2019 THIRD QUARTER REPORT
FOR GN-CGS RANKIN INLET

QUARTER BEING REPORTED: July - September 2019

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)
July	47,060.00	Same
August	33,412.00	Same
September	20,237.00	Same
QUARTER TOTAL	**100,709.00**	**100,709.00**

*Broken flow meters and missed readings gave caused monthly totals to become incomplete and inaccurate; most notably from August 18th to September 18th, 2019.

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)
July	4
August	4
September	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).

Below are the results for Monitoring Program Station GRA-7. There was an approximate water volume of 300,884.16 m^3 transferred from Lower Landing Lake to Nipissar Lake between July 1st and August 23rd, 2019.

Month Reported	Water Transferred From Lower Landing Lake to Nipissar (m^3)
July	188,052.60
August	112,831.56
September	None
QUARTER TOTAL	**300,884.16**

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.

Month Reported	Nipissar Lake Water Elevation (in)
July	No Reading on Record
August	No Reading on Record
September	No Reading on Record

List of Appendices

Appendix A: Certificate of Analysis, July 2, 2019 – 19 pages
Certificate of Analysis, July 8, 2019 – 18 pages
Certificate of Analysis, July 16, 2019 – 18 pages
Certificate of Analysis, July 22, 2019 – 18 pages
Certificate of Analysis, July 29, 2019 – 15 pages
Certificate of Analysis, August 6, 2019 – 18 pages
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Appendix B: Daily Record of Nipissar Lake Volumes GRA-1 – 1 page
Appendix C: Lower Landing Lake Pumping Volumes GRA-7 – 1 page

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Date Received: 04-JUL-19
Report Date: 22-JUL-19 07:20 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2304104

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - MONTHLY EFFLUENT
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2304104-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 02-JUL-19 @ 10:30							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		11-JUL-19	R4707927
Toluene	<0.0010		0.0010	mg/L		11-JUL-19	R4707927
Ethyl benzene	<0.00050		0.00050	mg/L		11-JUL-19	R4707927
o-Xylene	<0.00050		0.00050	mg/L		11-JUL-19	R4707927
m+p-Xylenes	<0.00040		0.00040	mg/L		11-JUL-19	R4707927
F1 (C6-C10)	<0.10		0.10	mg/L		11-JUL-19	R4707927
Surrogate: 4-Bromofluorobenzene (SS)	90.7		70-130	%		11-JUL-19	R4707927
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.14		0.10	mg/L	11-JUL-19	20-JUL-19	R4699009
F3 (C16-C34)	3.15		0.25	mg/L	11-JUL-19	20-JUL-19	R4699009
F4 (C34-C50)	0.72		0.25	mg/L	11-JUL-19	20-JUL-19	R4699009
Surrogate: 2-Bromobenzotrifluoride	88.7		60-140	%	11-JUL-19	20-JUL-19	R4699009
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		21-JUL-19	
F2-Naphth	0.14		0.10	mg/L		21-JUL-19	
F3-PAH	3.15		0.25	mg/L		21-JUL-19	
Total Hydrocarbons (C6-C50)	4.01		0.38	mg/L		21-JUL-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		14-JUL-19	
Miscellaneous Parameters							
Fluoride (F)	0.057		0.020	mg/L		05-JUL-19	R4698591
Total Coliform and E.coli by MPN QT97							
Total Coliforms	>2420	PEHR	1	MPN/100mL		04-JUL-19	R4694644
Escherichia Coli	>2420	PEHR	1	MPN/100mL		04-JUL-19	R4694644
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000028		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
2-Methyl Naphthalene	0.000031		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Acenaphthene	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Acenaphthylene	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Anthracene	<0.000010		0.000010	mg/L	05-JUL-19	11-JUL-19	R4708979
Acridine	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Benzo(a)anthracene	<0.000010		0.000010	mg/L	05-JUL-19	11-JUL-19	R4708979
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	05-JUL-19	11-JUL-19	R4708979
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	05-JUL-19	11-JUL-19	R4708979
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	05-JUL-19	11-JUL-19	R4708979
Chrysene	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	05-JUL-19	11-JUL-19	R4708979
Fluoranthene	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Fluorene	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	05-JUL-19	11-JUL-19	R4708979
Naphthalene	<0.000050		0.000050	mg/L	05-JUL-19	11-JUL-19	R4708979
Phenanthrene	<0.000050		0.000050	mg/L	05-JUL-19	11-JUL-19	R4708979
Pyrene	<0.000010		0.000010	mg/L	05-JUL-19	11-JUL-19	R4708979
Quinoline	<0.000020		0.000020	mg/L	05-JUL-19	11-JUL-19	R4708979
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	05-JUL-19	11-JUL-19	R4708979
Surrogate: Acenaphthene d10	91.2		60-130	%	05-JUL-19	11-JUL-19	R4708979
Surrogate: Acridine d9	91.9		60-130	%	05-JUL-19	11-JUL-19	R4708979
Surrogate: Chrysene d12	105.9		60-130	%	05-JUL-19	11-JUL-19	R4708979
Surrogate: Naphthalene d8	85.7		50-130	%	05-JUL-19	11-JUL-19	R4708979
Surrogate: Phenanthrene d10	103.4		60-130	%	05-JUL-19	11-JUL-19	R4708979

* 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
L2304104-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 02-JUL-19 @ 10:30							
Matrix: WASTE							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	59.4		1.2	mg/L		08-JUL-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		08-JUL-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		08-JUL-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	48.7		1.0	mg/L		05-JUL-19	R4696018
Ammonia by colour							
Ammonia, Total (as N)	1.92		0.10	mg/L		09-JUL-19	R4704510
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	28		20	mg/L		05-JUL-19	R4707552
Carbonaceous BOD							
BOD Carbonaceous	22.7		6.0	mg/L		05-JUL-19	R4707552
Chloride in Water by IC							
Chloride (Cl)	38.0		0.50	mg/L		05-JUL-19	R4698591
Conductivity							
Conductivity	256		1.0	umhos/cm		05-JUL-19	R4696018
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	>24200	PEHR	10	MPN/100mL		04-JUL-19	R4694636
Hardness Calculated							
Hardness (as CaCO3)	68.9	HTC	0.20	mg/L		15-JUL-19	
Mercury Total							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L	12-JUL-19	15-JUL-19	R4712816
Nitrate in Water by IC							
Nitrate (as N)	0.039		0.020	mg/L		05-JUL-19	R4698591
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		09-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-JUL-19	R4698591
Oil & Grease - Gravimetric							
Oil and Grease	10.0		5.0	mg/L		10-JUL-19	R4705011
Phenol (4AAP)							
Phenols (4AAP)	0.0027		0.0010	mg/L		10-JUL-19	R4698590
Phosphorus, Total							
Phosphorus (P)-Total	0.722		0.0030	mg/L		11-JUL-19	R4707716
Sulfate in Water by IC							
Sulfate (SO4)	20.1		0.30	mg/L		05-JUL-19	R4698591
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.148		0.0030	mg/L	12-JUL-19	12-JUL-19	R4710569
Antimony (Sb)-Total	0.00013		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Arsenic (As)-Total	0.00139		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Barium (Ba)-Total	0.0252		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Bismuth (Bi)-Total	0.00132		0.000050	mg/L	12-JUL-19	12-JUL-19	R4710569
Boron (B)-Total	0.049		0.010	mg/L	12-JUL-19	12-JUL-19	R4710569
Cadmium (Cd)-Total	0.0000424		0.0000050	mg/L	12-JUL-19	12-JUL-19	R4710569
Calcium (Ca)-Total	19.8		0.050	mg/L	12-JUL-19	12-JUL-19	R4710569
Cesium (Cs)-Total	0.000038		0.000010	mg/L	12-JUL-19	12-JUL-19	R4710569
Chromium (Cr)-Total	0.00069		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Cobalt (Co)-Total	0.00053		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Copper (Cu)-Total	0.137		0.00050	mg/L	12-JUL-19	12-JUL-19	R4710569

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

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2304104-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 02-JUL-19 @ 10:30							
Matrix: WASTE							
Total Metals in Water by CRC ICPMS							
Iron (Fe)-Total	0.726		0.010	mg/L	12-JUL-19	12-JUL-19	R4710569
Lead (Pb)-Total	0.00217		0.000050	mg/L	12-JUL-19	12-JUL-19	R4710569
Lithium (Li)-Total	0.0023		0.0010	mg/L	12-JUL-19	12-JUL-19	R4710569
Magnesium (Mg)-Total	4.71		0.0050	mg/L	12-JUL-19	12-JUL-19	R4710569
Manganese (Mn)-Total	0.334		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Molybdenum (Mo)-Total	0.000418		0.000050	mg/L	12-JUL-19	12-JUL-19	R4710569
Nickel (Ni)-Total	0.00384		0.00050	mg/L	12-JUL-19	12-JUL-19	R4710569
Potassium (K)-Total	3.59		0.050	mg/L	12-JUL-19	12-JUL-19	R4710569
Phosphorus (P)-Total	0.631		0.030	mg/L	12-JUL-19	12-JUL-19	R4710569
Rubidium (Rb)-Total	0.00351		0.00020	mg/L	12-JUL-19	12-JUL-19	R4710569
Selenium (Se)-Total	0.000108		0.000050	mg/L	12-JUL-19	12-JUL-19	R4710569
Silicon (Si)-Total	0.36		0.10	mg/L	12-JUL-19	12-JUL-19	R4710569
Silver (Ag)-Total	<0.000010		0.000010	mg/L	12-JUL-19	12-JUL-19	R4710569
Sodium (Na)-Total	22.4		0.050	mg/L	12-JUL-19	12-JUL-19	R4710569
Strontium (Sr)-Total	0.0920		0.00020	mg/L	12-JUL-19	12-JUL-19	R4710569
Sulfur (S)-Total	7.81		0.50	mg/L	12-JUL-19	12-JUL-19	R4710569
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	12-JUL-19	12-JUL-19	R4710569
Thallium (Tl)-Total	0.000019		0.000010	mg/L	12-JUL-19	12-JUL-19	R4710569
Thorium (Th)-Total	<0.00010		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Tin (Sn)-Total	0.00019		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Titanium (Ti)-Total	0.00324		0.00030	mg/L	12-JUL-19	12-JUL-19	R4710569
Tungsten (W)-Total	<0.00010		0.00010	mg/L	12-JUL-19	12-JUL-19	R4710569
Uranium (U)-Total	0.000223		0.000010	mg/L	12-JUL-19	12-JUL-19	R4710569
Vanadium (V)-Total	0.00080		0.00050	mg/L	12-JUL-19	12-JUL-19	R4710569
Zinc (Zn)-Total	0.0408		0.0030	mg/L	12-JUL-19	12-JUL-19	R4710569
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	12-JUL-19	12-JUL-19	R4710569
Total Organic Carbon by Combustion							
Total Organic Carbon	22.9		0.50	mg/L		09-JUL-19	R4702703
Total Suspended Solids							
Total Suspended Solids	46.8		6.0	mg/L		09-JUL-19	R4702695
pH							
pH	7.13		0.10	pH units		05-JUL-19	R4696018

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

Reference Information

Qualifiers for Individual Samples Listed:

Lab Sample ID	Client Sample ID	Qualifier	Description
L2304104-1	RANKIN INLET WWTP - EFFI	PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

Sample Parameter Qualifier Key:

Qualifier	Description
DUPM	MPN duplicate results were outside default ALS Data Quality Objective, but within 95% confidence interval for MPN reference method. Sample results are reliable.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

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 transfered 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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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.

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 200.2/6020B (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-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 Phosphorus is determined colourmetrically

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
after persulphate digestion of the sample.			
PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA 3511/8270D (mod)
PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.			
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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-WP	Water	Total Coliform and E.coli by MPN QT97	APHA 9223B QT97
This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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

