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	17-OCT-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	17-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	17-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	17-OCT-18
Sulfur (S)-Total			<0.50		mg/L		0.5	17-OCT-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	17-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	17-OCT-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	17-OCT-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	17-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	17-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	17-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	17-OCT-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	17-OCT-18
NH3-COL-WP		Water						

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-COL-WP	Water							
Batch	R4282936							
WG2905862-14 LCS								
Ammonia, Total (as N)			101.7		%		85-115	16-OCT-18
WG2905862-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	16-OCT-18
NO2-IC-N-WP	Water							
Batch	R4278708							
WG2902239-10 LCS								
Nitrite (as N)			98.5		%		90-110	12-OCT-18
WG2902239-9 MB								
Nitrite (as N)			<0.010		mg/L		0.01	12-OCT-18
NO3-IC-N-WP	Water							
Batch	R4278708							
WG2902239-10 LCS								
Nitrate (as N)			100.2		%		90-110	12-OCT-18
WG2902239-9 MB								
Nitrate (as N)			<0.020		mg/L		0.02	12-OCT-18
OG-GRAV-WP	Water							
Batch	R4284581							
WG2904721-2 LCS								
Oil and Grease			100.4		%		70-130	18-OCT-18
WG2904721-1 MB								
Oil and Grease			<5.0		mg/L		5	18-OCT-18
P-T-L-COL-WP	Water							
Batch	R4293889							
WG2909100-10 LCS								
Phosphorus (P)-Total			92.5		%		80-120	22-OCT-18
WG2909100-9 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	22-OCT-18
PAH,PANH-WP	Water							
Batch	R4301427							
WG2907471-2 LCS								
1-Methyl Naphthalene			95.9		%		60-130	24-OCT-18
2-Methyl Naphthalene			95.8		%		60-130	24-OCT-18
Acenaphthene			87.4		%		60-130	24-OCT-18
Acenaphthylene			84.0		%		60-130	24-OCT-18
Anthracene			72.4		%		60-130	24-OCT-18
Acridine			79.0		%		60-130	24-OCT-18

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4301427							
WG2907471-2	LCS							
Benzo(a)anthracene			80.1		%		60-130	24-OCT-18
Benzo(a)pyrene			80.5		%		60-130	24-OCT-18
Benzo(b&j)fluoranthene			77.7		%		60-130	24-OCT-18
Benzo(g,h,i)perylene			80.6		%		60-130	24-OCT-18
Benzo(k)fluoranthene			85.3		%		60-130	24-OCT-18
Chrysene			129.0		%		60-130	24-OCT-18
Dibenzo(a,h)anthracene			103.6		%		60-130	24-OCT-18
Fluoranthene			88.0		%		60-130	24-OCT-18
Fluorene			87.4		%		60-130	24-OCT-18
Indeno(1,2,3-cd)pyrene			82.0		%		60-130	24-OCT-18
Naphthalene			87.2		%		50-130	24-OCT-18
Phenanthrene			86.0		%		60-130	24-OCT-18
Pyrene			89.6		%		60-130	24-OCT-18
Quinoline			126.9		%		60-130	24-OCT-18
WG2907471-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	24-OCT-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	24-OCT-18
Acenaphthene			<0.000020		mg/L		0.00002	24-OCT-18
Acenaphthylene			<0.000020		mg/L		0.00002	24-OCT-18
Anthracene			<0.000010		mg/L		0.00001	24-OCT-18
Acridine			<0.000020		mg/L		0.00002	24-OCT-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	24-OCT-18
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	24-OCT-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	24-OCT-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	24-OCT-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	24-OCT-18
Chrysene			<0.000020		mg/L		0.00002	24-OCT-18
Dibenzo(a,h)anthracene			<0.0000050		mg/L		0.000005	24-OCT-18
Fluoranthene			<0.000020		mg/L		0.00002	24-OCT-18
Fluorene			<0.000020		mg/L		0.00002	24-OCT-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	24-OCT-18
Naphthalene			<0.000050		mg/L		0.00005	24-OCT-18
Phenanthrene			<0.000050		mg/L		0.00005	24-OCT-18
Pyrene			<0.000010		mg/L		0.00001	24-OCT-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP Water								
Batch R4301427								
WG2907471-1 MB								
Quinoline			<0.000020		mg/L		0.00002	24-OCT-18
Surrogate: Acenaphthene d10			116.2		%		40-130	24-OCT-18
Surrogate: Acridine d9			106.4		%		40-130	24-OCT-18
Surrogate: Chrysene d12			111.1		%		40-130	24-OCT-18
Surrogate: Naphthalene d8			111.2		%		40-130	24-OCT-18
Surrogate: Phenanthrene d10			106.1		%		40-130	24-OCT-18
PH-WP Water								
Batch R4277661								
WG2903515-20 DUP		L2180094-1						
pH		7.06	7.03	J	pH units	0.03	0.2	12-OCT-18
WG2903515-17 LCS								
pH			7.38		pH units		7.3-7.5	12-OCT-18
PHENOLS-4AAP-WT Water								
Batch R4295099								
WG2911684-11 DUP		L2180094-1						
Phenols (4AAP)		0.0089	0.0073		mg/L	19	20	24-OCT-18
WG2911684-10 LCS								
Phenols (4AAP)			92.5		%		85-115	23-OCT-18
WG2911684-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	23-OCT-18
WG2911684-12 MS		L2180094-1						
Phenols (4AAP)			81.3		%		75-125	24-OCT-18
SO4-IC-N-WP Water								
Batch R4278708								
WG2902239-10 LCS								
Sulfate (SO4)			99.9		%		90-110	12-OCT-18
WG2902239-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	12-OCT-18
SOLIDS-TOTSUS-WP Water								
Batch R4288494								
WG2906876-41 DUP		L2180094-1						
Total Suspended Solids		54.7	55.9		mg/L	2.2	20	18-OCT-18
WG2906876-40 LCS								
Total Suspended Solids			111.0		%		85-115	18-OCT-18
WG2906876-39 MB								
Total Suspended Solids			<2.0		mg/L		2	18-OCT-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TC,EC-QT97-WP	Water							
Batch	R4277718							
WG2902305-3 MB								
Total Coliforms			<1		MPN/100mL		1	12-OCT-18
Escherichia Coli			<1		MPN/100mL		1	12-OCT-18

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	11-OCT-18 11:00	12-OCT-18 12:00	0.25	25	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2180094 were received on 12-OCT-18 11:55.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

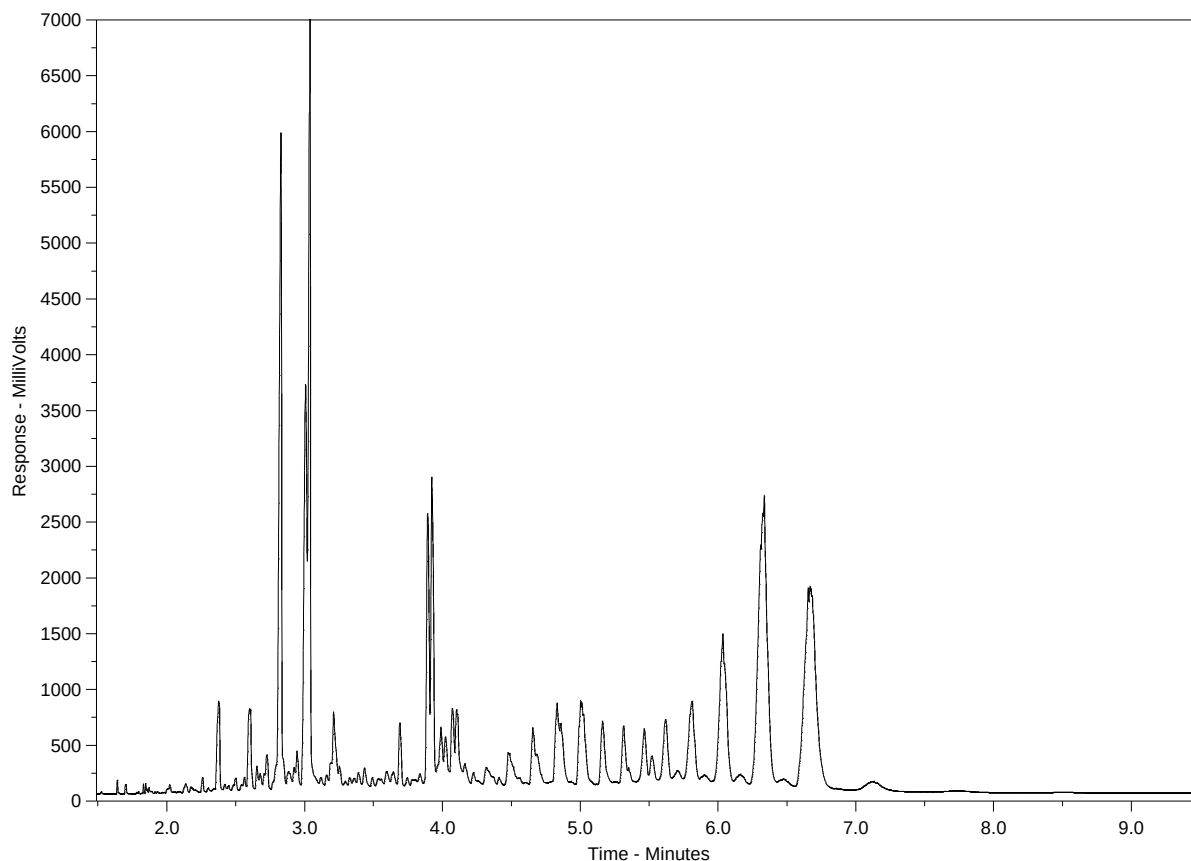
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2180094-1
 Client Sample ID: RANKIN INLET WWTP - EFFLUENT



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.



L2180094-COFC

COC # _____

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Report To				Service Requested (Rush for routine analysis subject to availability)																	
Company: Nunavut CGS - Rankin Inlet (W8133)				☒ Standard ☐ Other				☒ Regular (Standard Turnaround Times - Business Days)													
Contact: SIMON DOIRON				☒ PDF ☐ Excel ☐ Digital ☐ Fax				☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT													
Address: Box 490				Email 1: sdoiron@gov.nu.ca				☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT													
Rankin Inlet, NU, X0C 0G0				Email 2: mlusty@gov.nu.ca				☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT													
Phone: 867-645-8155 Cell#: _____				Email 3: _____				Analysis Request													
Invoice To Same as Report? ☒ Yes ☐ No				Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)													
Hardcopy of Invoice with Report? ☐ Yes ☐ No				Job #: Rankin Inlet WWTP- Monthly Effluent																	
Company: _____				PO / AFE: _____																	
Contact: _____				LSD: _____																	
Address: _____				Quote #: _____																	
Phone: _____ Fax: _____																					
Lab Work Order # _____ (lab use only)				ALS Contact: Craig Riddell				Sampled By: Simon Doiron													
Sample #		Sample Identification (This description will appear on the report)		Date Sampled		Time Sampled		Sample Type							Number of Containers						
		Rankin Inlet WWTP - Effluent						Waste													
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details Nunavut-WW-GRP1-WP pkg includes 1 L BOD/CBOD, 1 L Routine, 250 ml Metals, 40 ml Mercury Vial, 250 ml Amber Nutrient, 250 ml Amber Phenols, 2 x 250 ml Amber Oil & Grease, 250 ml Bacteria (9 bottles) + 5 Vials for BTX,F1-F4 and 1 L Amber for PAH's = Total of 15 Bottles per sample. Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab. Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.																					
SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)													
Released by: W. Ross		Date (dd-mm-yy): Oct 11/18		Time (hh-mm): 9:00am		Received by: MH		Date: 12-10-18		Time: 11:55		Temperature: 5.3 °C		Verified by: _____		Date: _____		Time: _____		Observations: Yes / No? If Yes add SIF	



Nunavut Community & Government
Services - Rankin Inlet
ATTN: SIMON DOIRON
P.O. Box 490
Rankin Inlet NU X0C 0G0

Date Received: 07-NOV-18
Report Date: 23-NOV-18 15:21 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2193330

Project P.O. #: NOT SUBMITTED

Job Reference: RANKIN INLET TTWP - MONTHLY EFFLUENT

C of C Numbers:

Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2193330-1 RANKIN INLET WWTP - EFFLUENT Sampled By: SIMON DOIRON on 05-NOV-18 @ 13:00 Matrix: WASTE BTEX plus F1-F4 BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		08-NOV-18	R4329433
Toluene	0.0075		0.0010	mg/L		08-NOV-18	R4329433
Ethyl benzene	<0.00050		0.00050	mg/L		08-NOV-18	R4329433
o-Xylene	<0.00050		0.00050	mg/L		08-NOV-18	R4329433
m+p-Xylenes	<0.00040		0.00040	mg/L		08-NOV-18	R4329433
F1 (C6-C10)	<0.10		0.10	mg/L		08-NOV-18	R4329433
Surrogate: 4-Bromofluorobenzene (SS)	97.7		70-130	%		08-NOV-18	R4329433
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.10		0.10	mg/L	09-NOV-18	09-NOV-18	R4328588
F3 (C16-C34)	<0.25		0.25	mg/L	09-NOV-18	09-NOV-18	R4328588
F4 (C34-C50)	<0.25		0.25	mg/L	09-NOV-18	09-NOV-18	R4328588
Surrogate: 2-Bromobenzotrifluoride	94.3		60-140	%	09-NOV-18	09-NOV-18	R4328588
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		21-NOV-18	
F2-Naphth	<0.10		0.10	mg/L		21-NOV-18	
F3-PAH	<0.25		0.25	mg/L		21-NOV-18	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		21-NOV-18	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		14-NOV-18	
Miscellaneous Parameters							
Fluoride (F)	0.099		0.020	mg/L		07-NOV-18	R4326114
Total and E. coli, 1:10 dilution by QT97							
Total Coliforms	>24200	PEHT	10	MPN/100mL		07-NOV-18	R4326127
Escherichia Coli	>24200	PEHT	10	MPN/100mL		07-NOV-18	R4326127
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000201		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
2-Methyl Naphthalene	0.000253		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Acenaphthene	0.000045		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Acenaphthylene	<0.000020		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Anthracene	0.000022	EMPC	0.000010	mg/L	19-NOV-18	20-NOV-18	R4347750
Acridine	0.000050		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Benzo(a)anthracene	0.000036		0.000010	mg/L	19-NOV-18	20-NOV-18	R4347750
Benzo(a)pyrene	0.0000058	EMPC	0.0000050	mg/L	19-NOV-18	20-NOV-18	R4347750
Benzo(b&j)fluoranthene	0.000033	EMPC	0.000010	mg/L	19-NOV-18	20-NOV-18	R4347750
Benzo(g,h,i)perylene	0.000214		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	19-NOV-18	20-NOV-18	R4347750
Chrysene	0.000049		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Dibenzo(a,h)anthracene	0.000224		0.0000050	mg/L	19-NOV-18	20-NOV-18	R4347750
Fluoranthene	0.000125	EMPC	0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Fluorene	0.000177	EMPC	0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
Indeno(1,2,3-cd)pyrene	0.00217		0.000010	mg/L	19-NOV-18	20-NOV-18	R4347750
Naphthalene	0.000146	EMPC	0.000050	mg/L	19-NOV-18	20-NOV-18	R4347750
Phenanthrene	0.000204	EMPC	0.000050	mg/L	19-NOV-18	20-NOV-18	R4347750
Pyrene	0.000113	EMPC	0.000010	mg/L	19-NOV-18	20-NOV-18	R4347750
Quinoline	<0.000020		0.000020	mg/L	19-NOV-18	20-NOV-18	R4347750
B(a)P Total Potency Equivalent	0.000457		0.000030	mg/L	19-NOV-18	20-NOV-18	R4347750
Surrogate: Acenaphthene d10	126.5		40-130	%	19-NOV-18	20-NOV-18	R4347750
Surrogate: Acridine d9	129.9		40-130	%	19-NOV-18	20-NOV-18	R4347750
Surrogate: Chrysene d12	86.1		40-130	%	19-NOV-18	20-NOV-18	R4347750
Surrogate: Naphthalene d8	360.6	SOL:MI	40-130	%	19-NOV-18	20-NOV-18	R4347750
Surrogate: Phenanthrene d10	129.7		40-130	%	19-NOV-18	20-NOV-18	R4347750

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2193330-1 RANKIN INLET WWTP - EFFLUENT Sampled By: SIMON DOIRON on 05-NOV-18 @ 13:00 Matrix: WASTE Nunavut WW Group 1							
Alkalinity, Bicarbonate Bicarbonate (HCO3)	171		1.2	mg/L		08-NOV-18	
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		08-NOV-18	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		08-NOV-18	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	141		1.0	mg/L		07-NOV-18	R4325795
Ammonia by colour Ammonia, Total (as N)	38.6		2.0	mg/L		09-NOV-18	R4328686
Biochemical Oxygen Demand (BOD) Biochemical Oxygen Demand	1490		300	mg/L		07-NOV-18	R4329653
Carbonaceous BOD BOD Carbonaceous	1460		300	mg/L		07-NOV-18	R4329653
Chloride in Water by IC Chloride (Cl)	55.4		0.50	mg/L		07-NOV-18	R4326114
Conductivity Conductivity	570		1.0	umhos/cm		07-NOV-18	R4325795
Fecal coliforms, 1:10 dilution by QT97 Fecal Coliforms	>24200	PEHT	10	MPN/100mL		07-NOV-18	R4326115
Hardness Calculated Hardness (as CaCO3)	113	HTC	0.20	mg/L		23-NOV-18	
Mercury Total Mercury (Hg)-Total	0.000075	DLM	0.000025	mg/L	07-NOV-18	08-NOV-18	R4328079
Nitrate in Water by IC Nitrate (as N)	0.059		0.020	mg/L		07-NOV-18	R4326114
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		08-NOV-18	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		07-NOV-18	R4326114
Oil & Grease - Gravimetric Oil and Grease	78.0		5.0	mg/L		15-NOV-18	R4335647
Phenol (4AAP) Phenols (4AAP)	0.0844		0.0010	mg/L		16-NOV-18	R4342896
Phosphorus, Total Phosphorus (P)-Total	2.23		0.010	mg/L		08-NOV-18	R4327545
Sulfate in Water by IC Sulfate (SO4)	23.5		0.30	mg/L		07-NOV-18	R4326114
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.676		0.0030	mg/L	20-NOV-18	22-NOV-18	R4355740
Antimony (Sb)-Total	0.00102		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Arsenic (As)-Total	0.0248		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Barium (Ba)-Total	0.0454		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Bismuth (Bi)-Total	0.0114		0.000050	mg/L	20-NOV-18	22-NOV-18	R4355740
Boron (B)-Total	0.087		0.010	mg/L	20-NOV-18	22-NOV-18	R4355740
Cadmium (Cd)-Total	0.000596		0.0000050	mg/L	20-NOV-18	22-NOV-18	R4355740
Calcium (Ca)-Total	31.6		0.050	mg/L	20-NOV-18	22-NOV-18	R4355740
Cesium (Cs)-Total	0.000163		0.000010	mg/L	20-NOV-18	22-NOV-18	R4355740
Chromium (Cr)-Total	0.00416		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Cobalt (Co)-Total	0.00075		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Copper (Cu)-Total	0.346		0.00050	mg/L	20-NOV-18	22-NOV-18	R4355740