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 R4696018								
WG3098502-14 LCS								
Alkalinity, Total (as CaCO3)			103.8		%		85-115	05-JUL-19
WG3098502-11 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	05-JUL-19
BOD-CBOD-WP	**Water**							
Batch R4707552								
WG3096542-2 LCS								
BOD Carbonaceous			106.3		%		85-115	05-JUL-19
WG3096542-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	05-JUL-19
BOD-WP	**Water**							
Batch R4707552								
WG3096542-2 LCS								
Biochemical Oxygen Demand			107.8		%		85-115	05-JUL-19
WG3096542-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	05-JUL-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4707927								
WG3102204-2 LCS								
Benzene			89.1		%		70-130	10-JUL-19
Toluene			91.1		%		70-130	10-JUL-19
Ethyl benzene			92.0		%		70-130	10-JUL-19
o-Xylene			101.3		%		70-130	10-JUL-19
m+p-Xylenes			95.3		%		70-130	10-JUL-19
WG3102204-3 LCS								
F1 (C6-C10)			89.8		%		70-130	10-JUL-19
WG3102204-1 MB								
Benzene			<0.00050		mg/L		0.0005	10-JUL-19
Toluene			<0.0010		mg/L		0.001	10-JUL-19
Ethyl benzene			<0.00050		mg/L		0.0005	10-JUL-19
o-Xylene			<0.00030		mg/L		0.0003	10-JUL-19
m+p-Xylenes			<0.00040		mg/L		0.0004	10-JUL-19
F1 (C6-C10)			<0.10		mg/L		0.1	10-JUL-19
Surrogate: 4-Bromofluorobenzene (SS)			95.7		%		70-130	10-JUL-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4702703								
WG3100819-2 LCS								
Total Organic Carbon			94.1		%		80-120	09-JUL-19
WG3100819-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-JUL-19
CL-IC-N-WP	**Water**							
Batch R4698591								
WG3097515-6 LCS								
Chloride (Cl)			103.2		%		90-110	05-JUL-19
WG3097515-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-JUL-19
EC-WP	**Water**							
Batch R4696018								
WG3098502-13 LCS								
Conductivity			97.9		%		90-110	05-JUL-19
WG3098502-11 MB								
Conductivity			<1.0		umhos/cm		1	05-JUL-19
F-IC-N-WP	**Water**							
Batch R4698591								
WG3097515-6 LCS								
Fluoride (F)			103.8		%		90-110	05-JUL-19
WG3097515-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-JUL-19
F2-F4-FID-WP	**Water**							
Batch R4699009								
WG3103140-2 LCS								
F2 (C10-C16)			97.7		%		70-130	20-JUL-19
F3 (C16-C34)			89.3		%		70-130	20-JUL-19
F4 (C34-C50)			92.2		%		70-130	20-JUL-19
WG3103140-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	20-JUL-19
F3 (C16-C34)			<0.25		mg/L		0.25	20-JUL-19
F4 (C34-C50)			<0.25		mg/L		0.25	20-JUL-19
Surrogate: 2-Bromobenzotrifluoride			91.1		%		60-140	20-JUL-19
FC10-QT97-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC10-QT97-WP	**Water**							
Batch R4694636								
WG3096058-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	04-JUL-19
HG-T-CVAA-WP	**Water**							
Batch R4712816								
WG3106610-2 LCS								
Mercury (Hg)-Total			90.0		%		80-120	15-JUL-19
WG3106610-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	15-JUL-19
MET-T-CCMS-WP	**Water**							
Batch R4710569								
WG3103633-6 LCS								
Aluminum (Al)-Total			97.7		%		80-120	12-JUL-19
Antimony (Sb)-Total			103.3		%		80-120	12-JUL-19
Arsenic (As)-Total			101.4		%		80-120	12-JUL-19
Barium (Ba)-Total			97.4		%		80-120	12-JUL-19
Beryllium (Be)-Total			109.4		%		80-120	12-JUL-19
Bismuth (Bi)-Total			104.6		%		80-120	12-JUL-19
Boron (B)-Total			110.3		%		80-120	12-JUL-19
Cadmium (Cd)-Total			101.9		%		80-120	12-JUL-19
Calcium (Ca)-Total			102.3		%		80-120	12-JUL-19
Cesium (Cs)-Total			99.1		%		80-120	12-JUL-19
Chromium (Cr)-Total			101.2		%		80-120	12-JUL-19
Cobalt (Co)-Total			99.8		%		80-120	12-JUL-19
Copper (Cu)-Total			103.8		%		80-120	12-JUL-19
Iron (Fe)-Total			97.9		%		80-120	12-JUL-19
Lead (Pb)-Total			101.7		%		80-120	12-JUL-19
Lithium (Li)-Total			107.2		%		80-120	12-JUL-19
Magnesium (Mg)-Total			109.3		%		80-120	12-JUL-19
Manganese (Mn)-Total			99.5		%		80-120	12-JUL-19
Molybdenum (Mo)-Total			103.6		%		80-120	12-JUL-19
Nickel (Ni)-Total			102.4		%		80-120	12-JUL-19
Potassium (K)-Total			95.6		%		80-120	12-JUL-19
Phosphorus (P)-Total			103.5		%		80-120	12-JUL-19
Rubidium (Rb)-Total			97.1		%		80-120	12-JUL-19
Selenium (Se)-Total			104.3		%		80-120	12-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4710569								
WG3103633-6 LCS								
Silicon (Si)-Total			98.4		%		80-120	12-JUL-19
Silver (Ag)-Total			98.8		%		80-120	12-JUL-19
Sodium (Na)-Total			103.8		%		80-120	12-JUL-19
Strontium (Sr)-Total			100.5		%		80-120	12-JUL-19
Sulfur (S)-Total			97.5		%		80-120	12-JUL-19
Tellurium (Te)-Total			102.1		%		80-120	12-JUL-19
Thallium (Tl)-Total			103.3		%		80-120	12-JUL-19
Thorium (Th)-Total			101.9		%		80-120	12-JUL-19
Tin (Sn)-Total			100.3		%		80-120	12-JUL-19
Titanium (Ti)-Total			97.1		%		80-120	12-JUL-19
Tungsten (W)-Total			102.5		%		80-120	12-JUL-19
Uranium (U)-Total			105.8		%		80-120	12-JUL-19
Vanadium (V)-Total			100.8		%		80-120	12-JUL-19
Zinc (Zn)-Total			102.6		%		80-120	12-JUL-19
Zirconium (Zr)-Total			103.3		%		80-120	12-JUL-19
WG3103633-5 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	12-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	12-JUL-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	12-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	12-JUL-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	12-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	12-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-JUL-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	12-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4710569								
WG3103633-5 MB								
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	12-JUL-19
Phosphorus (P)-Total			<0.030		mg/L		0.03	12-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	12-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	12-JUL-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	12-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	12-JUL-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	12-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	12-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	12-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	12-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	12-JUL-19
NH3-COL-WP	**Water**							
Batch R4704510								
WG3101324-2 LCS								
Ammonia, Total (as N)			103.8		%		85-115	09-JUL-19
WG3101324-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	09-JUL-19
NO2-IC-N-WP	**Water**							
Batch R4698591								
WG3097515-6 LCS								
Nitrite (as N)			104.5		%		90-110	05-JUL-19
WG3097515-5 MB								
Nitrite (as N)			<0.010		mg/L		0.01	05-JUL-19
NO3-IC-N-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP	**Water**							
Batch R4698591								
WG3097515-6 LCS								
Nitrate (as N)			103.9		%		90-110	05-JUL-19
WG3097515-5 MB								
Nitrate (as N)			<0.020		mg/L		0.02	05-JUL-19
OG-GRAV-WP	**Water**							
Batch R4705011								
WG3099060-2 LCS								
Oil and Grease			91.5		%		70-130	10-JUL-19
WG3099060-1 MB								
Oil and Grease			<5.0		mg/L		5	10-JUL-19
P-T-COL-WP	**Water**							
Batch R4707716								
WG3101905-2 LCS								
Phosphorus (P)-Total			97.1		%		80-120	11-JUL-19
WG3101905-1 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	11-JUL-19
PAH,PANH-WP	**Water**							
Batch R4708979								
WG3102534-2 LCS								
1-Methyl Naphthalene			95.4		%		60-130	12-JUL-19
2-Methyl Naphthalene			86.3		%		60-130	12-JUL-19
Acenaphthene			94.4		%		60-130	12-JUL-19
Acenaphthylene			82.8		%		60-130	12-JUL-19
Anthracene			86.5		%		60-130	12-JUL-19
Acridine			88.4		%		60-130	12-JUL-19
Benzo(a)anthracene			87.4		%		60-130	12-JUL-19
Benzo(a)pyrene			82.2		%		60-130	12-JUL-19
Benzo(b&j)fluoranthene			89.3		%		60-130	12-JUL-19
Benzo(g,h,i)perylene			77.7		%		60-130	12-JUL-19
Benzo(k)fluoranthene			85.0		%		60-130	12-JUL-19
Chrysene			90.5		%		60-130	12-JUL-19
Dibenzo(a,h)anthracene			89.6		%		60-130	12-JUL-19
Fluoranthene			91.3		%		60-130	12-JUL-19
Fluorene			96.9		%		60-130	12-JUL-19
Indeno(1,2,3-cd)pyrene			77.6		%		60-130	12-JUL-19
Naphthalene			114.2		%		50-130	12-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4708979								
WG3102534-2 LCS								
Phenanthrene			110.5		%		60-130	12-JUL-19
Pyrene			91.9		%		60-130	12-JUL-19
Quinoline			105.9		%		60-130	12-JUL-19
WG3102534-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	11-JUL-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	11-JUL-19
Acenaphthene			<0.000020		mg/L		0.00002	11-JUL-19
Acenaphthylene			<0.000020		mg/L		0.00002	11-JUL-19
Anthracene			<0.000010		mg/L		0.00001	11-JUL-19
Acridine			<0.000020		mg/L		0.00002	11-JUL-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	11-JUL-19
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	11-JUL-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	11-JUL-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	11-JUL-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	11-JUL-19
Chrysene			<0.000020		mg/L		0.00002	11-JUL-19
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	11-JUL-19
Fluoranthene			<0.000020		mg/L		0.00002	11-JUL-19
Fluorene			<0.000020		mg/L		0.00002	11-JUL-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	11-JUL-19
Naphthalene			<0.000050		mg/L		0.00005	11-JUL-19
Phenanthrene			<0.000050		mg/L		0.00005	11-JUL-19
Pyrene			<0.000010		mg/L		0.00001	11-JUL-19
Quinoline			<0.000020		mg/L		0.00002	11-JUL-19
Surrogate: Acenaphthene d10			93.0		%		60-130	11-JUL-19
Surrogate: Acridine d9			69.5		%		60-130	11-JUL-19
Surrogate: Chrysene d12			97.3		%		60-130	11-JUL-19
Surrogate: Naphthalene d8			95.8		%		50-130	11-JUL-19
Surrogate: Phenanthrene d10			91.9		%		60-130	11-JUL-19
PH-WP	**Water**							
Batch R4696018								
WG3098502-12 LCS								
pH			7.37		pH units		7.3-7.5	05-JUL-19
PHENOLS-4AAP-WT	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-WT	**Water**							
Batch R4698590								
WG3099616-2 LCS								
Phenols (4AAP)			100.5		%		85-115	09-JUL-19
WG3099616-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	09-JUL-19
SO4-IC-N-WP	**Water**							
Batch R4698591								
WG3097515-6 LCS								
Sulfate (SO4)			104.0		%		90-110	05-JUL-19
WG3097515-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-JUL-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4702695								
WG3098899-13 LCS								
Total Suspended Solids			103.6		%		85-115	09-JUL-19
WG3098899-12 MB								
Total Suspended Solids			<2.0		mg/L		2	09-JUL-19
TC,EC-QT97-WP	**Water**							
Batch R4694644								
WG3096065-2 DUP		**L2304104-1**						
Total Coliforms		>2420	>2420		MPN/100mL	0.0	65	04-JUL-19
Escherichia Coli		>2420	>2420		MPN/100mL	0.0	65	04-JUL-19
WG3096065-1 MB								
Total Coliforms			<1		MPN/100mL		1	04-JUL-19
Escherichia Coli			<1		MPN/100mL		1	04-JUL-19

Quality Control Report

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

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	02-JUL-19 10:30	05-JUL-19 12:00	0.25	73	hours	EHTR-FM
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97							
	1	02-JUL-19 10:30	04-JUL-19 17:30	30	55	hours	EHTR
Total Coliform and E.coli by MPN QT97							
	1	02-JUL-19 10:30	04-JUL-19 17:30	30	55	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)							
	1	02-JUL-19 10:30	05-JUL-19 07:00	48	68	hours	EHTR
Carbonaceous BOD							
	1	02-JUL-19 10:30	05-JUL-19 07:00	48	68	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 L2304104 were received on 04-JUL-19 14:20.

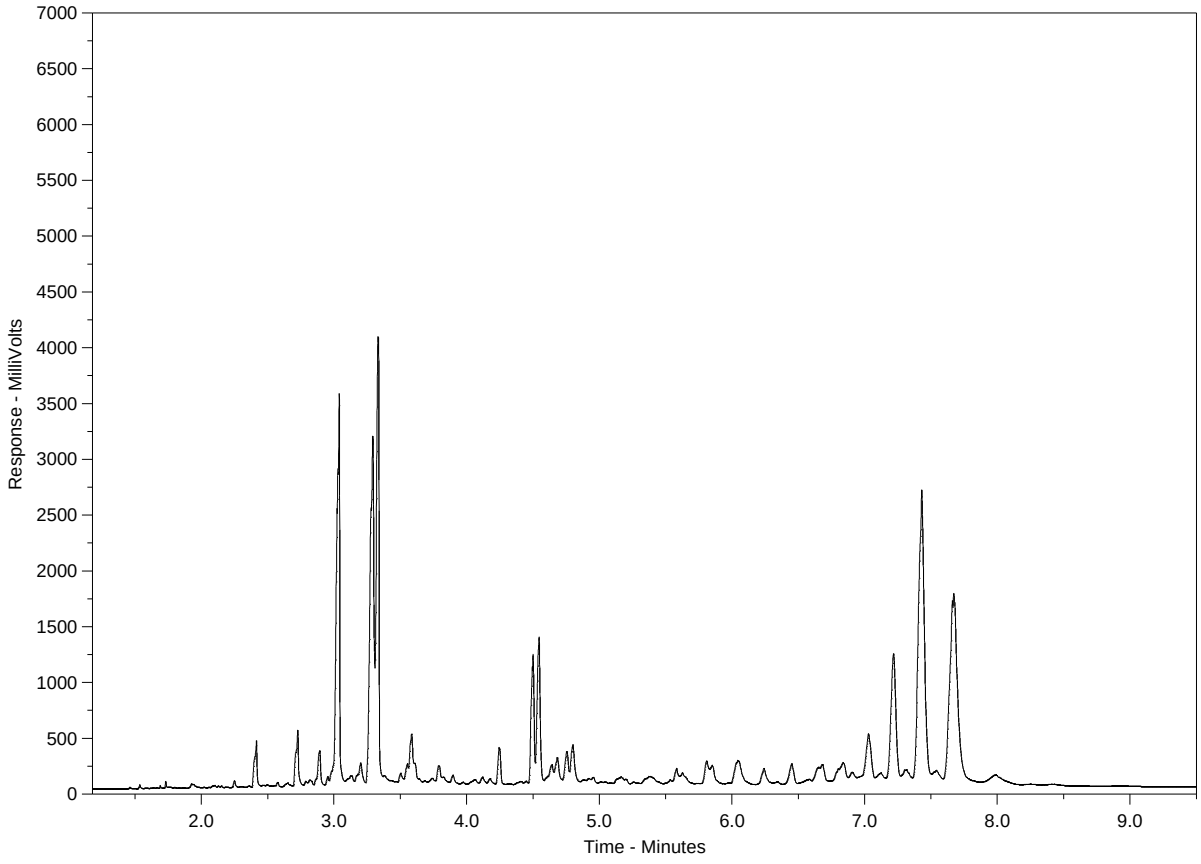
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

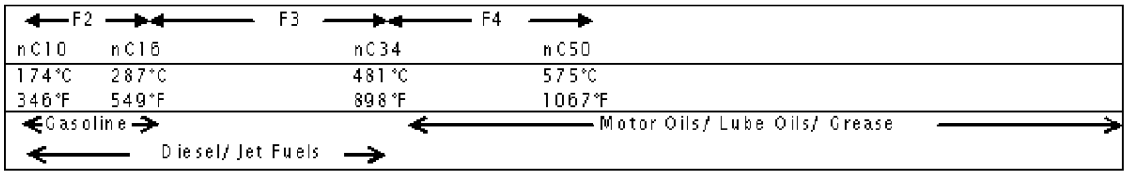
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2304104-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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.

ALS Environmental

L2304104-COFC

COC # _____

Page ____ of ____

Report To				R				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:				
Invoice To	Same as Report ?	☑ Yes	☐ No.	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?		☐ Yes	☐ No	Job #:	Rankin Inlet WWTP- Monthly Effluent			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:				
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	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	F-IC-N-WP	TC,EC-QT97-WP								Number of Containers
	Rankin Inlet WWTP - Effluent	July 2/19 as per bottles	10:30	Waste	X	X	X	X	X								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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	02/Jul/19	10:30	JF	July 4	2:20	8.8 °C				

GENF 18.01 Front

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

Date Received: 11-JUL-19
Report Date: 25-JUL-19 13:17 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2308289

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2308289-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		18-JUL-19	R4714779
Toluene	0.0013		0.0010	mg/L		18-JUL-19	R4714779
Ethyl benzene	<0.00050		0.00050	mg/L		18-JUL-19	R4714779
o-Xylene	<0.00050		0.00050	mg/L		18-JUL-19	R4714779
m+p-Xylenes	0.00059		0.00040	mg/L		18-JUL-19	R4714779
F1 (C6-C10)	<0.10		0.10	mg/L		18-JUL-19	R4714779
Surrogate: 4-Bromofluorobenzene (SS)	98.0		70-130	%		18-JUL-19	R4714779
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.72		0.10	mg/L	12-JUL-19	18-JUL-19	R4699009
F3 (C16-C34)	10.3		0.25	mg/L	12-JUL-19	18-JUL-19	R4699009
F4 (C34-C50)	4.74		0.25	mg/L	12-JUL-19	18-JUL-19	R4699009
Surrogate: 2-Bromobenzotrifluoride	104.7		60-140	%	12-JUL-19	18-JUL-19	R4699009
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		22-JUL-19	
F2-Naphth	0.72		0.10	mg/L		22-JUL-19	
F3-PAH	10.3		0.25	mg/L		22-JUL-19	
Total Hydrocarbons (C6-C50)	15.7		0.38	mg/L		22-JUL-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		22-JUL-19	
Miscellaneous Parameters							
Fecal Coliforms	>2420		1	MPN/100mL		11-JUL-19	R4708698
Total Coliform and E.coli by MPN QT97							
Total Coliforms	>2420		1	MPN/100mL		11-JUL-19	R4708700
Escherichia Coli	>2420		1	MPN/100mL		11-JUL-19	R4708700
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000192		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
2-Methyl Naphthalene	0.000247		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Acenaphthene	<0.000020		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Acenaphthylene	<0.000020		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Anthracene	<0.000010		0.000010	mg/L	12-JUL-19	18-JUL-19	R4715869
Acridine	<0.000020		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Benzo(a)anthracene	<0.000010		0.000010	mg/L	12-JUL-19	18-JUL-19	R4715869
Benzo(a)pyrene	0.0000105	EMPC	0.0000050	mg/L	12-JUL-19	18-JUL-19	R4715869
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	12-JUL-19	18-JUL-19	R4715869
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	12-JUL-19	18-JUL-19	R4715869
Chrysene	<0.000020		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Dibenzo(a,h)anthracene	0.0000092	EMPC	0.0000050	mg/L	12-JUL-19	18-JUL-19	R4715869
Fluoranthene	<0.000020		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Fluorene	0.000041	EMPC	0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	12-JUL-19	18-JUL-19	R4715869
Naphthalene	0.000162		0.000050	mg/L	12-JUL-19	18-JUL-19	R4715869
Phenanthrene	<0.000050		0.000050	mg/L	12-JUL-19	18-JUL-19	R4715869
Pyrene	<0.000010		0.000010	mg/L	12-JUL-19	18-JUL-19	R4715869
Quinoline	<0.000020		0.000020	mg/L	12-JUL-19	18-JUL-19	R4715869
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	12-JUL-19	18-JUL-19	R4715869
Surrogate: Acenaphthene d10	93.2		60-130	%	12-JUL-19	18-JUL-19	R4715869
Surrogate: Acridine d9	95.5		60-130	%	12-JUL-19	18-JUL-19	R4715869
Surrogate: Chrysene d12	102.5		60-130	%	12-JUL-19	18-JUL-19	R4715869
Surrogate: Naphthalene d8	109.6		50-130	%	12-JUL-19	18-JUL-19	R4715869
Surrogate: Phenanthrene d10	106.7		60-130	%	12-JUL-19	18-JUL-19	R4715869

* 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
L2308289-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA							
Matrix: WASTE							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	108		1.2	mg/L		15-JUL-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		15-JUL-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		15-JUL-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	88.6		1.0	mg/L		12-JUL-19	R4710828
Ammonia by colour							
Ammonia, Total (as N)	4.37		0.10	mg/L		18-JUL-19	R4714710
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	115		20	mg/L		12-JUL-19	R4716108
Carbonaceous BOD							
BOD Carbonaceous	110		20	mg/L		12-JUL-19	R4716108
Chloride in Water by IC							
Chloride (Cl)	51.2		0.50	mg/L		12-JUL-19	R4712449
Conductivity							
Conductivity	380		1.0	umhos/cm		12-JUL-19	R4710828
Hardness Calculated							
Hardness (as CaCO3)	103	HTC	0.20	mg/L		25-JUL-19	
Mercury Total							
Mercury (Hg)-Total	0.0000050		0.0000050	mg/L	15-JUL-19	16-JUL-19	R4713506
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		12-JUL-19	R4712449
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		16-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-JUL-19	R4712449
Oil & Grease - Gravimetric							
Oil and Grease	52.2		5.0	mg/L		18-JUL-19	R4714203
Phenol (4AAP)							
Phenols (4AAP)	0.0059		0.0010	mg/L		18-JUL-19	R4714834
Phosphorus, Total							
Phosphorus (P)-Total	1.67		0.12	mg/L		15-JUL-19	R4711474
Sulfate in Water by IC							
Sulfate (SO4)	29.2		0.30	mg/L		12-JUL-19	R4712449
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.289		0.0030	mg/L	18-JUL-19	18-JUL-19	R4717602
Arsenic (As)-Total	0.00138		0.00010	mg/L	18-JUL-19	18-JUL-19	R4717602
Cadmium (Cd)-Total	0.0000723		0.0000050	mg/L	18-JUL-19	18-JUL-19	R4717602
Calcium (Ca)-Total	32.6		0.050	mg/L	18-JUL-19	18-JUL-19	R4717602
Chromium (Cr)-Total	0.00128		0.00010	mg/L	18-JUL-19	18-JUL-19	R4717602
Cobalt (Co)-Total	0.00058		0.00010	mg/L	18-JUL-19	18-JUL-19	R4717602
Copper (Cu)-Total	0.136		0.00050	mg/L	18-JUL-19	18-JUL-19	R4717602
Iron (Fe)-Total	0.411		0.010	mg/L	18-JUL-19	18-JUL-19	R4717602
Lead (Pb)-Total	0.00127		0.000050	mg/L	18-JUL-19	18-JUL-19	R4717602
Magnesium (Mg)-Total	5.36		0.0050	mg/L	18-JUL-19	18-JUL-19	R4717602
Manganese (Mn)-Total	0.0433		0.00010	mg/L	18-JUL-19	18-JUL-19	R4717602
Nickel (Ni)-Total	0.00952		0.00050	mg/L	18-JUL-19	18-JUL-19	R4717602
Potassium (K)-Total	7.86		0.050	mg/L	18-JUL-19	18-JUL-19	R4717602
Sodium (Na)-Total	30.0		0.050	mg/L	18-JUL-19	18-JUL-19	R4717602
Zinc (Zn)-Total	0.132		0.0030	mg/L	18-JUL-19	18-JUL-19	R4717602

* 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
L2308289-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA							
Matrix: WASTE							
Total Organic Carbon by Combustion							
Total Organic Carbon	70.2		2.5	mg/L		17-JUL-19	R4714206
Total Suspended Solids							
Total Suspended Solids	106		4.3	mg/L		18-JUL-19	R4715410
pH							
pH	7.01		0.10	pH units		12-JUL-19	R4710828

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
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.