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2193330-1 RANKIN INLET WWTP - EFFLUENT Sampled By: SIMON DOIRON on 05-NOV-18 @ 13:00 Matrix: WASTE							
Total Metals in Water by CRC ICPMS							
Iron (Fe)-Total	1.01		0.010	mg/L	20-NOV-18	22-NOV-18	R4355740
Lead (Pb)-Total	0.00452		0.000050	mg/L	20-NOV-18	22-NOV-18	R4355740
Lithium (Li)-Total	0.0033		0.0010	mg/L	20-NOV-18	22-NOV-18	R4355740
Magnesium (Mg)-Total	8.26		0.0050	mg/L	20-NOV-18	22-NOV-18	R4355740
Manganese (Mn)-Total	0.0903		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Molybdenum (Mo)-Total	0.00233		0.000050	mg/L	20-NOV-18	22-NOV-18	R4355740
Nickel (Ni)-Total	0.00658		0.00050	mg/L	20-NOV-18	22-NOV-18	R4355740
Potassium (K)-Total	23.3		0.050	mg/L	20-NOV-18	22-NOV-18	R4355740
Phosphorus (P)-Total	15.1		0.030	mg/L	20-NOV-18	22-NOV-18	R4355740
Rubidium (Rb)-Total	0.0250		0.00020	mg/L	20-NOV-18	22-NOV-18	R4355740
Selenium (Se)-Total	0.00154		0.000050	mg/L	20-NOV-18	22-NOV-18	R4355740
Silicon (Si)-Total	0.94		0.10	mg/L	20-NOV-18	22-NOV-18	R4355740
Silver (Ag)-Total	0.000144		0.000010	mg/L	20-NOV-18	22-NOV-18	R4355740
Sodium (Na)-Total	50.0		0.050	mg/L	20-NOV-18	22-NOV-18	R4355740
Strontium (Sr)-Total	0.111		0.00020	mg/L	20-NOV-18	22-NOV-18	R4355740
Sulfur (S)-Total	13.6		0.50	mg/L	20-NOV-18	22-NOV-18	R4355740
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	20-NOV-18	22-NOV-18	R4355740
Thallium (Tl)-Total	0.000018		0.000010	mg/L	20-NOV-18	22-NOV-18	R4355740
Thorium (Th)-Total	<0.00010		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Tin (Sn)-Total	0.00371		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Titanium (Ti)-Total	0.00583		0.00030	mg/L	20-NOV-18	22-NOV-18	R4355740
Tungsten (W)-Total	0.00014		0.00010	mg/L	20-NOV-18	22-NOV-18	R4355740
Uranium (U)-Total	0.000217		0.000010	mg/L	20-NOV-18	22-NOV-18	R4355740
Vanadium (V)-Total	0.00146		0.00050	mg/L	20-NOV-18	22-NOV-18	R4355740
Zinc (Zn)-Total	0.316		0.0030	mg/L	20-NOV-18	22-NOV-18	R4355740
Zirconium (Zr)-Total	0.000884		0.000060	mg/L	20-NOV-18	22-NOV-18	R4355740
Total Organic Carbon by Combustion							
Total Organic Carbon	1670		50	mg/L		14-NOV-18	R4337151
Total Suspended Solids							
Total Suspended Solids	765		10	mg/L		09-NOV-18	R4329528
pH							
pH	6.69		0.10	pH units		07-NOV-18	R4325795

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
EMPC	Estimated Maximum Possible Concentration. Parameter detected but didn't meet all criteria for positive identification.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-CO3CO3-CALC-WP	Water	Alkalinity, Carbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO3 2-/L.			
ALK-HCO3HCO3-CALC-WP	Water	Alkalinity, Bicarbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO3-/L			
ALK-OHOH-CALC-WP	Water	Alkalinity, Hydroxide	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.			
ALK-TITR-WP	Water	Alkalinity, Total (as CaCO3)	APHA 2320B
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO3- and H2CO3 endpoints indicated electrometrically.			
BOD-CBOD-WP	Water	Carbonaceous BOD	APHA 5210 B
Samples are diluted and seeded, have TCMP added to inhibit nitrogenous demands, and then are incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.			
BOD-WP	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B
Samples are diluted and seeded and then incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.			
BTEXS+F1-HSMS-WP	Water	BTX plus F1 by GCMS	EPA 8260C / EPA 5021A
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-SCREEN-WP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other test eg. IC, TDS, TSS, etc			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
F-IC-N-WP	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons. In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1. In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3. Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range: 1. All extraction and analysis holding times were met. 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene. 3. Linearity of gasoline response within 15% throughout the calibration range. Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges: 1. All extraction and analysis holding times were met. 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average. 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors. 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.			
F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511
Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.			
FC10-QT97-WP	Water	Fecal coliforms, 1:10 dilution by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Fecal (thermotolerant) coliform bacteria are determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 44.5 – 0.2°C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.			
HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-T-CVAA-WP	Water	Mercury Total	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.			
MET-T-CCMS-WP	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod.)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F
Ammonia in water samples forms indophenol when reacted with hypochlorite and phenol. The intensity is amplified by the addition of sodium nitroprusside and measured colourmetrically.			
NO2+NO3-CALC-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
OG-GRAV-WP	Water	Oil & Grease - Gravimetric	EPA 1664 (modified)
Water samples are acidified and extracted with hexane; the hexane extract is collected in a pre-weighed vial. The solvent is evaporated and Total Oil & Grease is determined from the weight of the residue in the vial.			
P-T-L-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorous is determined colourimetrically after persulphate digestion of the sample.			
PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA SW 846/8270-GC/MS
Water is spiked with a surrogate spike mix and extracted using solvent extraction techniques. Analysis is performed by GC/MS in the selected ion monitoring (SIM) mode.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PH-WP	Water	pH	APHA 4500H
The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.			
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.			
SO4-IC-N-WP	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended solids in aqueous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC10-QT97-WP	Water	Total and E. coli, 1:10 dilution by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 35.0 – 0.5°C for 18 or 24 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.			
XYLENES-SUM-CALC-WP	Water	Sum of Xylene Isomer Concentrations	CALCULATED RESULT
Total xylenes represents the sum of o-xylene and m&p-xylene.			

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

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

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

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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

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

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

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

Quality Control Report

Workorder: L2193330

Report Date: 23-NOV-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	Water							
Batch	R4337151							
WG2931197-2	LCS							
Total Organic Carbon			96.4		%		80-120	14-NOV-18
WG2931197-1	MB							
Total Organic Carbon			<0.50		mg/L		0.5	14-NOV-18
CL-IC-N-WP	Water							
Batch	R4326114							
WG2925529-2	LCS							
Chloride (Cl)			101.2		%		90-110	07-NOV-18
WG2925529-1	MB							
Chloride (Cl)			<0.50		mg/L		0.5	07-NOV-18
EC-WP	Water							
Batch	R4325795							
WG2926012-18	LCS							
Conductivity			99.8		%		90-110	07-NOV-18
WG2926012-16	MB							
Conductivity			<1.0		umhos/cm		1	07-NOV-18
F-IC-N-WP	Water							
Batch	R4326114							
WG2925529-2	LCS							
Fluoride (F)			100.8		%		90-110	07-NOV-18
WG2925529-1	MB							
Fluoride (F)			<0.020		mg/L		0.02	07-NOV-18
F2-F4-FID-WP	Water							
Batch	R4328588							
WG2927240-2	LCS							
F2 (C10-C16)			114.1		%		70-130	09-NOV-18
F3 (C16-C34)			115.1		%		70-130	09-NOV-18
F4 (C34-C50)			101.0		%		70-130	09-NOV-18
WG2927240-1	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	09-NOV-18
F3 (C16-C34)			<0.25		mg/L		0.25	09-NOV-18
F4 (C34-C50)			<0.25		mg/L		0.25	09-NOV-18
Surrogate: 2-Bromobenzotrifluoride			97.2		%		60-140	09-NOV-18
FC10-QT97-WP	Water							

Quality Control Report

Workorder: L2193330

Report Date: 23-NOV-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC10-QT97-WP	Water							
Batch R4326115								
WG2925349-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	07-NOV-18
HG-T-CVAA-WP	Water							
Batch R4328079								
WG2927391-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	08-NOV-18
WG2927391-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	08-NOV-18
MET-T-CCMS-WP	Water							
Batch R4355740								
WG2934422-2 LCS								
Aluminum (Al)-Total			103.4		%		80-120	22-NOV-18
Antimony (Sb)-Total			103.4		%		80-120	22-NOV-18
Arsenic (As)-Total			103.9		%		80-120	22-NOV-18
Barium (Ba)-Total			104.4		%		80-120	22-NOV-18
Beryllium (Be)-Total			107.1		%		80-120	22-NOV-18
Bismuth (Bi)-Total			101.3		%		80-120	22-NOV-18
Boron (B)-Total			99.6		%		80-120	22-NOV-18
Cadmium (Cd)-Total			104.3		%		80-120	22-NOV-18
Calcium (Ca)-Total			102.4		%		80-120	22-NOV-18
Cesium (Cs)-Total			102.0		%		80-120	22-NOV-18
Chromium (Cr)-Total			104.0		%		80-120	22-NOV-18
Cobalt (Co)-Total			102.6		%		80-120	22-NOV-18
Copper (Cu)-Total			104.9		%		80-120	22-NOV-18
Iron (Fe)-Total			96.0		%		80-120	22-NOV-18
Lead (Pb)-Total			101.5		%		80-120	22-NOV-18
Lithium (Li)-Total			105.6		%		80-120	22-NOV-18
Magnesium (Mg)-Total			114.6		%		80-120	22-NOV-18
Manganese (Mn)-Total			103.1		%		80-120	22-NOV-18
Molybdenum (Mo)-Total			103.9		%		80-120	22-NOV-18
Nickel (Ni)-Total			102.3		%		80-120	22-NOV-18
Potassium (K)-Total			96.6		%		80-120	22-NOV-18
Phosphorus (P)-Total			110.7		%		80-120	22-NOV-18
Rubidium (Rb)-Total			103.3		%		80-120	22-NOV-18
Selenium (Se)-Total			104.5		%		80-120	22-NOV-18