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 transfered 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-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.

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.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

FC-QT97-WP	Water	Fecal Coliform by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

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)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-WP	Water	Total Coliform and E.coli by MPN QT97	APHA 9223B QT97
This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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

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 R4710828								
WG3105128-19 LCS								
Alkalinity, Total (as CaCO3)			102.9		%		85-115	12-JUL-19
WG3105128-16 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	12-JUL-19
BOD-CBOD-WP	**Water**							
Batch R4716108								
WG3103224-2 LCS								
BOD Carbonaceous			110.1		%		85-115	12-JUL-19
WG3103224-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	12-JUL-19
BOD-WP	**Water**							
Batch R4716108								
WG3103224-2 LCS								
Biochemical Oxygen Demand			113.9		%		85-115	12-JUL-19
WG3103224-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	12-JUL-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4714779								
WG3107943-2 LCS								
Benzene			83.6		%		70-130	18-JUL-19
Toluene			86.2		%		70-130	18-JUL-19
Ethyl benzene			96.0		%		70-130	18-JUL-19
o-Xylene			90.1		%		70-130	18-JUL-19
m+p-Xylenes			90.2		%		70-130	18-JUL-19
WG3107943-3 LCS								
F1 (C6-C10)			76.5		%		70-130	18-JUL-19
WG3107943-1 MB								
Benzene			<0.00050		mg/L		0.0005	18-JUL-19
Toluene			<0.0010		mg/L		0.001	18-JUL-19
Ethyl benzene			<0.00050		mg/L		0.0005	18-JUL-19
o-Xylene			<0.00030		mg/L		0.0003	18-JUL-19
m+p-Xylenes			<0.00040		mg/L		0.0004	18-JUL-19
F1 (C6-C10)			<0.10		mg/L		0.1	18-JUL-19
Surrogate: 4-Bromofluorobenzene (SS)			92.0		%		70-130	18-JUL-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4714206								
WG3107856-6 LCS								
Total Organic Carbon			97.8		%		80-120	17-JUL-19
WG3107856-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	17-JUL-19
CL-IC-N-WP	**Water**							
Batch R4712449								
WG3103429-6 LCS								
Chloride (Cl)			103.5		%		90-110	12-JUL-19
WG3103429-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	12-JUL-19
EC-WP	**Water**							
Batch R4710828								
WG3105128-18 LCS								
Conductivity			97.6		%		90-110	12-JUL-19
WG3105128-16 MB								
Conductivity			<1.0		umhos/cm		1	12-JUL-19
F2-F4-FID-WP	**Water**							
Batch R4699009								
WG3103566-2 LCS								
F2 (C10-C16)			102.0		%		70-130	20-JUL-19
F3 (C16-C34)			97.2		%		70-130	20-JUL-19
F4 (C34-C50)			103.9		%		70-130	20-JUL-19
WG3103566-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	20-JUL-19
F3 (C16-C34)			<0.25		mg/L		0.25	20-JUL-19
F4 (C34-C50)			<0.25		mg/L		0.25	20-JUL-19
Surrogate: 2-Bromobenzotrifluoride			89.7		%		60-140	20-JUL-19
WG3103566-3 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	18-JUL-19
F3 (C16-C34)			<0.25		mg/L		0.25	18-JUL-19
F4 (C34-C50)			<0.25		mg/L		0.25	18-JUL-19
Surrogate: 2-Bromobenzotrifluoride			96.7		%		60-140	18-JUL-19
FC-QT97-WP	**Water**							
Batch R4708698								
WG3102641-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	11-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WP	**Water**							
Batch R4713506								
WG3107536-2 LCS								
Mercury (Hg)-Total			93.0		%		80-120	16-JUL-19
WG3107536-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	16-JUL-19
MET-T-CCMS-WP	**Water**							
Batch R4717602								
WG3108640-2 LCS								
Aluminum (Al)-Total			104.3		%		80-120	18-JUL-19
Arsenic (As)-Total			105.0		%		80-120	18-JUL-19
Cadmium (Cd)-Total			104.8		%		80-120	18-JUL-19
Calcium (Ca)-Total			103.1		%		80-120	18-JUL-19
Chromium (Cr)-Total			100.7		%		80-120	18-JUL-19
Cobalt (Co)-Total			102.3		%		80-120	18-JUL-19
Copper (Cu)-Total			106.4		%		80-120	18-JUL-19
Iron (Fe)-Total			101.4		%		80-120	18-JUL-19
Lead (Pb)-Total			101.7		%		80-120	18-JUL-19
Magnesium (Mg)-Total			105.8		%		80-120	18-JUL-19
Manganese (Mn)-Total			104.1		%		80-120	18-JUL-19
Nickel (Ni)-Total			110.3		%		80-120	18-JUL-19
Potassium (K)-Total			102.2		%		80-120	18-JUL-19
Sodium (Na)-Total			106.1		%		80-120	18-JUL-19
Zinc (Zn)-Total			103.2		%		80-120	18-JUL-19
WG3108640-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	18-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	18-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	18-JUL-19
Chromium (Cr)-Total			0.00011	B	mg/L		0.0001	18-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	18-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	18-JUL-19
Lead (Pb)-Total			0.000474	B	mg/L		0.00005	18-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	18-JUL-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	18-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	18-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4717602								
WG3108640-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	18-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	18-JUL-19
NH3-COL-WP	**Water**							
Batch R4714710								
WG3108983-2 LCS								
Ammonia, Total (as N)			98.6		%		85-115	18-JUL-19
WG3108983-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	18-JUL-19
NO2-IC-N-WP	**Water**							
Batch R4712449								
WG3103429-6 LCS								
Nitrite (as N)			101.6		%		90-110	12-JUL-19
WG3103429-5 MB								
Nitrite (as N)			<0.010		mg/L		0.01	12-JUL-19
NO3-IC-N-WP	**Water**							
Batch R4712449								
WG3103429-6 LCS								
Nitrate (as N)			104.1		%		90-110	12-JUL-19
WG3103429-5 MB								
Nitrate (as N)			<0.020		mg/L		0.02	12-JUL-19
OG-GRAV-WP	**Water**							
Batch R4714203								
WG3105352-2 LCS								
Oil and Grease			109.0		%		70-130	18-JUL-19
WG3105352-1 MB								
Oil and Grease			<5.0		mg/L		5	18-JUL-19
P-T-COL-WP	**Water**							
Batch R4711474								
WG3103799-18 LCS								
Phosphorus (P)-Total			97.4		%		80-120	15-JUL-19
WG3103799-17 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	15-JUL-19
PAH,PANH-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4715869								
WG3103709-2 LCS								
1-Methyl Naphthalene			116.9		%		60-130	17-JUL-19
2-Methyl Naphthalene			105.9		%		60-130	17-JUL-19
Acenaphthene			113.7		%		60-130	17-JUL-19
Acenaphthylene			94.7		%		60-130	17-JUL-19
Anthracene			85.9		%		60-130	17-JUL-19
Acridine			90.2		%		60-130	17-JUL-19
Benzo(a)anthracene			72.2		%		60-130	17-JUL-19
Benzo(a)pyrene			71.5		%		60-130	17-JUL-19
Benzo(b&j)fluoranthene			96.0		%		60-130	17-JUL-19
Benzo(g,h,i)perylene			101.7		%		60-130	17-JUL-19
Benzo(k)fluoranthene			106.7		%		60-130	17-JUL-19
Chrysene			74.7		%		60-130	17-JUL-19
Dibenzo(a,h)anthracene			81.0		%		60-130	17-JUL-19
Fluoranthene			103.0		%		60-130	17-JUL-19
Fluorene			108.9		%		60-130	17-JUL-19
Indeno(1,2,3-cd)pyrene			80.1		%		60-130	17-JUL-19
Naphthalene			113.6		%		50-130	17-JUL-19
Phenanthrene			105.6		%		60-130	17-JUL-19
Pyrene			99.6		%		60-130	17-JUL-19
Quinoline			103.0		%		60-130	17-JUL-19
WG3103709-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	17-JUL-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	17-JUL-19
Acenaphthene			<0.000020		mg/L		0.00002	17-JUL-19
Acenaphthylene			<0.000020		mg/L		0.00002	17-JUL-19
Anthracene			<0.000010		mg/L		0.00001	17-JUL-19
Acridine			<0.000020		mg/L		0.00002	17-JUL-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	17-JUL-19
Benzo(a)pyrene			<0.000005(		mg/L		0.000005	17-JUL-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	17-JUL-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	17-JUL-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	17-JUL-19
Chrysene			<0.000020		mg/L		0.00002	17-JUL-19
Dibenzo(a,h)anthracene			<0.000005(		mg/L		0.000005	17-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4715869								
WG3103709-1 MB								
Fluoranthene			<0.000020		mg/L		0.00002	17-JUL-19
Fluorene			<0.000020		mg/L		0.00002	17-JUL-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	17-JUL-19
Naphthalene			<0.000050		mg/L		0.00005	17-JUL-19
Phenanthrene			<0.000050		mg/L		0.00005	17-JUL-19
Pyrene			<0.000010		mg/L		0.00001	17-JUL-19
Quinoline			<0.000020		mg/L		0.00002	17-JUL-19
Surrogate: Acenaphthene d10			110.2		%		60-130	17-JUL-19
Surrogate: Acridine d9			89.1		%		60-130	17-JUL-19
Surrogate: Chrysene d12			104.1		%		60-130	17-JUL-19
Surrogate: Naphthalene d8			103.8		%		50-130	17-JUL-19
Surrogate: Phenanthrene d10			116.7		%		60-130	17-JUL-19
PH-WP	**Water**							
Batch R4710828								
WG3105128-17 LCS								
pH			7.40		pH units		7.3-7.5	12-JUL-19
PHENOLS-4AAP-WT	**Water**							
Batch R4714834								
WG3108592-6 LCS								
Phenols (4AAP)			105.0		%		85-115	18-JUL-19
WG3108592-5 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	18-JUL-19
SO4-IC-N-WP	**Water**							
Batch R4712449								
WG3103429-6 LCS								
Sulfate (SO4)			104.1		%		90-110	12-JUL-19
WG3103429-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	12-JUL-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4715410								
WG3107798-2 LCS								
Total Suspended Solids			97.6		%		85-115	18-JUL-19
WG3107798-1 MB								
Total Suspended Solids			<2.0		mg/L		2	18-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TC,EC-QT97-WP	**Water**							
Batch R4708700								
WG3102628-1 MB								
Total Coliforms			<1		MPN/100mL		1	11-JUL-19
Escherichia Coli			<1		MPN/100mL		1	11-JUL-19

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
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	Not provided	12-JUL-19 12:00	0.25	24	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 L2308289 were received on 11-JUL-19 12:20.

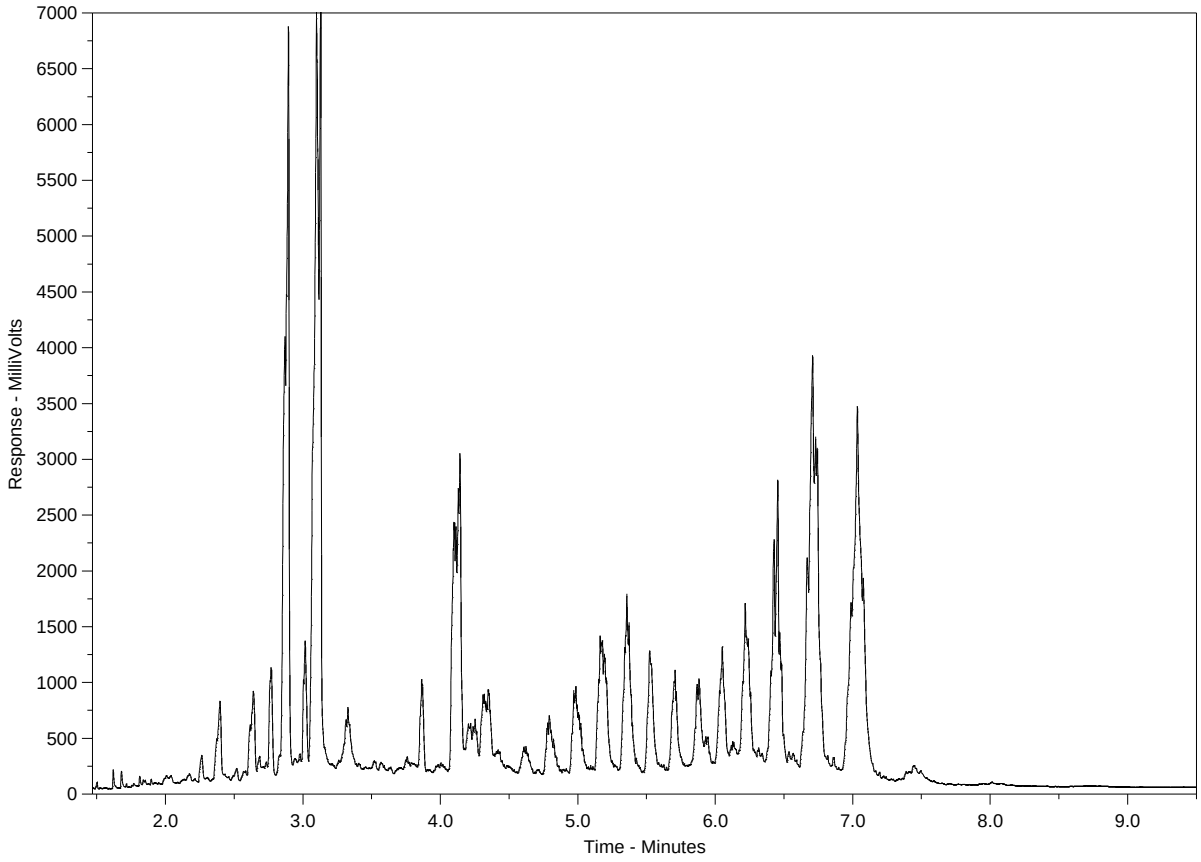
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

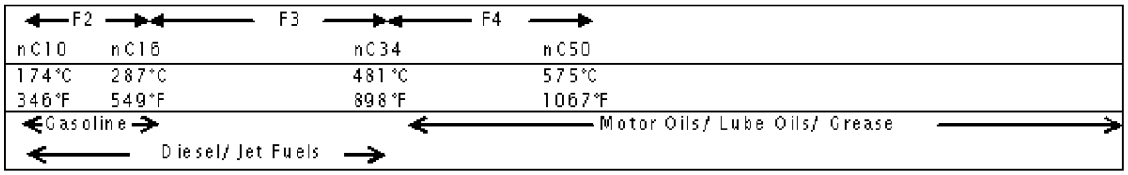
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2308289-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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.