Quality Control Report

Workorder: L2193330

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4355740							
WG2934422-2	LCS							
Silicon (Si)-Total			103.8		%		80-120	22-NOV-18
Silver (Ag)-Total			102.2		%		80-120	22-NOV-18
Sodium (Na)-Total			105.2		%		80-120	22-NOV-18
Strontium (Sr)-Total			102.2		%		80-120	22-NOV-18
Sulfur (S)-Total			109.0		%		80-120	22-NOV-18
Tellurium (Te)-Total			97.8		%		80-120	22-NOV-18
Thallium (Tl)-Total			102.1		%		80-120	22-NOV-18
Thorium (Th)-Total			98.5		%		80-120	22-NOV-18
Tin (Sn)-Total			101.9		%		80-120	22-NOV-18
Titanium (Ti)-Total			100.7		%		80-120	22-NOV-18
Tungsten (W)-Total			103.6		%		80-120	22-NOV-18
Uranium (U)-Total			107.2		%		80-120	22-NOV-18
Vanadium (V)-Total			104.3		%		80-120	22-NOV-18
Zinc (Zn)-Total			105.8		%		80-120	22-NOV-18
Zirconium (Zr)-Total			101.7		%		80-120	22-NOV-18
WG2934422-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	22-NOV-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	22-NOV-18
Boron (B)-Total			<0.010		mg/L		0.01	22-NOV-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	22-NOV-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	22-NOV-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	22-NOV-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	22-NOV-18
Iron (Fe)-Total			<0.010		mg/L		0.01	22-NOV-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	22-NOV-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	22-NOV-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	22-NOV-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	22-NOV-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4355740							
WG2934422-1 MB								
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	22-NOV-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	22-NOV-18
Potassium (K)-Total			<0.050		mg/L		0.05	22-NOV-18
Phosphorus (P)-Total			<0.030		mg/L		0.03	22-NOV-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	22-NOV-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	22-NOV-18
Silicon (Si)-Total			<0.10		mg/L		0.1	22-NOV-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	22-NOV-18
Sodium (Na)-Total			<0.050		mg/L		0.05	22-NOV-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	22-NOV-18
Sulfur (S)-Total			<0.50		mg/L		0.5	22-NOV-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	22-NOV-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	22-NOV-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	22-NOV-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	22-NOV-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	22-NOV-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	22-NOV-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	22-NOV-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	22-NOV-18
NH3-COL-WP		Water						
Batch	R4328686							
WG2928059-2 LCS								
Ammonia, Total (as N)			101.5		%		85-115	09-NOV-18
WG2928059-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	09-NOV-18
NO2-IC-N-WP		Water						
Batch	R4326114							
WG2925529-2 LCS								
Nitrite (as N)			100.8		%		90-110	07-NOV-18
WG2925529-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	07-NOV-18
NO3-IC-N-WP		Water						

Quality Control Report

Workorder: L2193330

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP		Water						
Batch	R4326114							
WG2925529-2	LCS							
Nitrate (as N)			101.2		%		90-110	07-NOV-18
WG2925529-1	MB							
Nitrate (as N)			<0.020		mg/L		0.02	07-NOV-18
OG-GRAV-WP		Water						
Batch	R4335647							
WG2929562-2	LCS							
Oil and Grease			93.6		%		70-130	15-NOV-18
WG2929562-1	MB							
Oil and Grease			<5.0		mg/L		5	15-NOV-18
P-T-L-COL-WP		Water						
Batch	R4327545							
WG2926011-6	LCS							
Phosphorus (P)-Total			93.3		%		80-120	08-NOV-18
WG2926011-5	MB							
Phosphorus (P)-Total			<0.0010		mg/L		0.001	08-NOV-18
PAH,PANH-WP		Water						
Batch	R4347750							
WG2931692-2	LCS							
1-Methyl Naphthalene			102.7		%		60-130	20-NOV-18
2-Methyl Naphthalene			97.4		%		60-130	20-NOV-18
Acenaphthene			92.6		%		60-130	20-NOV-18
Acenaphthylene			92.4		%		60-130	20-NOV-18
Anthracene			77.1		%		60-130	20-NOV-18
Acridine			81.2		%		60-130	20-NOV-18
Benzo(a)anthracene			85.1		%		60-130	20-NOV-18
Benzo(a)pyrene			84.0		%		60-130	20-NOV-18
Benzo(b&j)fluoranthene			90.2		%		60-130	20-NOV-18
Benzo(g,h,i)perylene			93.7		%		60-130	20-NOV-18
Benzo(k)fluoranthene			84.0		%		60-130	20-NOV-18
Chrysene			98.6		%		60-130	20-NOV-18
Dibenzo(a,h)anthracene			102.9		%		60-130	20-NOV-18
Fluoranthene			102.9		%		60-130	20-NOV-18
Fluorene			91.6		%		60-130	20-NOV-18
Indeno(1,2,3-cd)pyrene			90.6		%		60-130	20-NOV-18
Naphthalene			90.3		%		50-130	20-NOV-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4347750							
WG2931692-2		LCS						
Phenanthrene			97.3		%		60-130	20-NOV-18
Pyrene			99.3		%		60-130	20-NOV-18
Quinoline			118.8		%		60-130	20-NOV-18
WG2931692-1		MB						
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	20-NOV-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	20-NOV-18
Acenaphthene			<0.000020		mg/L		0.00002	20-NOV-18
Acenaphthylene			<0.000020		mg/L		0.00002	20-NOV-18
Anthracene			<0.000010		mg/L		0.00001	20-NOV-18
Acridine			<0.000020		mg/L		0.00002	20-NOV-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	20-NOV-18
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	20-NOV-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	20-NOV-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	20-NOV-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	20-NOV-18
Chrysene			<0.000020		mg/L		0.00002	20-NOV-18
Dibenzo(a,h)anthracene			<0.0000050		mg/L		0.000005	20-NOV-18
Fluoranthene			<0.000020		mg/L		0.00002	20-NOV-18
Fluorene			<0.000020		mg/L		0.00002	20-NOV-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	20-NOV-18
Naphthalene			<0.000050		mg/L		0.00005	20-NOV-18
Phenanthrene			<0.000050		mg/L		0.00005	20-NOV-18
Pyrene			<0.000010		mg/L		0.00001	20-NOV-18
Quinoline			<0.000020		mg/L		0.00002	20-NOV-18
Surrogate: Acenaphthene d10			117.5		%		40-130	20-NOV-18
Surrogate: Acridine d9			108.8		%		40-130	20-NOV-18
Surrogate: Chrysene d12			117.1		%		40-130	20-NOV-18
Surrogate: Naphthalene d8			111.0		%		40-130	20-NOV-18
Surrogate: Phenanthrene d10			110.2		%		40-130	20-NOV-18
PH-WP		Water						
Batch	R4325795							
WG2926012-17		LCS						
pH			7.42		pH units		7.3-7.5	07-NOV-18
PHENOLS-4AAP-WT		Water						

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-WT								
Batch R4342896								
WG2932377-22 LCS								
Phenols (4AAP)			98.5		%		85-115	16-NOV-18
WG2932377-21 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	16-NOV-18
SO4-IC-N-WP								
Batch R4326114								
WG2925529-2 LCS								
Sulfate (SO4)			102.7		%		90-110	07-NOV-18
WG2925529-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	07-NOV-18
SOLIDS-TOTSUS-WP								
Batch R4329528								
WG2927005-6 LCS								
Total Suspended Solids			102.0		%		85-115	09-NOV-18
WG2927005-5 MB								
Total Suspended Solids			<2.0		mg/L		2	09-NOV-18
TC,EC10-QT97-WP								
Batch R4326127								
WG2925353-1 MB								
Total Coliforms			<1		MPN/100mL		1	07-NOV-18
Escherichia Coli			<1		MPN/100mL		1	07-NOV-18

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Quality Control Report

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	05-NOV-18 13:00	07-NOV-18 12:00	0.25	47	hours	EHTR-FM
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97	1	05-NOV-18 13:00	07-NOV-18 15:50	30	51	hours	EHTR
Total and E. coli, 1:10 dilution by QT97	1	05-NOV-18 13:00	07-NOV-18 15:50	30	51	hours	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2193330 were received on 07-NOV-18 23:45.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

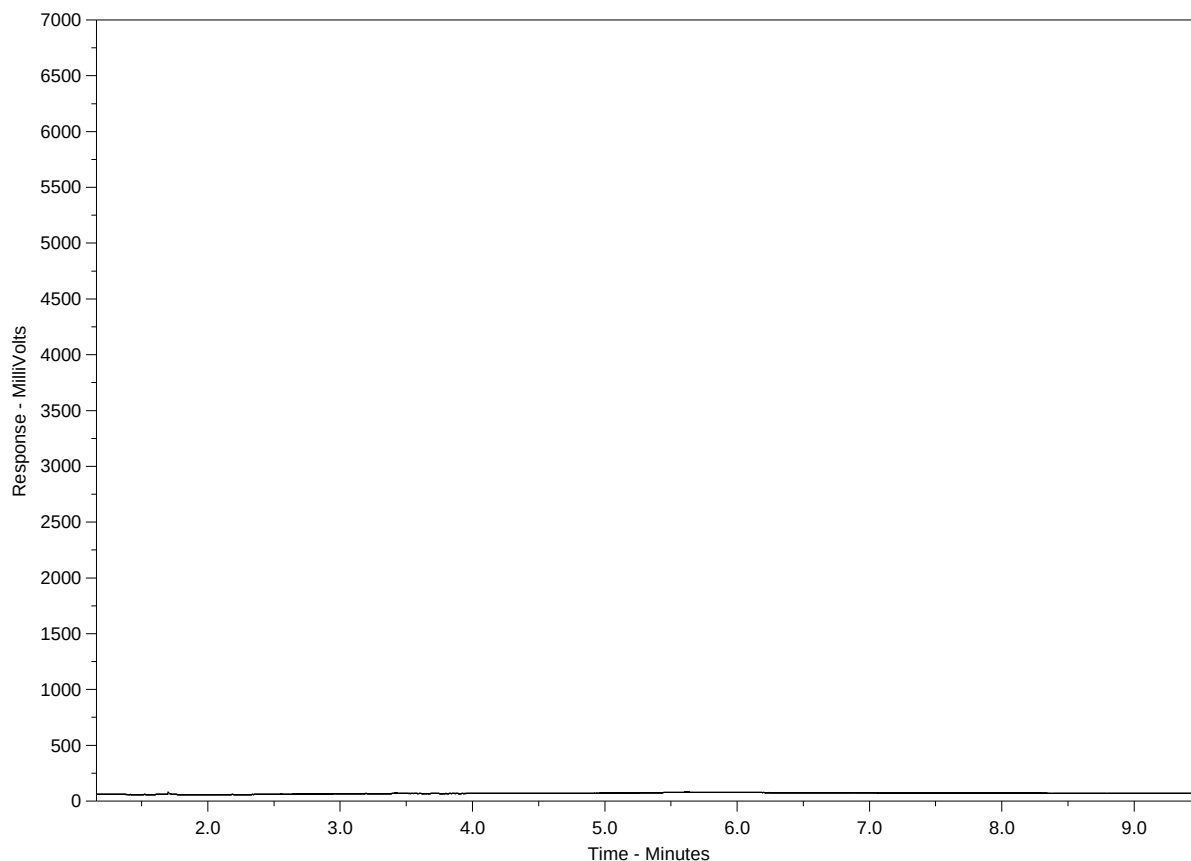
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2193330-1
 Client Sample ID: RANKIN INLET WWTP - EFFLUENT



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.



L2193330-COFC

COC # L2193330

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Report To		Rep.		Service Requested (Rush for routine analysis subject to availability)																	
Company: Nunavut CGS - Rankin Inlet (W8133)		☒ Standard ☐ Other		☒ Regular (Standard Turnaround Times - Business Days)																	
Contact: SIMON DOIRON		☒ PDF ☐ Excel ☐ Digital ☐ Fax		☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																	
Address: Box 490		Email 1: sdoiron@gov.nu.ca		☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT																	
Rankin Inlet, NU, X0C 0G0		Email 2: mlfusty@gov.nu.ca		☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT																	
Phone: 867-645-8155 Cell#:		Email 3:		Analysis Request																	
Invoice To Same as Report? ☒ Yes ☐ No		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)																	
Hardcopy of Invoice with Report? ☐ Yes ☐ No		Job #: Rankin Inlet WWTP- Monthly Effluent																			
Company:		PO / AFE:																			
Contact:		LSD:																			
Address:		Quote #:																			
Phone: Fax:		ALS Contact: Craig Riddell		Sampled By: Simon Doiron																	
Lab Work Order # (lab use only)																					
Sample #		Sample Identification (This description will appear on the report)		Date Sampled		Time Sampled		Sample Type		Number of Containers											
		Rankin Inlet WWTP - Effluent		Nov 5/18		1:00 pm		Waste		15											
		**NOTE TO LOGIN - remove metals Reporting Code WP-NUNAVUT-WW-GRP1																			
		So all ICP-MS metals report.																			
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details																					
Nunavut-WW-GRP1-WP pkg includes 1 L BOD/CBOD, 1 L Routine, 250 ml Metals, 40 ml Mercury Vial, 250 ml Amber Nutrient, 250 ml Amber Phenols, 2 x 250 ml Amber Oil & Grease, 250 ml Bacteria (9 bottles) + 5 Vials for BTX,F1-F4 and 1 L Amber for PAH's = Total of 15 Bottles per sample.																					
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																					
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.																					
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.																					
SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)													
Released by:		Date (dd-mm-yy)		Time (hh-mm)		Received by:		Date:		Time:		Temperature:		Verified by:		Date:		Time:		Observations:	
Bill Ross		Nov 05/18		1:00 pm		SD		Nov 07/18		11:45		7.4 °C								Yes / No ? If Yes add SIF	