ALS Environmental

Chain of Custody / Analytical Request Form

L2308289-COFC

COC # _____

Page 1 of 1

Report To				Service Requested (Rush for routine analysis subject to availability)
Company:	Nunavut CGS - Rankin Inlet (W8133)			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	SIMON DOIRON		☐ 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: aanderson@gov.nu.ca		
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #: Rankin Inlet WWTP- Monthly Effluent		Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		**PO / AFE:**		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		**ALS Contact:** Craig Riddell	**Sampled By:** Amanda Anderson	

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	8/9 (bottle)		Waste	x	x	x	x	x	15

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	08/Jul/19	3:29		JUL 11 2019		9.6 °C				

OK 12:20

GENF 18.01 Front

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

Date Received: 18-JUL-19
Report Date: 31-JUL-19 16:47 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2312572

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2312572-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 16-JUL-19 @ 09:00							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		19-JUL-19	R4729929
Toluene	<0.0010		0.0010	mg/L		19-JUL-19	R4729929
Ethyl benzene	<0.00050		0.00050	mg/L		19-JUL-19	R4729929
o-Xylene	<0.00050		0.00050	mg/L		19-JUL-19	R4729929
m+p-Xylenes	<0.00040		0.00040	mg/L		19-JUL-19	R4729929
F1 (C6-C10)	<0.10		0.10	mg/L		19-JUL-19	R4729929
Surrogate: 4-Bromofluorobenzene (SS)	85.0		70-130	%		19-JUL-19	R4729929
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.49		0.10	mg/L	19-JUL-19	20-JUL-19	R4699009
F3 (C16-C34)	8.96		0.25	mg/L	19-JUL-19	20-JUL-19	R4699009
F4 (C34-C50)	2.66		0.25	mg/L	19-JUL-19	20-JUL-19	R4699009
Surrogate: 2-Bromobenzotrifluoride	121.5		60-140	%	19-JUL-19	20-JUL-19	R4699009
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		31-JUL-19	
F2-Naphth	0.49		0.10	mg/L		31-JUL-19	
F3-PAH	8.96		0.25	mg/L		31-JUL-19	
Total Hydrocarbons (C6-C50)	12.1		0.38	mg/L		31-JUL-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		31-JUL-19	
Miscellaneous Parameters							
Fecal Coliforms	3870000	PEHR	1	MPN/100mL		18-JUL-19	R4715829
Total and E. coli to endpoint by QT97							
Total Coliforms	83600000	PEHR	1	MPN/100mL		18-JUL-19	R4715814
Escherichia Coli	10900000	PEHR	1	MPN/100mL		18-JUL-19	R4715814
Note: MBEF: Microbiological test results for E. coli > Fecal coliforms due to sample heterogeneity. Both test results are within normal variability for MPN tests.							
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
2-Methyl Naphthalene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Acenaphthene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Acenaphthylene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Anthracene	<0.000030	DLIS	0.000030	mg/L	19-JUL-19	23-JUL-19	R4727407
Acridine	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Benzo(a)anthracene	<0.000030	DLIS	0.000030	mg/L	19-JUL-19	23-JUL-19	R4727407
Benzo(a)pyrene	<0.000015	DLIS	0.000015	mg/L	19-JUL-19	23-JUL-19	R4727407
Benzo(b&j)fluoranthene	<0.000030	DLIS	0.000030	mg/L	19-JUL-19	23-JUL-19	R4727407
Benzo(g,h,i)perylene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Benzo(k)fluoranthene	<0.000030	DLIS	0.000030	mg/L	19-JUL-19	23-JUL-19	R4727407
Chrysene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Dibenzo(a,h)anthracene	<0.000015	DLIS	0.000015	mg/L	19-JUL-19	23-JUL-19	R4727407
Fluoranthene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Fluorene	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
Indeno(1,2,3-cd)pyrene	<0.000030	DLIS	0.000030	mg/L	19-JUL-19	23-JUL-19	R4727407
Naphthalene	<0.00015	DLIS	0.00015	mg/L	19-JUL-19	23-JUL-19	R4727407
Phenanthrene	<0.00015	DLIS	0.00015	mg/L	19-JUL-19	23-JUL-19	R4727407
Pyrene	<0.000030	DLIS	0.000030	mg/L	19-JUL-19	23-JUL-19	R4727407
Quinoline	<0.000060	DLIS	0.000060	mg/L	19-JUL-19	23-JUL-19	R4727407
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	19-JUL-19	23-JUL-19	R4727407
Surrogate: Acenaphthene d10	92.8		60-130	%	19-JUL-19	23-JUL-19	R4727407

* 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
L2312572-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 16-JUL-19 @ 09:00							
Matrix: WASTE							
Polyaromatic Hydrocarbons (PAHs)							
Surrogate: Acridine d9	104.7		60-130	%	19-JUL-19	23-JUL-19	R4727407
Surrogate: Chrysene d12	105.7		60-130	%	19-JUL-19	23-JUL-19	R4727407
Surrogate: Naphthalene d8	95.1		50-130	%	19-JUL-19	23-JUL-19	R4727407
Surrogate: Phenanthrene d10	98.3		60-130	%	19-JUL-19	23-JUL-19	R4727407
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	135		1.2	mg/L		22-JUL-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		22-JUL-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		22-JUL-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	110		1.0	mg/L		19-JUL-19	R4719748
Ammonia by colour							
Ammonia, Total (as N)	9.2		1.0	mg/L		22-JUL-19	R4721003
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	113		20	mg/L		19-JUL-19	R4727945
Carbonaceous BOD							
BOD Carbonaceous	75		20	mg/L		19-JUL-19	R4727945
Chloride in Water by IC							
Chloride (Cl)	43.7		0.50	mg/L		19-JUL-19	R4722635
Conductivity							
Conductivity	430		1.0	umhos/cm		19-JUL-19	R4719748
Hardness Calculated							
Hardness (as CaCO3)	77.9	HTC	0.20	mg/L		29-JUL-19	
Mercury Total							
Mercury (Hg)-Total	0.000610		0.0000050	mg/L	23-JUL-19	23-JUL-19	R4723870
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		19-JUL-19	R4722635
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		24-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-JUL-19	R4722635
Oil & Grease - Gravimetric							
Oil and Grease	18.3		5.0	mg/L		23-JUL-19	R4720809
Phenol (4AAP)							
Phenols (4AAP)	0.0116		0.0010	mg/L		19-JUL-19	R4719699
Phosphorus, Total							
Phosphorus (P)-Total	2.97		0.030	mg/L		22-JUL-19	R4720390
Sulfate in Water by IC							
Sulfate (SO4)	23.3		0.30	mg/L		19-JUL-19	R4722635
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.115		0.0030	mg/L	26-JUL-19	26-JUL-19	R4728936
Arsenic (As)-Total	0.00098		0.00010	mg/L	26-JUL-19	26-JUL-19	R4728936
Cadmium (Cd)-Total	0.0000744		0.0000050	mg/L	26-JUL-19	26-JUL-19	R4728936
Calcium (Ca)-Total	23.0		0.050	mg/L	26-JUL-19	26-JUL-19	R4728936
Chromium (Cr)-Total	0.00070		0.00010	mg/L	26-JUL-19	26-JUL-19	R4728936
Cobalt (Co)-Total	0.00033		0.00010	mg/L	26-JUL-19	26-JUL-19	R4728936
Copper (Cu)-Total	0.137		0.00050	mg/L	26-JUL-19	26-JUL-19	R4728936
Iron (Fe)-Total	0.226		0.010	mg/L	26-JUL-19	26-JUL-19	R4728936
Lead (Pb)-Total	0.00107		0.000050	mg/L	26-JUL-19	26-JUL-19	R4728936
Magnesium (Mg)-Total	4.95		0.0050	mg/L	26-JUL-19	26-JUL-19	R4728936

* 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
L2312572-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 16-JUL-19 @ 09:00							
Matrix: WASTE							
Total Metals in Water by CRC ICPMS							
Manganese (Mn)-Total	0.0348		0.00010	mg/L	26-JUL-19	26-JUL-19	R4728936
Nickel (Ni)-Total	0.00667		0.00050	mg/L	26-JUL-19	26-JUL-19	R4728936
Potassium (K)-Total	6.48		0.050	mg/L	26-JUL-19	26-JUL-19	R4728936
Sodium (Na)-Total	25.6		0.050	mg/L	26-JUL-19	26-JUL-19	R4728936
Zinc (Zn)-Total	0.0830		0.0030	mg/L	26-JUL-19	26-JUL-19	R4728936
Total Organic Carbon by Combustion							
Total Organic Carbon	59.2		5.0	mg/L		23-JUL-19	R4722928
Total Suspended Solids							
Total Suspended Solids	111		2.0	mg/L		23-JUL-19	R4722808
pH							
pH	7.29		0.10	pH units		19-JUL-19	R4719748

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

Reference Information

Qualifiers for Individual Samples Listed:

Lab Sample ID	Client Sample ID	Qualifier	Description
L2312572-1	RANKIN INLET WWTP - EFFI	PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

Sample Parameter Qualifier Key:

Qualifier	Description
DLIS	Detection Limit Adjusted: Insufficient Sample
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.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

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 transfered 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-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.

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.

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-ENDPT-WP	Water	Total and E. coli to endpoint by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing serial dilutions 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

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 R4719748								
WG3111568-24 LCS								
Alkalinity, Total (as CaCO3)			104.8		%		85-115	19-JUL-19
WG3111568-21 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	19-JUL-19
BOD-CBOD-WP	**Water**							
Batch R4727945								
WG3110347-2 LCS								
BOD Carbonaceous			106.1		%		85-115	19-JUL-19
WG3110347-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	19-JUL-19
BOD-WP	**Water**							
Batch R4727945								
WG3110347-2 LCS								
Biochemical Oxygen Demand			106.5		%		85-115	19-JUL-19
WG3110347-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	19-JUL-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4729929								
WG3113019-2 LCS								
Benzene			91.5		%		70-130	19-JUL-19
Toluene			94.5		%		70-130	19-JUL-19
Ethyl benzene			102.0		%		70-130	19-JUL-19
o-Xylene			103.3		%		70-130	19-JUL-19
m+p-Xylenes			96.3		%		70-130	19-JUL-19
WG3113019-3 LCS								
F1 (C6-C10)			120.8		%		70-130	19-JUL-19
WG3113019-1 MB								
Benzene			<0.00050		mg/L		0.0005	19-JUL-19
Toluene			<0.0010		mg/L		0.001	19-JUL-19
Ethyl benzene			<0.00050		mg/L		0.0005	19-JUL-19
o-Xylene			<0.00030		mg/L		0.0003	19-JUL-19
m+p-Xylenes			<0.00040		mg/L		0.0004	19-JUL-19
F1 (C6-C10)			<0.10		mg/L		0.1	19-JUL-19
Surrogate: 4-Bromofluorobenzene (SS)			89.0		%		70-130	19-JUL-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4722928								
WG3113747-2 LCS								
Total Organic Carbon			101.9		%		80-120	23-JUL-19
WG3113747-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-JUL-19
CL-IC-N-WP	**Water**							
Batch R4722635								
WG3109097-6 LCS								
Chloride (Cl)			101.0		%		90-110	19-JUL-19
WG3109097-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-JUL-19
EC-WP	**Water**							
Batch R4719748								
WG3111568-23 LCS								
Conductivity			97.9		%		90-110	19-JUL-19
WG3111568-21 MB								
Conductivity			<1.0		umhos/cm		1	19-JUL-19
F2-F4-FID-WP	**Water**							
Batch R4699009								
WG3109857-2 LCS								
F2 (C10-C16)			105.6		%		70-130	20-JUL-19
F3 (C16-C34)			97.9		%		70-130	20-JUL-19
F4 (C34-C50)			101.7		%		70-130	20-JUL-19
WG3109857-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	20-JUL-19
F3 (C16-C34)			<0.25		mg/L		0.25	20-JUL-19
F4 (C34-C50)			<0.25		mg/L		0.25	20-JUL-19
Surrogate: 2-Bromobenzotrifluoride			90.0		%		60-140	20-JUL-19
FC-QT97-ENDPT-WP	**Water**							
Batch R4715829								
WG3109206-2 DUP		**L2312572-1**						
Fecal Coliforms		3870000	2910000		MPN/100mL	28	65	18-JUL-19
WG3109206-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	18-JUL-19
HG-T-CVAA-WP	**Water**							

Quality Control Report

Workorder: L2312572 Report Date: 31-JUL-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WP	**Water**							
Batch R4723870								
WG3113275-2 LCS								
Mercury (Hg)-Total			97.0		%		80-120	23-JUL-19
WG3113275-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	23-JUL-19
MET-T-CCMS-WP	**Water**							
Batch R4728936								
WG3116414-2 LCS								
Aluminum (Al)-Total			100.7		%		80-120	26-JUL-19
Arsenic (As)-Total			101.9		%		80-120	26-JUL-19
Cadmium (Cd)-Total			103.8		%		80-120	26-JUL-19
Calcium (Ca)-Total			99.4		%		80-120	26-JUL-19
Chromium (Cr)-Total			100.6		%		80-120	26-JUL-19
Cobalt (Co)-Total			101.9		%		80-120	26-JUL-19
Copper (Cu)-Total			101.8		%		80-120	26-JUL-19
Iron (Fe)-Total			96.9		%		80-120	26-JUL-19
Lead (Pb)-Total			103.8		%		80-120	26-JUL-19
Magnesium (Mg)-Total			114.0		%		80-120	26-JUL-19
Manganese (Mn)-Total			102.3		%		80-120	26-JUL-19
Nickel (Ni)-Total			101.9		%		80-120	26-JUL-19
Potassium (K)-Total			99.2		%		80-120	26-JUL-19
Sodium (Na)-Total			104.8		%		80-120	26-JUL-19
Zinc (Zn)-Total			104.2		%		80-120	26-JUL-19
WG3116414-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	26-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	26-JUL-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	26-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	26-JUL-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	26-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	26-JUL-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	26-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	26-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	26-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	26-JUL-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	26-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	26-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	26-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4728936								
WG3116414-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	26-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	26-JUL-19
NH3-COL-WP	**Water**							
Batch R4721003								
WG3113131-10 LCS								
Ammonia, Total (as N)			100.8		%		85-115	22-JUL-19
WG3113131-9 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	22-JUL-19
NO2-IC-N-WP	**Water**							
Batch R4722635								
WG3109097-6 LCS								
Nitrite (as N)			100.3		%		90-110	19-JUL-19
WG3109097-5 MB								
Nitrite (as N)			<0.010		mg/L		0.01	19-JUL-19
NO3-IC-N-WP	**Water**							
Batch R4722635								
WG3109097-6 LCS								
Nitrate (as N)			100.1		%		90-110	19-JUL-19
WG3109097-5 MB								
Nitrate (as N)			<0.020		mg/L		0.02	19-JUL-19
OG-GRAV-WP	**Water**							
Batch R4720809								
WG3110326-2 LCS								
Oil and Grease			90.7		%		70-130	23-JUL-19
WG3110326-1 MB								
Oil and Grease			<5.0		mg/L		5	23-JUL-19
P-T-COL-WP	**Water**							
Batch R4720390								
WG3110374-2 LCS								
Phosphorus (P)-Total			100.8		%		80-120	22-JUL-19
WG3110374-1 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	22-JUL-19
PAH,PANH-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4727407								
WG3110428-2 LCS								
1-Methyl Naphthalene			101.9		%		60-130	22-JUL-19
2-Methyl Naphthalene			94.5		%		60-130	22-JUL-19
Acenaphthene			102.6		%		60-130	22-JUL-19
Acenaphthylene			89.1		%		60-130	22-JUL-19
Anthracene			94.4		%		60-130	22-JUL-19
Acridine			99.1		%		60-130	22-JUL-19
Benzo(a)anthracene			90.9		%		60-130	22-JUL-19
Benzo(a)pyrene			99.7		%		60-130	22-JUL-19
Benzo(b&j)fluoranthene			80.1		%		60-130	22-JUL-19
Benzo(g,h,i)perylene			105.0		%		60-130	22-JUL-19
Benzo(k)fluoranthene			93.4		%		60-130	22-JUL-19
Chrysene			93.6		%		60-130	22-JUL-19
Dibenzo(a,h)anthracene			97.8		%		60-130	22-JUL-19
Fluoranthene			100.8		%		60-130	22-JUL-19
Fluorene			109.1		%		60-130	22-JUL-19
Indeno(1,2,3-cd)pyrene			92.9		%		60-130	22-JUL-19
Naphthalene			113.7		%		50-130	22-JUL-19
Phenanthrene			112.6		%		60-130	22-JUL-19
Pyrene			99.0		%		60-130	22-JUL-19
Quinoline			102.4		%		60-130	22-JUL-19
WG3110428-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	23-JUL-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	23-JUL-19
Acenaphthene			<0.000020		mg/L		0.00002	23-JUL-19
Acenaphthylene			<0.000020		mg/L		0.00002	23-JUL-19
Anthracene			<0.000010		mg/L		0.00001	23-JUL-19
Acridine			<0.000020		mg/L		0.00002	23-JUL-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	23-JUL-19
Benzo(a)pyrene			<0.000005		mg/L		0.000005	23-JUL-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	23-JUL-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	23-JUL-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	23-JUL-19
Chrysene			<0.000020		mg/L		0.00002	23-JUL-19
Dibenzo(a,h)anthracene			<0.000005		mg/L		0.000005	23-JUL-19

Quality Control Report

Workorder: L2312572 Report Date: 31-JUL-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4727407								
WG3110428-1 MB								
Fluoranthene			<0.000020		mg/L		0.00002	23-JUL-19
Fluorene			<0.000020		mg/L		0.00002	23-JUL-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	23-JUL-19
Naphthalene			<0.000050		mg/L		0.00005	23-JUL-19
Phenanthrene			<0.000050		mg/L		0.00005	23-JUL-19
Pyrene			<0.000010		mg/L		0.00001	23-JUL-19
Quinoline			<0.000020		mg/L		0.00002	23-JUL-19
Surrogate: Acenaphthene d10			101.5		%		60-130	23-JUL-19
Surrogate: Acridine d9			89.2		%		60-130	23-JUL-19
Surrogate: Chrysene d12			104.9		%		60-130	23-JUL-19
Surrogate: Naphthalene d8			99.98		%		50-130	23-JUL-19
Surrogate: Phenanthrene d10			98.1		%		60-130	23-JUL-19
PH-WP	**Water**							
Batch R4719748								
WG3111568-22 LCS								
pH			7.36		pH units		7.3-7.5	19-JUL-19
PHENOLS-4AAP-WT	**Water**							
Batch R4719699								
WG3109768-38 LCS								
Phenols (4AAP)			104.3		%		85-115	19-JUL-19
WG3109768-37 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	19-JUL-19
SO4-IC-N-WP	**Water**							
Batch R4722635								
WG3109097-6 LCS								
Sulfate (SO4)			102.0		%		90-110	19-JUL-19
WG3109097-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-JUL-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4722808								
WG3111829-26 LCS								
Total Suspended Solids			95.6		%		85-115	23-JUL-19
WG3111829-25 MB								
Total Suspended Solids			<2.0		mg/L		2	23-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TC,EC-QT97-ENDPT-WP	**Water**							
Batch R4715814								
WG3109207-2 DUP		**L2312572-1**						
Total Coliforms		83600000	58100000		MPN/100mL	36	65	18-JUL-19
Escherichia Coli		10900000	8500000		MPN/100mL	25	65	18-JUL-19
WG3109207-1 MB								
Total Coliforms			<1		MPN/100mL		1	18-JUL-19
Escherichia Coli			<1		MPN/100mL		1	18-JUL-19

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

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	16-JUL-19 09:00	19-JUL-19 12:00	0.25	75	hours	EHTR-FM
Bacteriological Tests							
Fecal Coliform to endpoint by MPN QT97							
	1	16-JUL-19 09:00	18-JUL-19 16:20	30	55	hours	EHTR
Total and E. coli to endpoint by QT97							
	1	16-JUL-19 09:00	18-JUL-19 16:25	30	55	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)							
	1	16-JUL-19 09:00	19-JUL-19 07:00	48	70	hours	EHTR
Carbonaceous BOD							
	1	16-JUL-19 09:00	19-JUL-19 07:00	48	70	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 L2312572 were received on 18-JUL-19 13:00.

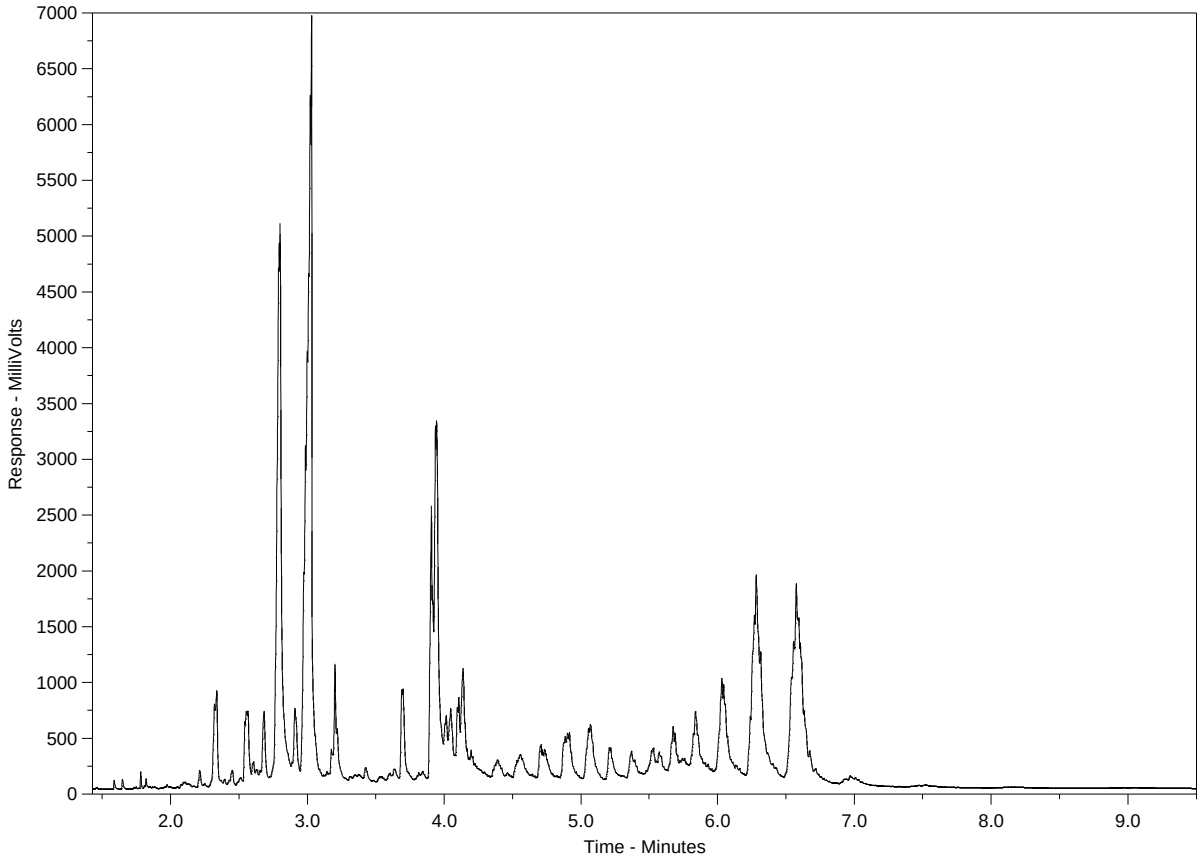
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

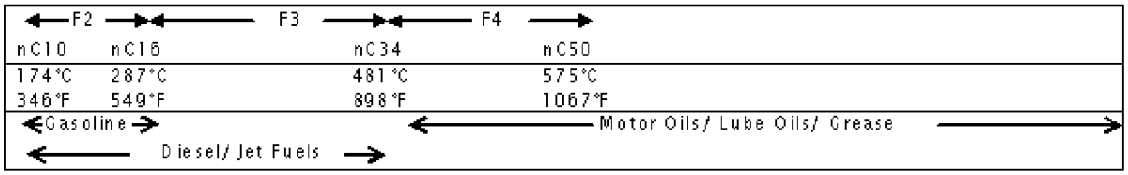
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2312572-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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.

ALS Environmental

Chain of Custody / Analytical Request Form

L2312572-COFC

COC # _____

Page 1 of 1

Report To					
Company:	Nunavut CGS - Rankin Inlet (W8133)				
Contact:	SIMON DOIRON				
Address:	Box 490				
	Rankin Inlet , NU, X0C 0G0				
Phone:	867-645-8155	Cell# :			
Invoice To	Same as Report ?	☑ Yes	☐ No		
Hardcopy of Invoice with Report?		☐ Yes	☐ No		
Company:					
Contact:					
Address:					
Phone:		Fax:			

☑ PDF	☑ Excel	☐ Digital	☐ Fax
Email 1:	sdoiron@gov.nu.ca		
Email 2:	mlusty@gov.nu.ca		
Email 3:	aanderson@gov.nu.ca		
Client / Project Information			
Job #:	Rankin Inlet WWTP- Monthly Effluent		
PO / AFE:			
LSD:			
Quote #:			
ALS Contact:	Craig Riddell	**Sampled By:**	Amanda Anderson

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
- ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	Jul 16	9:00	Waste	x	x	x	x	x	15

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	16-Jul-19	9:00		July 18/19	1620	16.6°C		JUL 18 2019	1330	

GENF 18.01 Front

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

Date Received: 23-JUL-19
Report Date: 01-AUG-19 08:04 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2314912

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314912-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 22-JUL-19 @ 09:15							
Matrix: WASTE							
BTEX							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		25-JUL-19	R4727342
Toluene	<0.0010		0.0010	mg/L		25-JUL-19	R4727342
Ethyl benzene	<0.00050		0.00050	mg/L		25-JUL-19	R4727342
o-Xylene	<0.00050		0.00050	mg/L		25-JUL-19	R4727342
m+p-Xylenes	<0.00040		0.00040	mg/L		25-JUL-19	R4727342
F1 (C6-C10)	<0.10		0.10	mg/L		25-JUL-19	R4727342
Surrogate: 4-Bromofluorobenzene (SS)	82.7		70-130	%		25-JUL-19	R4727342
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		29-JUL-19	
F2-Naphth	<0.10		0.10	mg/L		29-JUL-19	
F3-PAH	0.78		0.25	mg/L		29-JUL-19	
Total Hydrocarbons (C6-C50)	1.28		0.38	mg/L		29-JUL-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		26-JUL-19	
Miscellaneous Parameters							
Fecal Coliforms	13000000	MBEF	1	MPN/100mL		23-JUL-19	R4722496
Total and E. coli to endpoint by QT97							
Total Coliforms	248000000		1	MPN/100mL		23-JUL-19	R4722508
Escherichia Coli	26900000		1	MPN/100mL		23-JUL-19	R4722508
F2-F4 (O.Reg.153/04)							
F2 (C10-C16)	<100	OWP	100	ug/L	24-JUL-19	25-JUL-19	R4726354
F3 (C16-C34)	780	OWP	250	ug/L	24-JUL-19	25-JUL-19	R4726354
F4 (C34-C50)	500	OWP	250	ug/L	24-JUL-19	25-JUL-19	R4726354
Chrom. to baseline at nC50	YES				24-JUL-19	25-JUL-19	R4726354
Surrogate: 2-Bromobenzotrifluoride	88.3		60-140	%	24-JUL-19	25-JUL-19	R4726354
CCME PAHs in mg/L							
1-Methyl Naphthalene	0.000083		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
2-Methyl Naphthalene	0.000084		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Acenaphthene	<0.000020		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Acenaphthylene	<0.000020		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Anthracene	<0.000010		0.000010	mg/L	24-JUL-19	29-JUL-19	R4729324
Acridine	<0.000020		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Benzo(a)anthracene	<0.000010		0.000010	mg/L	24-JUL-19	29-JUL-19	R4729324
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	24-JUL-19	29-JUL-19	R4729324
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	24-JUL-19	29-JUL-19	R4729324
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	24-JUL-19	29-JUL-19	R4729324
Chrysene	<0.000020		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Dibenzo(a,h)anthracene	0.0000093		0.0000050	mg/L	24-JUL-19	29-JUL-19	R4729324
Fluoranthene	<0.000020		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Fluorene	0.000037	R	0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	24-JUL-19	29-JUL-19	R4729324
Naphthalene	0.000099		0.000050	mg/L	24-JUL-19	29-JUL-19	R4729324
Phenanthrene	<0.000050		0.000050	mg/L	24-JUL-19	29-JUL-19	R4729324
Pyrene	<0.000010		0.000010	mg/L	24-JUL-19	29-JUL-19	R4729324
Quinoline	0.000021		0.000020	mg/L	24-JUL-19	29-JUL-19	R4729324
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	24-JUL-19	29-JUL-19	R4729324
Surrogate: d8-Naphthalene	131.8		50-150	%	24-JUL-19	29-JUL-19	R4729324
Surrogate: d10-Phenanthrene	99.9		50-150	%	24-JUL-19	29-JUL-19	R4729324
Surrogate: d12-Chrysene	103.1		50-150	%	24-JUL-19	29-JUL-19	R4729324
Surrogate: d10-Acenaphthene	92.3		50-150	%	24-JUL-19	29-JUL-19	R4729324

* 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
L2314912-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 22-JUL-19 @ 09:15							
Matrix: WASTE							
CCME PAHs in mg/L							
Surrogate: d9-Acridine (SS)	96.4		50-150	%	24-JUL-19	29-JUL-19	R4729324
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	151		1.2	mg/L		24-JUL-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		24-JUL-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		24-JUL-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	124		1.0	mg/L		23-JUL-19	R4723131
Ammonia by colour							
Ammonia, Total (as N)	1.90		0.20	mg/L		23-JUL-19	R4723915
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	108		50	mg/L		24-JUL-19	R4730556
Carbonaceous BOD							
BOD Carbonaceous	114		20	mg/L		24-JUL-19	R4730556
Chloride in Water by IC							
Chloride (Cl)	49.9		0.50	mg/L		23-JUL-19	R4724448
Conductivity							
Conductivity	491		1.0	umhos/cm		23-JUL-19	R4723131
Hardness Calculated							
Hardness (as CaCO3)	91.4	HTC	0.20	mg/L		01-AUG-19	
Mercury Total							
Mercury (Hg)-Total	0.0000170		0.0000050	mg/L	30-JUL-19	30-JUL-19	R4731130
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		23-JUL-19	R4724448
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		25-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		23-JUL-19	R4724448
Oil & Grease - Gravimetric							
Oil and Grease	17.5		5.0	mg/L		25-JUL-19	R4725510
Phenol (4AAP)							
Phenols (4AAP)	0.0117		0.0010	mg/L		26-JUL-19	R4727957
Phosphorus, Total							
Phosphorus (P)-Total	3.94		0.030	mg/L		25-JUL-19	R4727317
Sulfate in Water by IC							
Sulfate (SO4)	28.7		0.30	mg/L		23-JUL-19	R4724448
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.112		0.0030	mg/L	31-JUL-19	31-JUL-19	R4734210
Arsenic (As)-Total	0.00105		0.00010	mg/L	31-JUL-19	31-JUL-19	R4734210
Cadmium (Cd)-Total	0.000136		0.0000050	mg/L	31-JUL-19	31-JUL-19	R4734210
Calcium (Ca)-Total	27.4		0.050	mg/L	31-JUL-19	31-JUL-19	R4734210
Chromium (Cr)-Total	0.00057		0.00010	mg/L	31-JUL-19	31-JUL-19	R4734210
Cobalt (Co)-Total	0.00053		0.00010	mg/L	31-JUL-19	31-JUL-19	R4734210
Copper (Cu)-Total	0.157		0.00050	mg/L	31-JUL-19	31-JUL-19	R4734210
Iron (Fe)-Total	0.284		0.010	mg/L	31-JUL-19	31-JUL-19	R4734210
Lead (Pb)-Total	0.00124		0.000050	mg/L	31-JUL-19	31-JUL-19	R4734210
Magnesium (Mg)-Total	5.59		0.0050	mg/L	31-JUL-19	31-JUL-19	R4734210
Manganese (Mn)-Total	0.0517		0.00010	mg/L	31-JUL-19	31-JUL-19	R4734210
Nickel (Ni)-Total	0.0138		0.00050	mg/L	31-JUL-19	31-JUL-19	R4734210
Potassium (K)-Total	11.7		0.050	mg/L	31-JUL-19	31-JUL-19	R4734210

* 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
L2314912-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 22-JUL-19 @ 09:15							
Matrix: WASTE							
Total Metals in Water by CRC ICPMS							
Sodium (Na)-Total	28.0		0.050	mg/L	31-JUL-19	31-JUL-19	R4734210
Zinc (Zn)-Total	0.104		0.0030	mg/L	31-JUL-19	31-JUL-19	R4734210
Total Organic Carbon by Combustion							
Total Organic Carbon	68.8		5.0	mg/L		25-JUL-19	R4727520
Total Suspended Solids							
Total Suspended Solids	78.0		2.7	mg/L		29-JUL-19	R4730574
pH							
pH	7.23		0.10	pH units		23-JUL-19	R4723131

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MBEF	Microbiological test results for E. coli > Fecal Coliforms due to sample heterogeneity. Both test results are within normal variability for MPN tests.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.
R	The ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.

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 transfered 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-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.

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.