GENF 18 01 Front

**2018 FOURTH QUARTER REPORT
FOR GN-CGS RANKIN INLET**

Appendix B: Daily Record of Nipissar Lake Volumes GRA-1



Raw Water Supply From Nipissar Lake

Water Licence No. 3AM-GRA1624

GRA-1

Date	Volume (m ³)	Daily Volume (m ³)	Total Volume (m ³)	Total Monthly Volume (m ³)
01-Oct-18	3,617,025.00	2027.00	594344.05	
02-Oct-18	3,618,420.00	1395.00	595739.05	
03-Oct-18				
04-Oct-18	3,621,565.00	3145.00	598884.05	
05-Oct-18	3,623,263.00	1698.00	600582.05	
06-Oct-18	3,624,726.69	1463.69	602045.74	
07-Oct-18	3,626,469.20	1742.51	603788.25	
08-Oct-18	3,628,070.87	1601.67	605389.92	
09-Oct-18				
10-Oct-18	3,631,490.00	3419.13	608809.05	
11-Oct-18	3,633,196.00	1706.00	610515.05	
12-Oct-18	3,634,926.00	1730.00	612245.05	
13-Oct-18	3,636,743.00	1817.00	614062.05	
14-Oct-18	3,638,505.00	1762.00	615824.05	
15-Oct-18	3,640,378.54	1873.54	617697.59	
16-Oct-18	3,642,185.00	1806.46	619504.05	
17-Oct-18	3,643,927.00	1742.00	621246.05	
18-Oct-18	3,645,751.00	1824.00	623070.05	
19-Oct-18	3,647,773.00	2022.00	625092.05	
20-Oct-18	3,649,453.00	1680.00	626772.05	
21-Oct-18	3,651,250.00	1797.00	628569.05	
22-Oct-18	3,652,952.00	1702.00	630271.05	
23-Oct-18	3,655,141.00	2189.00	632460.05	
24-Oct-18	3,656,681.00	1540.00	634000.05	
25-Oct-18				
26-Oct-18	3,660,411.00	3730.00	637730.05	
27-Oct-18	3,661,992.00	1581.00	639311.05	
28-Oct-18	3,663,901.00	1909.00	641220.05	
29-Oct-18	3,665,820.00	1919.00	643139.05	
30-Oct-18	3,667,521.00	1701.00	644840.05	
31-Oct-18	3,669,336.00	1815.00	646655.05	54,338.00
01-Nov-18	3,671,185.00	1849.00	648504.05	
02-Nov-18	3,672,950.00	1765.00	650269.05	
03-Nov-18	3,674,741.16	1791.16	652060.21	
04-Nov-18				
05-Nov-18	3,678,663.00	3921.84	655982.05	
06-Nov-18	3,680,522.00	1859.00	657841.05	
07-Nov-18	3,682,383.00	1861.00	659702.05	
08-Nov-18	3,684,267.00	1884.00	661586.05	
09-Nov-18				
10-Nov-18	3,688,058.00	3791.00	665377.05	
11-Nov-18	3,689,927.00	1869.00	667246.05	
12-Nov-18	3,691,608.00	1681.00	668927.05	
13-Nov-18				
14-Nov-18				
15-Nov-18				
16-Nov-18				
17-Nov-18				
18-Nov-18				
19-Nov-18				
20-Nov-18	3,707,381.00	15773.00	684700.05	
21-Nov-18	3,709,067.00	1686.00	686386.05	
22-Nov-18	3,711,087.00	2020.00	688406.05	
23-Nov-18	3,712,979.00	1892.00	690298.05	
24-Nov-18	3,715,105.00	2126.00	692424.05	
25-Nov-18	3,717,019.00	1914.00	694338.05	
26-Nov-18	3,718,938.00	1919.00	696257.05	
27-Nov-18				
28-Nov-18				
29-Nov-18	3,724,981.00	6043.00	702300.05	
30-Nov-18	3,726,795.00	1814.00	704114.05	57,459.00
01-Dec-18	3,727,727.00	932.00	705046.05	
02-Dec-18	3,730,605.00	2878.00	707924.05	
03-Dec-18	3,732,533.00	1928.00	709852.05	
04-Dec-18				
05-Dec-18	3,736,423.00	3890.00	713742.05	
06-Dec-18	3,738,968.00	2545.00	716287.05	
07-Dec-18	3,740,528.00	1560.00	717847.05	
08-Dec-18	3,742,307.00	1779.00	719626.05	
09-Dec-18	3,744,301.00	1994.00	721620.05	
10-Dec-18	3,746,437.00	2136.00	723756.05	
11-Dec-18	3,748,332.00	1895.00	725651.05	
12-Dec-18				
13-Dec-18	3,752,314.00	3982.00	729633.05	
14-Dec-18	3,754,328.00	2014.00	731647.05	
15-Dec-18	3,756,336.00	2008.00	733655.05	
16-Dec-18	3,758,173.00	1837.00	735492.05	
17-Dec-18	3,760,340.00	2167.00	737659.05	
18-Dec-18	3,762,162.00	1822.00	739481.05	
19-Dec-18	3,764,127.00	1965.00	741446.05	
20-Dec-18	3,766,105.00	1978.00	743424.05	
21-Dec-18	3,768,065.00	1960.00	745384.05	
22-Dec-18	3,769,908.00	1843.00	747227.05	
23-Dec-18	3,771,989.00	2081.00	749308.05	
24-Dec-18	3,773,783.00	1794.00	751102.05	
25-Dec-18	3,775,782.00	1999.00	753101.05	
26-Dec-18				
27-Dec-18	3,778,125.00	2343.00	755444.05	
28-Dec-18	3,781,498.00	3373.00	758817.05	
29-Dec-18	3,783,434.00	1936.00	760753.05	
30-Dec-18	3,785,382.00	1948.00	762701.05	58,587.00
31-Dec-18				