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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-WT	Water	F2-F4 (O.Reg.153/04)	MOE DECPH-E3421/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

PAH-CCME-PPM-WT	Water	CCME PAHs in mg/L	EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-ENDPT-WP	Water	Total and E. coli to endpoint by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing serial dilutions 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: L2314912 Report Date: 01-AUG-19

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 R4723131								
WG3113895-15 DUP		**L2314912-1**						
Alkalinity, Total (as CaCO3)		124	124		mg/L	0.2	20	23-JUL-19
WG3113895-14 LCS								
Alkalinity, Total (as CaCO3)			102.0		%		85-115	23-JUL-19
WG3113895-11 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	23-JUL-19
BOD-CBOD-WP	**Water**							
Batch R4730556								
WG3113688-7 LCS								
BOD Carbonaceous			101.9		%		85-115	24-JUL-19
WG3113688-6 MB								
BOD Carbonaceous			<2.0		mg/L		2	24-JUL-19
BOD-WP	**Water**							
Batch R4730556								
WG3113688-7 LCS								
Biochemical Oxygen Demand			106.4		%		85-115	24-JUL-19
WG3113688-6 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	24-JUL-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4727342								
WG3114967-2 LCS								
Benzene			93.5		%		70-130	25-JUL-19
Toluene			87.7		%		70-130	25-JUL-19
Ethyl benzene			89.7		%		70-130	25-JUL-19
o-Xylene			98.3		%		70-130	25-JUL-19
m+p-Xylenes			95.9		%		70-130	25-JUL-19
WG3114967-3 LCS								
F1 (C6-C10)			113.0		%		70-130	25-JUL-19
WG3114967-1 MB								
Benzene			<0.00050		mg/L		0.0005	25-JUL-19
Toluene			<0.0010		mg/L		0.001	25-JUL-19
Ethyl benzene			<0.00050		mg/L		0.0005	25-JUL-19
o-Xylene			<0.00030		mg/L		0.0003	25-JUL-19
m+p-Xylenes			<0.00040		mg/L		0.0004	25-JUL-19
F1 (C6-C10)			<0.10		mg/L		0.1	25-JUL-19
Surrogate: 4-Bromofluorobenzene (SS)			80.1		%		70-130	25-JUL-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Workorder: L2314912 Report Date: 01-AUG-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4727520								
WG3116296-2 LCS								
Total Organic Carbon			102.1		%		80-120	25-JUL-19
WG3116296-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	25-JUL-19
CL-IC-N-WP	**Water**							
Batch R4724448								
WG3112856-6 LCS								
Chloride (Cl)			99.1		%		90-110	23-JUL-19
WG3112856-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	23-JUL-19
EC-WP	**Water**							
Batch R4723131								
WG3113895-15 DUP		**L2314912-1**						
Conductivity		491	490		umhos/cm	0.2	10	23-JUL-19
WG3113895-13 LCS								
Conductivity			96.9		%		90-110	23-JUL-19
WG3113895-11 MB								
Conductivity			<1.0		umhos/cm		1	23-JUL-19
F2-F4-WT	**Water**							
Batch R4726354								
WG3114663-2 LCS								
F2 (C10-C16)			99.6		%		65-135	25-JUL-19
F3 (C16-C34)			97.5		%		65-135	25-JUL-19
F4 (C34-C50)			105.3		%		65-135	25-JUL-19
WG3114663-1 MB								
F2 (C10-C16)			<100		ug/L		100	25-JUL-19
F3 (C16-C34)			<250		ug/L		250	25-JUL-19
F4 (C34-C50)			<250		ug/L		250	25-JUL-19
Surrogate: 2-Bromobenzotrifluoride			84.7		%		60-140	25-JUL-19
FC-QT97-ENDPT-WP	**Water**							
Batch R4722496								
WG3113017-2 DUP		**L2314912-1**						
Fecal Coliforms		13000000	11200000		MPN/100mL	15	65	23-JUL-19
WG3113017-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	23-JUL-19
HG-T-CVAA-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WP	**Water**							
Batch R4731130								
WG3119636-2 LCS								
Mercury (Hg)-Total			95.0		%		80-120	30-JUL-19
WG3119636-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	30-JUL-19
MET-T-CCMS-WP	**Water**							
Batch R4734210								
WG3120363-2 LCS								
Aluminum (Al)-Total			106.7		%		80-120	31-JUL-19
Arsenic (As)-Total			101.8		%		80-120	31-JUL-19
Cadmium (Cd)-Total			101.4		%		80-120	31-JUL-19
Calcium (Ca)-Total			100.2		%		80-120	31-JUL-19
Chromium (Cr)-Total			106.5		%		80-120	31-JUL-19
Cobalt (Co)-Total			102.4		%		80-120	31-JUL-19
Copper (Cu)-Total			103.2		%		80-120	31-JUL-19
Iron (Fe)-Total			94.2		%		80-120	31-JUL-19
Lead (Pb)-Total			104.0		%		80-120	31-JUL-19
Magnesium (Mg)-Total			112.9		%		80-120	31-JUL-19
Manganese (Mn)-Total			104.0		%		80-120	31-JUL-19
Nickel (Ni)-Total			103.0		%		80-120	31-JUL-19
Potassium (K)-Total			108.1		%		80-120	31-JUL-19
Sodium (Na)-Total			104.5		%		80-120	31-JUL-19
Zinc (Zn)-Total			102.4		%		80-120	31-JUL-19
WG3120363-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	31-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	31-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	31-JUL-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	31-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	31-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	31-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	31-JUL-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	31-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	31-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4734210								
WG3120363-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	31-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	31-JUL-19
NH3-COL-WP	**Water**							
Batch R4723915								
WG3114259-14 LCS								
Ammonia, Total (as N)			102.3		%		85-115	23-JUL-19
WG3114259-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	23-JUL-19
NO2-IC-N-WP	**Water**							
Batch R4724448								
WG3112856-6 LCS								
Nitrite (as N)			100.8		%		90-110	23-JUL-19
WG3112856-5 MB								
Nitrite (as N)			<0.010		mg/L		0.01	23-JUL-19
NO3-IC-N-WP	**Water**							
Batch R4724448								
WG3112856-6 LCS								
Nitrate (as N)			99.1		%		90-110	23-JUL-19
WG3112856-5 MB								
Nitrate (as N)			<0.020		mg/L		0.02	23-JUL-19
OG-GRAV-WP	**Water**							
Batch R4725510								
WG3113910-2 LCS								
Oil and Grease			97.1		%		70-130	25-JUL-19
WG3113910-1 MB								
Oil and Grease			<5.0		mg/L		5	25-JUL-19
P-T-COL-WP	**Water**							
Batch R4727317								
WG3114346-6 LCS								
Phosphorus (P)-Total			97.7		%		80-120	25-JUL-19
WG3114346-5 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	25-JUL-19
PAH-CCME-PPM-WT	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-CCME-PPM-WT	**Water**							
Batch R4729324								
WG3114663-2 LCS								
1-Methyl Naphthalene			101.9		%		50-150	23-JUL-19
2-Methyl Naphthalene			92.9		%		50-150	23-JUL-19
Acenaphthene			99.2		%		50-150	23-JUL-19
Acenaphthylene			112.3		%		50-150	23-JUL-19
Anthracene			106.3		%		50-150	23-JUL-19
Acridine			98.3		%		50-150	23-JUL-19
Benzo(a)anthracene			129.4		%		50-150	23-JUL-19
Benzo(a)pyrene			106.8		%		50-150	23-JUL-19
Benzo(b&j)fluoranthene			109.7		%		50-150	23-JUL-19
Benzo(g,h,i)perylene			112.6		%		50-150	23-JUL-19
Benzo(k)fluoranthene			114.3		%		50-150	23-JUL-19
Chrysene			130.4		%		50-150	23-JUL-19
Dibenzo(a,h)anthracene			112.7		%		50-150	23-JUL-19
Fluoranthene			112.2		%		50-150	23-JUL-19
Fluorene			109.1		%		50-150	23-JUL-19
Indeno(1,2,3-cd)pyrene			127.3		%		50-150	23-JUL-19
Naphthalene			95.3		%		50-150	23-JUL-19
Phenanthrene			113.5		%		50-150	23-JUL-19
Pyrene			118.4		%		50-150	23-JUL-19
Quinoline			123.3		%		50-150	23-JUL-19
WG3114663-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	23-JUL-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	23-JUL-19
Acenaphthene			<0.000020		mg/L		0.00002	23-JUL-19
Acenaphthylene			<0.000020		mg/L		0.00002	23-JUL-19
Anthracene			<0.000010		mg/L		0.00001	23-JUL-19
Acridine			<0.000020		mg/L		0.00002	23-JUL-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	23-JUL-19
Benzo(a)pyrene			<0.000005		mg/L		0.000005	23-JUL-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	23-JUL-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	23-JUL-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	23-JUL-19
Chrysene			<0.000020		mg/L		0.00002	23-JUL-19
Dibenzo(a,h)anthracene			<0.000005		mg/L		0.000005	23-JUL-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-CCME-PPM-WT	**Water**							
Batch R4729324								
WG3114663-1 MB								
Fluoranthene			<0.000020		mg/L		0.00002	23-JUL-19
Fluorene			<0.000020		mg/L		0.00002	23-JUL-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	23-JUL-19
Naphthalene			<0.000050		mg/L		0.00005	23-JUL-19
Phenanthrene			<0.000050		mg/L		0.00005	23-JUL-19
Pyrene			<0.000010		mg/L		0.00001	23-JUL-19
Quinoline			<0.000020		mg/L		0.00002	23-JUL-19
Surrogate: d8-Naphthalene			99.5		%		50-150	23-JUL-19
Surrogate: d10-Phenanthrene			101.7		%		50-150	23-JUL-19
Surrogate: d12-Chrysene			106.0		%		50-150	23-JUL-19
Surrogate: d10-Acenaphthene			89.8		%		50-150	23-JUL-19
Surrogate: d9-Acridine (SS)			84.0		%		50-150	23-JUL-19
PH-WP	**Water**							
Batch R4723131								
WG3113895-15 DUP		**L2314912-1**						
pH		7.23	7.24	J	pH units	0.01	0.2	23-JUL-19
WG3113895-12 LCS								
pH			7.38		pH units		7.3-7.5	23-JUL-19
PHENOLS-4AAP-WT	**Water**							
Batch R4727957								
WG3116725-10 LCS								
Phenols (4AAP)			105.7		%		85-115	26-JUL-19
WG3116725-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	26-JUL-19
SO4-IC-N-WP	**Water**							
Batch R4724448								
WG3112856-6 LCS								
Sulfate (SO4)			99.8		%		90-110	23-JUL-19
WG3112856-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	23-JUL-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4730574								
WG3116376-2 LCS								
Total Suspended Solids			88.0		%		85-115	29-JUL-19
WG3116376-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOTSUS-WP	**Water**							
Batch R4730574								
WG3116376-1 MB								
Total Suspended Solids			<2.0		mg/L		2	29-JUL-19
TC,EC-QT97-ENDPT-WP	**Water**							
Batch R4722508								
WG3113018-2 DUP		**L2314912-1**						
Total Coliforms		248000000	236000000		MPN/100mL	5.0	65	23-JUL-19
Escherichia Coli		26900000	20300000		MPN/100mL	28	65	23-JUL-19
WG3113018-1 MB								
Total Coliforms			<1		MPN/100mL		1	23-JUL-19
Escherichia Coli			<1		MPN/100mL		1	23-JUL-19

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.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	22-JUL-19 09:15	23-JUL-19 12:00	0.25	27	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 L2314912 were received on 23-JUL-19 11:25.

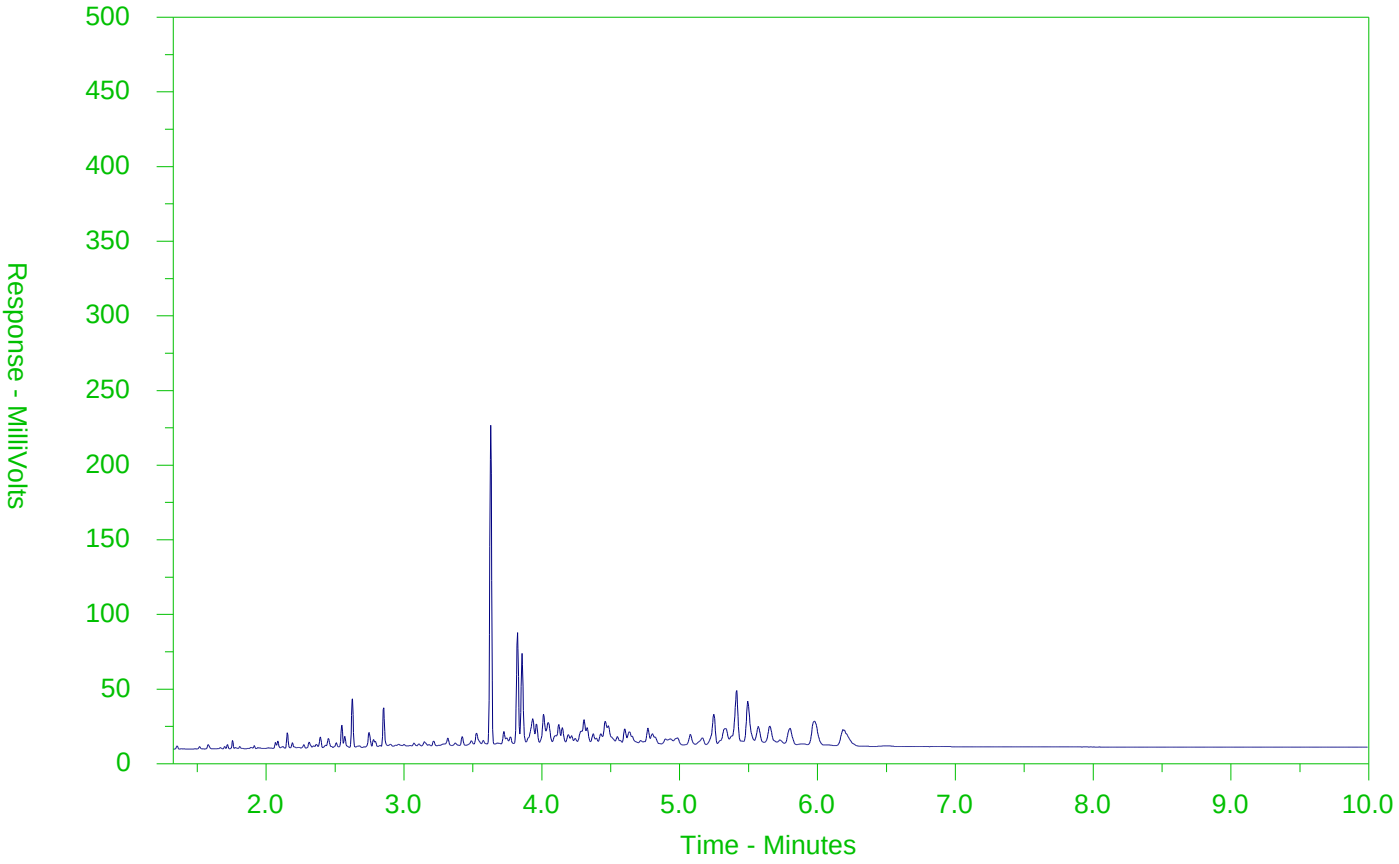
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where 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: L2314912-1
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 the 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.

ALS Environmental

Chain of Custody / Analytical Request Form

L2314912-COFC

COC # _____

Page 1 of 1

Report To					**Service Requested** (Rush for routine analysis subject to availability)
Company:	Nunavut CGS - Rankin Inlet (W8133)				◉ Regular (Standard Turnaround Times - Business Days)
Contact:	SIMON DOIRON		☐ 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:	aanderson@gov.nu.ca		**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:					
Phone:	Fax:	Quote #:			
Lab Work Order # (lab use only)		**ALS Contact:**	Craig Riddell	**Sampled By:**	Amanda Anderson

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	July 22	9:15	Waste	x	x	x	x	x	15

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	07-Jul-19	9:15	DK	JUL 23 2019	1125	16.1°C		JUL 23 2019		

GENF 18.01 Front

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

Date Received: 30-JUL-19
Report Date: 12-AUG-19 07:30 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2319681

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2319681-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 29-JUL-19 @ 13:15							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		03-AUG-19	R4739804
Toluene	<0.0010		0.0010	mg/L		03-AUG-19	R4739804
Ethyl benzene	<0.00050		0.00050	mg/L		03-AUG-19	R4739804
o-Xylene	<0.00050		0.00050	mg/L		03-AUG-19	R4739804
m+p-Xylenes	<0.00040		0.00040	mg/L		03-AUG-19	R4739804
F1 (C6-C10)	<0.10		0.10	mg/L		03-AUG-19	R4739804
Surrogate: 4-Bromofluorobenzene (SS)	96.3		70-130	%		03-AUG-19	R4739804
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.25		0.10	mg/L	01-AUG-19	02-AUG-19	R4739024
F3 (C16-C34)	4.45		0.25	mg/L	01-AUG-19	02-AUG-19	R4739024
F4 (C34-C50)	2.58		0.25	mg/L	01-AUG-19	02-AUG-19	R4739024
Surrogate: 2-Bromobenzotrifluoride	97.9		60-140	%	01-AUG-19	02-AUG-19	R4739024
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		06-AUG-19	
Total Hydrocarbons (C6-C50)	7.28		0.38	mg/L		06-AUG-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		06-AUG-19	
Miscellaneous Parameters							
Fecal Coliforms	2140000	MBEF	1	MPN/100mL		30-JUL-19	R4732091
Total and E. coli to endpoint by QT97							
Total Coliforms	56500000		1	MPN/100mL		30-JUL-19	R4732068
Escherichia Coli	5200000		1	MPN/100mL		30-JUL-19	R4732068
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	78.9		1.2	mg/L		01-AUG-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		01-AUG-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		01-AUG-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	64.7		1.0	mg/L		31-JUL-19	R4734401
Ammonia by colour							
Ammonia, Total (as N)	3.70		0.20	mg/L		31-JUL-19	R4735088
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	65		20	mg/L		31-JUL-19	R4739685
Carbonaceous BOD							
BOD Carbonaceous	46		20	mg/L		31-JUL-19	R4739685
Chloride in Water by IC							
Chloride (Cl)	44.2		0.50	mg/L		31-JUL-19	R4738653
Conductivity							
Conductivity	336		1.0	umhos/cm		31-JUL-19	R4734401
Hardness Calculated							
Hardness (as CaCO3)	78.2	HTC	0.20	mg/L		12-AUG-19	
Mercury Total							
Mercury (Hg)-Total	0.0000050		0.0000050	mg/L	07-AUG-19	08-AUG-19	R4744895
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		31-JUL-19	R4738653
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-JUL-19	R4738653

* 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
L2319681-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 29-JUL-19 @ 13:15							
Matrix: WASTE							
Oil & Grease - Gravimetric							
Oil and Grease	15.3		5.0	mg/L		02-AUG-19	R4738743
Phenol (4AAP)							
Phenols (4AAP)	0.0057		0.0010	mg/L		01-AUG-19	R4737245
Phosphorus, Total							
Phosphorus (P)-Total	1.28		0.0060	mg/L		02-AUG-19	R4737930
Sulfate in Water by IC							
Sulfate (SO4)	22.8		0.30	mg/L		31-JUL-19	R4738653
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.106		0.0030	mg/L	08-AUG-19	08-AUG-19	R4746362
Arsenic (As)-Total	0.00085		0.00010	mg/L	08-AUG-19	08-AUG-19	R4746362
Cadmium (Cd)-Total	0.0000465		0.0000050	mg/L	08-AUG-19	08-AUG-19	R4746362
Calcium (Ca)-Total	22.7		0.050	mg/L	08-AUG-19	08-AUG-19	R4746362
Chromium (Cr)-Total	0.00047		0.00010	mg/L	08-AUG-19	08-AUG-19	R4746362
Cobalt (Co)-Total	0.00030		0.00010	mg/L	08-AUG-19	08-AUG-19	R4746362
Copper (Cu)-Total	0.0911		0.00050	mg/L	08-AUG-19	08-AUG-19	R4746362
Iron (Fe)-Total	0.162		0.010	mg/L	08-AUG-19	08-AUG-19	R4746362
Lead (Pb)-Total	0.00123		0.000050	mg/L	08-AUG-19	08-AUG-19	R4746362
Magnesium (Mg)-Total	5.21		0.0050	mg/L	08-AUG-19	08-AUG-19	R4746362
Manganese (Mn)-Total	0.0476		0.00010	mg/L	08-AUG-19	08-AUG-19	R4746362
Nickel (Ni)-Total	0.00403		0.00050	mg/L	08-AUG-19	08-AUG-19	R4746362
Potassium (K)-Total	5.71		0.050	mg/L	08-AUG-19	08-AUG-19	R4746362
Sodium (Na)-Total	25.6		0.050	mg/L	08-AUG-19	08-AUG-19	R4746362
Zinc (Zn)-Total	0.0487		0.0030	mg/L	08-AUG-19	08-AUG-19	R4746362
Total Organic Carbon by Combustion							
Total Organic Carbon	46.8		0.50	mg/L		06-AUG-19	R4742609
Total Suspended Solids							
Total Suspended Solids	63.5		2.0	mg/L		05-AUG-19	R4740066
pH							
pH	6.95		0.10	pH units		31-JUL-19	R4734401

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MBEF	Microbiological test results for E. coli > Fecal Coliforms due to sample heterogeneity. Both test results are within normal variability for MPN tests.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-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 transfered 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-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.

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.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
TC,EC-QT97-ENDPT-WP	Water	Total and E. coli to endpoint by QT97	APHA 9223B QT97

Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing serial dilutions 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

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 R4734401								
WG3121523-4 LCS								
Alkalinity, Total (as CaCO3)			100.3		%		85-115	31-JUL-19
WG3121523-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	31-JUL-19
BOD-CBOD-WP	**Water**							
Batch R4739685								
WG3120103-7 LCS								
BOD Carbonaceous			98.1		%		85-115	31-JUL-19
WG3120103-6 MB								
BOD Carbonaceous			<2.0		mg/L		2	31-JUL-19
BOD-WP	**Water**							
Batch R4739685								
WG3120103-7 LCS								
Biochemical Oxygen Demand			104.1		%		85-115	31-JUL-19
WG3120103-6 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	31-JUL-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4739804								
WG3123237-2 LCS								
Benzene			86.7		%		70-130	03-AUG-19
Toluene			94.7		%		70-130	03-AUG-19
Ethyl benzene			94.5		%		70-130	03-AUG-19
o-Xylene			102.9		%		70-130	03-AUG-19
m+p-Xylenes			100.2		%		70-130	03-AUG-19
WG3123237-3 LCS								
F1 (C6-C10)			96.1		%		70-130	03-AUG-19
WG3123237-1 MB								
Benzene			<0.00050		mg/L		0.0005	03-AUG-19
Toluene			<0.0010		mg/L		0.001	03-AUG-19
Ethyl benzene			<0.00050		mg/L		0.0005	03-AUG-19
o-Xylene			<0.00030		mg/L		0.0003	03-AUG-19
m+p-Xylenes			<0.00040		mg/L		0.0004	03-AUG-19
F1 (C6-C10)			<0.10		mg/L		0.1	03-AUG-19
Surrogate: 4-Bromofluorobenzene (SS)			94.0		%		70-130	03-AUG-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4742609								
WG3125745-2 LCS								
Total Organic Carbon			103.5		%		80-120	06-AUG-19
WG3125745-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	06-AUG-19
CL-IC-N-WP	**Water**							
Batch R4738653								
WG3120477-6 LCS								
Chloride (Cl)			99.9		%		90-110	31-JUL-19
WG3120477-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	31-JUL-19
EC-WP	**Water**							
Batch R4734401								
WG3121523-3 LCS								
Conductivity			100.8		%		90-110	31-JUL-19
WG3121523-1 MB								
Conductivity			<1.0		umhos/cm		1	31-JUL-19
F2-F4-FID-WP	**Water**							
Batch R4739024								
WG3121638-2 LCS								
F2 (C10-C16)			99.0		%		70-130	02-AUG-19
F3 (C16-C34)			91.7		%		70-130	02-AUG-19
F4 (C34-C50)			99.3		%		70-130	02-AUG-19
WG3121638-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	02-AUG-19
F3 (C16-C34)			<0.25		mg/L		0.25	02-AUG-19
F4 (C34-C50)			<0.25		mg/L		0.25	02-AUG-19
Surrogate: 2-Bromobenzotrifluoride			94.3		%		60-140	02-AUG-19
FC-QT97-ENDPT-WP	**Water**							
Batch R4732091								
WG3119749-2 DUP		**L2319681-1**						
Fecal Coliforms		2140000	1430000		MPN/100mL	40	65	30-JUL-19
WG3119749-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	30-JUL-19
HG-T-CVAA-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WP	**Water**							
Batch R4744895								
WG3127888-2 LCS								
Mercury (Hg)-Total			99.0		%		80-120	08-AUG-19
WG3127888-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	08-AUG-19
MET-T-CCMS-WP	**Water**							
Batch R4746362								
WG3127038-2 LCS								
Aluminum (Al)-Total			98.9		%		80-120	08-AUG-19
Arsenic (As)-Total			96.9		%		80-120	08-AUG-19
Cadmium (Cd)-Total			98.1		%		80-120	08-AUG-19
Calcium (Ca)-Total			96.8		%		80-120	08-AUG-19
Chromium (Cr)-Total			96.5		%		80-120	08-AUG-19
Cobalt (Co)-Total			95.2		%		80-120	08-AUG-19
Copper (Cu)-Total			96.6		%		80-120	08-AUG-19
Iron (Fe)-Total			102.6		%		80-120	08-AUG-19
Lead (Pb)-Total			94.7		%		80-120	08-AUG-19
Magnesium (Mg)-Total			111.8		%		80-120	08-AUG-19
Manganese (Mn)-Total			99.5		%		80-120	08-AUG-19
Nickel (Ni)-Total			93.8		%		80-120	08-AUG-19
Potassium (K)-Total			93.1		%		80-120	08-AUG-19
Sodium (Na)-Total			101.5		%		80-120	08-AUG-19
Zinc (Zn)-Total			101.4		%		80-120	08-AUG-19
WG3127038-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	08-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	08-AUG-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	08-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	08-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	08-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	08-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	08-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	08-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	08-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	08-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	08-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	08-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	08-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4746362								
WG3127038-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	08-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	08-AUG-19
NH3-COL-WP	**Water**							
Batch R4735088								
WG3121920-6 LCS								
Ammonia, Total (as N)			98.4		%		85-115	31-JUL-19
WG3121920-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	31-JUL-19
NO2-IC-N-WP	**Water**							
Batch R4738653								
WG3120477-6 LCS								
Nitrite (as N)			100.5		%		90-110	31-JUL-19
WG3120477-5 MB								
Nitrite (as N)			<0.010		mg/L		0.01	31-JUL-19
NO3-IC-N-WP	**Water**							
Batch R4738653								
WG3120477-6 LCS								
Nitrate (as N)			99.2		%		90-110	31-JUL-19
WG3120477-5 MB								
Nitrate (as N)			<0.020		mg/L		0.02	31-JUL-19
OG-GRAV-WP	**Water**							
Batch R4738743								
WG3122012-2 LCS								
Oil and Grease			97.5		%		70-130	02-AUG-19
WG3122012-1 MB								
Oil and Grease			<5.0		mg/L		5	02-AUG-19
P-T-COL-WP	**Water**							
Batch R4737930								
WG3122069-6 LCS								
Phosphorus (P)-Total			98.6		%		80-120	02-AUG-19
WG3122069-5 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	02-AUG-19
PH-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WP	**Water**							
Batch R4734401								
WG3121523-2 LCS								
pH			7.37		pH units		7.3-7.5	31-JUL-19
PHENOLS-4AAP-WT	**Water**							
Batch R4737245								
WG3121581-6 LCS								
Phenols (4AAP)			101.2		%		85-115	01-AUG-19
WG3121581-5 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	01-AUG-19
SO4-IC-N-WP	**Water**							
Batch R4738653								
WG3120477-6 LCS								
Sulfate (SO4)			100.8		%		90-110	31-JUL-19
WG3120477-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	31-JUL-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4740066								
WG3123253-6 LCS								
Total Suspended Solids			89.3		%		85-115	05-AUG-19
WG3123253-5 MB								
Total Suspended Solids			<2.0		mg/L		2	05-AUG-19
TC,EC-QT97-ENDPT-WP	**Water**							
Batch R4732068								
WG3119754-2 DUP		**L2319681-1**						
Total Coliforms		56500000	55400000		MPN/100mL	2.0	65	30-JUL-19
Escherichia Coli		5200000	5100000		MPN/100mL	1.9	65	30-JUL-19
WG3119754-1 MB								
Total Coliforms			<1		MPN/100mL		1	30-JUL-19
Escherichia Coli			<1		MPN/100mL		1	30-JUL-19

Quality Control Report

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

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	29-JUL-19 13:15	31-JUL-19 12:00	0.25	47	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 L2319681 were received on 30-JUL-19 16:25.

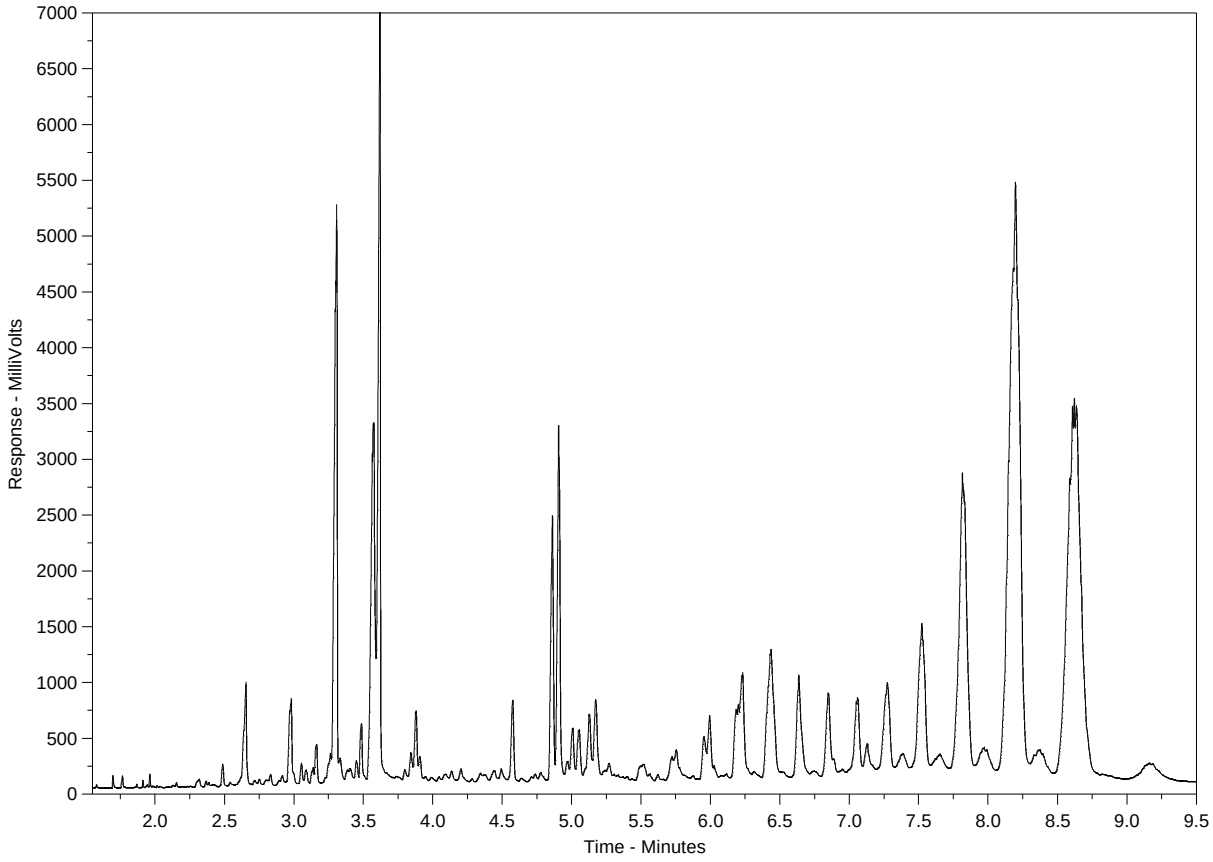
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

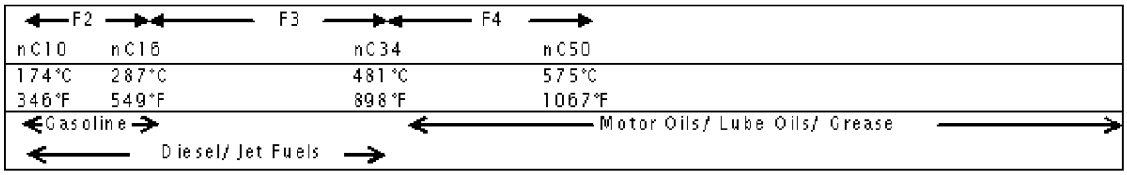
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2319681-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll

L2319681-COFC

COC # _____

Report To				Report				Service Requested (Rush for routine analysis subject to availability)	
Company:	Nunavut CGS - Rankin Inlet (W8133)			☑ Stand				◉ Regular (Standard Turnaround Times - Business Days)	
Contact:	SIMON DOIRON			☑ PDF			☐ 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:	aanderson@gov.nu.ca				
Invoice To	Same as Report ?	☑ Yes	☐ No	**Client / Project Information**				**Analysis Request**	
Hardcopy of Invoice with Report?		☐ Yes	☐ No	Job #:	Rankin Inlet WWTP- Monthly Effluent			Please indicate below Filtered, Preserved or both (F, P, F/P)	
Company:				**PO / AFE:**					
Contact:				LSD:					
Address:									
Phone:		Fax:		Quote #:					
Lab Work Order # (lab use only)				**ALS Contact:**	Craig Riddell	**Sampled By:**	Amanda Anderson		

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	Jul 29	1:15	Waste	x	x	x	x	x	15

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
manda Anderson	29/Jul/2019	1:15	JH	July 30	4:25	9.3 °C				

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

Date Received: 07-AUG-19
Report Date: 16-AUG-19 15:11 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2323983

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2323983-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 06-AUG-19 @ 10:30							
Matrix: WASTE							
BTEX							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		09-AUG-19	R4756835
Toluene	<0.0010		0.0010	mg/L		09-AUG-19	R4756835
Ethyl benzene	<0.00050		0.00050	mg/L		09-AUG-19	R4756835
o-Xylene	<0.00050		0.00050	mg/L		09-AUG-19	R4756835
m+p-Xylenes	<0.00040		0.00040	mg/L		09-AUG-19	R4756835
F1 (C6-C10)	<0.10		0.10	mg/L		09-AUG-19	R4756835
Surrogate: 4-Bromofluorobenzene (SS)	93.0		70-130	%		09-AUG-19	R4756835
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		15-AUG-19	
F2-Naphth	<0.10		0.10	mg/L		15-AUG-19	
F3-PAH	<0.25		0.25	mg/L		15-AUG-19	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		15-AUG-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		15-AUG-19	
Miscellaneous Parameters							
Fecal Coliforms	1720000	MBHT	1	MPN/100mL		07-AUG-19	R4744013
Total and E. coli to endpoint by QT97							
Total Coliforms	>24200000	MBHT	1	MPN/100mL		07-AUG-19	R4744249
Escherichia Coli	3260000	MBHT	1	MPN/100mL		07-AUG-19	R4744249
F2-F4 (O.Reg.153/04)							
F2 (C10-C16)	<100		100	ug/L	09-AUG-19	12-AUG-19	R4746599
F3 (C16-C34)	<250		250	ug/L	09-AUG-19	12-AUG-19	R4746599
F4 (C34-C50)	<250		250	ug/L	09-AUG-19	12-AUG-19	R4746599
Chrom. to baseline at nC50	YES				09-AUG-19	12-AUG-19	R4746599
Surrogate: 2-Bromobenzotrifluoride	90.1		60-140	%	09-AUG-19	12-AUG-19	R4746599
CCME PAHs in mg/L							
1-Methyl Naphthalene	0.000060		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
2-Methyl Naphthalene	0.000062		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Acenaphthene	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Acenaphthylene	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Anthracene	<0.000010		0.000010	mg/L	09-AUG-19	13-AUG-19	R4746580
Acridine	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Benzo(a)anthracene	<0.000010		0.000010	mg/L	09-AUG-19	13-AUG-19	R4746580
Benzo(a)pyrene	0.0000051		0.0000050	mg/L	09-AUG-19	13-AUG-19	R4746580
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	09-AUG-19	13-AUG-19	R4746580
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	09-AUG-19	13-AUG-19	R4746580
Chrysene	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Dibenzo(a,h)anthracene	0.0000147		0.0000050	mg/L	09-AUG-19	13-AUG-19	R4746580
Fluoranthene	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Fluorene	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	09-AUG-19	13-AUG-19	R4746580
Naphthalene	0.000088		0.000050	mg/L	09-AUG-19	13-AUG-19	R4746580
Phenanthrene	<0.000050		0.000050	mg/L	09-AUG-19	13-AUG-19	R4746580
Pyrene	<0.000010		0.000010	mg/L	09-AUG-19	13-AUG-19	R4746580
Quinoline	<0.000020		0.000020	mg/L	09-AUG-19	13-AUG-19	R4746580
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	09-AUG-19	13-AUG-19	R4746580
Surrogate: d8-Naphthalene	135.4		50-150	%	09-AUG-19	13-AUG-19	R4746580
Surrogate: d10-Phenanthrene	106.0		50-150	%	09-AUG-19	13-AUG-19	R4746580
Surrogate: d12-Chrysene	92.3		50-150	%	09-AUG-19	13-AUG-19	R4746580
Surrogate: d10-Acenaphthene	123.1		50-150	%	09-AUG-19	13-AUG-19	R4746580

* 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
L2323983-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 06-AUG-19 @ 10:30							
Matrix: WASTE							
CCME PAHs in mg/L							
Surrogate: d9-Acridine (SS)	100.2		50-150	%	09-AUG-19	13-AUG-19	R4746580
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	63.9		1.2	mg/L		09-AUG-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		09-AUG-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		09-AUG-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	52.4		1.0	mg/L		08-AUG-19	R4744874
Ammonia by colour							
Ammonia, Total (as N)	2.95		0.10	mg/L		07-AUG-19	R4744419
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	49		20	mg/L		08-AUG-19	R4753016
Carbonaceous BOD							
BOD Carbonaceous	40		20	mg/L		08-AUG-19	R4753016
Chloride in Water by IC							
Chloride (Cl)	38.0		0.50	mg/L		08-AUG-19	R4746733
Conductivity							
Conductivity	271		1.0	umhos/cm		08-AUG-19	R4744874
Hardness Calculated							
Hardness (as CaCO3)	62.5	HTC	0.20	mg/L		16-AUG-19	
Mercury Total							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L	08-AUG-19	09-AUG-19	R4746685
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		08-AUG-19	R4746733
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		08-AUG-19	R4746733
Oil & Grease - Gravimetric							
Oil and Grease	11.2		5.0	mg/L		12-AUG-19	R4747276
Phenol (4AAP)							
Phenols (4AAP)	0.0034		0.0010	mg/L		09-AUG-19	R4746535
Phosphorus, Total							
Phosphorus (P)-Total	1.01		0.0060	mg/L		09-AUG-19	R4745230
Sulfate in Water by IC							
Sulfate (SO4)	20.7		0.30	mg/L		08-AUG-19	R4746733
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0962		0.0030	mg/L	15-AUG-19	15-AUG-19	R4757095
Arsenic (As)-Total	0.00093		0.00010	mg/L	15-AUG-19	15-AUG-19	R4757095
Cadmium (Cd)-Total	0.0000299		0.0000050	mg/L	15-AUG-19	15-AUG-19	R4757095
Calcium (Ca)-Total	17.9		0.050	mg/L	15-AUG-19	15-AUG-19	R4757095
Chromium (Cr)-Total	0.00052		0.00010	mg/L	15-AUG-19	15-AUG-19	R4757095
Cobalt (Co)-Total	0.00021		0.00010	mg/L	15-AUG-19	15-AUG-19	R4757095
Copper (Cu)-Total	0.0714		0.00050	mg/L	15-AUG-19	15-AUG-19	R4757095
Iron (Fe)-Total	0.196		0.010	mg/L	15-AUG-19	15-AUG-19	R4757095
Lead (Pb)-Total	0.00114		0.000050	mg/L	15-AUG-19	15-AUG-19	R4757095
Magnesium (Mg)-Total	4.34		0.0050	mg/L	15-AUG-19	15-AUG-19	R4757095
Manganese (Mn)-Total	0.0435		0.00010	mg/L	15-AUG-19	15-AUG-19	R4757095
Nickel (Ni)-Total	0.00247		0.00050	mg/L	15-AUG-19	15-AUG-19	R4757095
Potassium (K)-Total	4.03		0.050	mg/L	15-AUG-19	15-AUG-19	R4757095

* 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
L2323983-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 06-AUG-19 @ 10:30							
Matrix: WASTE							
Total Metals in Water by CRC ICPMS							
Sodium (Na)-Total	20.1		0.050	mg/L	15-AUG-19	15-AUG-19	R4757095
Zinc (Zn)-Total	0.0506		0.0030	mg/L	15-AUG-19	15-AUG-19	R4757095
Total Organic Carbon by Combustion							
Total Organic Carbon	37.9		0.50	mg/L		15-AUG-19	R4757724
Total Suspended Solids							
Total Suspended Solids	45.9		2.0	mg/L		13-AUG-19	R4752484
pH							
pH	7.02		0.10	pH units		08-AUG-19	R4744874

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MBHT	The APHA 30 hour hold time was exceeded for microbiological testing. Samples processed within 48 hours from time of sampling may be valid in some cases (refer to Health Canada guidance).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-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 transfered 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-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.

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.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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-WT	Water	F2-F4 (O.Reg.153/04)	MOE DECPH-E3421/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

PAH-CCME-PPM-WT	Water	CCME PAHs in mg/L	EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

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)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-ENDPT-WP	Water	Total and E. coli to endpoint by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing serial dilutions 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: L2323983 Report Date: 16-AUG-19

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 R4744874								
WG3127828-5 DUP		**L2323983-1**						
Alkalinity, Total (as CaCO3)		52.4	52.3		mg/L	0.2	20	08-AUG-19
WG3127828-4 LCS								
Alkalinity, Total (as CaCO3)			100.8		%		85-115	08-AUG-19
WG3127828-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	08-AUG-19
BOD-CBOD-WP	**Water**							
Batch R4753016								
WG3126648-2 LCS								
BOD Carbonaceous			106.1		%		85-115	08-AUG-19
WG3126648-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	08-AUG-19
BOD-WP	**Water**							
Batch R4753016								
WG3126648-2 LCS								
Biochemical Oxygen Demand			109.7		%		85-115	08-AUG-19
WG3126648-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	08-AUG-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4756835								
WG3126980-2 LCS								
Benzene			89.0		%		70-130	08-AUG-19
Toluene			90.8		%		70-130	08-AUG-19
Ethyl benzene			99.9		%		70-130	08-AUG-19
o-Xylene			90.3		%		70-130	08-AUG-19
m+p-Xylenes			90.5		%		70-130	08-AUG-19
WG3126980-3 LCS								
F1 (C6-C10)			95.5		%		70-130	08-AUG-19
WG3126980-1 MB								
Benzene			<0.00050		mg/L		0.0005	08-AUG-19
Toluene			<0.0010		mg/L		0.001	08-AUG-19
Ethyl benzene			<0.00050		mg/L		0.0005	08-AUG-19
o-Xylene			<0.00030		mg/L		0.0003	08-AUG-19
m+p-Xylenes			<0.00040		mg/L		0.0004	08-AUG-19
F1 (C6-C10)			<0.10		mg/L		0.1	08-AUG-19
Surrogate: 4-Bromofluorobenzene (SS)			90.0		%		70-130	08-AUG-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4757724								
WG3134703-6 LCS								
Total Organic Carbon			105.5		%		80-120	15-AUG-19
WG3134703-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	15-AUG-19
CL-IC-N-WP	**Water**							
Batch R4746733								
WG3127304-10 LCS								
Chloride (Cl)			98.2		%		90-110	08-AUG-19
WG3127304-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	08-AUG-19
EC-WP	**Water**							
Batch R4744874								
WG3127828-5 DUP		**L2323983-1**						
Conductivity		271	273		umhos/cm	0.7	10	08-AUG-19
WG3127828-3 LCS								
Conductivity			98.0		%		90-110	08-AUG-19
WG3127828-1 MB								
Conductivity			<1.0		umhos/cm		1	08-AUG-19
F2-F4-WT	**Water**							
Batch R4746599								
WG3128165-2 LCS								
F2 (C10-C16)			95.2		%		65-135	12-AUG-19
F3 (C16-C34)			95.7		%		65-135	12-AUG-19
F4 (C34-C50)			101.7		%		65-135	12-AUG-19
WG3128165-1 MB								
F2 (C10-C16)			<100		ug/L		100	12-AUG-19
F3 (C16-C34)			<250		ug/L		250	12-AUG-19
F4 (C34-C50)			<250		ug/L		250	12-AUG-19
Surrogate: 2-Bromobenzotrifluoride			86.8		%		60-140	12-AUG-19
FC-QT97-ENDPT-WP	**Water**							
Batch R4744013								
WG3126323-2 DUP		**L2323983-1**						
Fecal Coliforms		1720000	1500000		MPN/100mL	14	65	07-AUG-19
WG3126323-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	07-AUG-19
HG-T-CVAA-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WP	**Water**							
Batch R4746685								
WG3130097-2 LCS								
Mercury (Hg)-Total			105.0		%		80-120	09-AUG-19
WG3130097-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	09-AUG-19
MET-T-CCMS-WP	**Water**							
Batch R4757095								
WG3133852-2 LCS								
Aluminum (Al)-Total			100.9		%		80-120	15-AUG-19
Arsenic (As)-Total			98.3		%		80-120	15-AUG-19
Cadmium (Cd)-Total			96.2		%		80-120	15-AUG-19
Calcium (Ca)-Total			93.7		%		80-120	15-AUG-19
Chromium (Cr)-Total			98.6		%		80-120	15-AUG-19
Cobalt (Co)-Total			94.4		%		80-120	15-AUG-19
Copper (Cu)-Total			95.9		%		80-120	15-AUG-19
Iron (Fe)-Total			88.0		%		80-120	15-AUG-19
Lead (Pb)-Total			97.1		%		80-120	15-AUG-19
Magnesium (Mg)-Total			106.3		%		80-120	15-AUG-19
Manganese (Mn)-Total			99.6		%		80-120	15-AUG-19
Nickel (Ni)-Total			94.2		%		80-120	15-AUG-19
Potassium (K)-Total			92.0		%		80-120	15-AUG-19
Sodium (Na)-Total			96.8		%		80-120	15-AUG-19
Zinc (Zn)-Total			98.0		%		80-120	15-AUG-19
WG3133852-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	15-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	15-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	15-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	15-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	15-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	15-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	15-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	15-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	15-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	15-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	15-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	15-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	15-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4757095								
WG3133852-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	15-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	15-AUG-19
NH3-COL-WP	**Water**							
Batch R4744419								
WG3127188-14 LCS								
Ammonia, Total (as N)			104.2		%		85-115	07-AUG-19
WG3127188-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	07-AUG-19
NO2-IC-N-WP	**Water**							
Batch R4746733								
WG3127304-10 LCS								
Nitrite (as N)			99.0		%		90-110	08-AUG-19
WG3127304-9 MB								
Nitrite (as N)			<0.010		mg/L		0.01	08-AUG-19
NO3-IC-N-WP	**Water**							
Batch R4746733								
WG3127304-10 LCS								
Nitrate (as N)			98.6		%		90-110	08-AUG-19
WG3127304-9 MB								
Nitrate (as N)			<0.020		mg/L		0.02	08-AUG-19
OG-GRAV-WP	**Water**							
Batch R4747276								
WG3128574-2 LCS								
Oil and Grease			93.6		%		70-130	12-AUG-19
WG3128574-1 MB								
Oil and Grease			<5.0		mg/L		5	12-AUG-19
P-T-COL-WP	**Water**							
Batch R4745230								
WG3127329-18 LCS								
Phosphorus (P)-Total			103.2		%		80-120	09-AUG-19
WG3127329-17 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	09-AUG-19
PAH-CCME-PPM-WT	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-CCME-PPM-WT	**Water**							
Batch R4746580								
WG3128165-2 LCS								
1-Methyl Naphthalene			114.6		%		50-150	12-AUG-19
2-Methyl Naphthalene			103.8		%		50-150	12-AUG-19
Acenaphthene			115.5		%		50-150	12-AUG-19
Acenaphthylene			111.0		%		50-150	12-AUG-19
Anthracene			103.9		%		50-150	12-AUG-19
Acridine			100.5		%		50-150	12-AUG-19
Benzo(a)anthracene			113.1		%		50-150	12-AUG-19
Benzo(a)pyrene			113.0		%		50-150	12-AUG-19
Benzo(b&j)fluoranthene			120.4		%		50-150	12-AUG-19
Benzo(g,h,i)perylene			104.1		%		50-150	12-AUG-19
Benzo(k)fluoranthene			126.0		%		50-150	12-AUG-19
Chrysene			119.3		%		50-150	12-AUG-19
Dibenzo(a,h)anthracene			110.9		%		50-150	12-AUG-19
Fluoranthene			116.8		%		50-150	12-AUG-19
Fluorene			112.0		%		50-150	12-AUG-19
Indeno(1,2,3-cd)pyrene			107.8		%		50-150	12-AUG-19
Naphthalene			106.3		%		50-150	12-AUG-19
Phenanthrene			116.3		%		50-150	12-AUG-19
Pyrene			110.5		%		50-150	12-AUG-19
Quinoline			114.2		%		50-150	12-AUG-19
WG3128165-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	12-AUG-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	12-AUG-19
Acenaphthene			<0.000020		mg/L		0.00002	12-AUG-19
Acenaphthylene			<0.000020		mg/L		0.00002	12-AUG-19
Anthracene			<0.000010		mg/L		0.00001	12-AUG-19
Acridine			<0.000020		mg/L		0.00002	12-AUG-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	12-AUG-19
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	12-AUG-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	12-AUG-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	12-AUG-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	12-AUG-19
Chrysene			<0.000020		mg/L		0.00002	12-AUG-19
Dibenzo(a,h)anthracene			<0.0000050		mg/L		0.000005	12-AUG-19

Quality Control Report

Workorder: L2323983 Report Date: 16-AUG-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-CCME-PPM-WT	**Water**							
Batch R4746580								
WG3128165-1 MB								
Fluoranthene			<0.000020		mg/L		0.00002	12-AUG-19
Fluorene			<0.000020		mg/L		0.00002	12-AUG-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	12-AUG-19
Naphthalene			<0.000050		mg/L		0.00005	12-AUG-19
Phenanthrene			<0.000050		mg/L		0.00005	12-AUG-19
Pyrene			<0.000010		mg/L		0.00001	12-AUG-19
Quinoline			<0.000020		mg/L		0.00002	12-AUG-19
Surrogate: d8-Naphthalene			99.1		%		50-150	12-AUG-19
Surrogate: d10-Phenanthrene			103.2		%		50-150	12-AUG-19
Surrogate: d12-Chrysene			101.1		%		50-150	12-AUG-19
Surrogate: d10-Acenaphthene			104.4		%		50-150	12-AUG-19
Surrogate: d9-Acridine (SS)			80.8		%		50-150	12-AUG-19
PH-WP	**Water**							
Batch R4744874								
WG3127828-5 DUP		**L2323983-1**						
pH		7.02	7.02	J	pH units	0.00	0.2	08-AUG-19
WG3127828-2 LCS								
pH			7.40		pH units		7.3-7.5	08-AUG-19
PHENOLS-4AAP-WT	**Water**							
Batch R4746535								
WG3128502-2 LCS								
Phenols (4AAP)			105.5		%		85-115	09-AUG-19
WG3128502-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	09-AUG-19
SO4-IC-N-WP	**Water**							
Batch R4746733								
WG3127304-10 LCS								
Sulfate (SO4)			99.8		%		90-110	08-AUG-19
WG3127304-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	08-AUG-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4752484								
WG3130115-30 LCS								
Total Suspended Solids			91.1		%		85-115	13-AUG-19
WG3130115-29 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOTSUS-WP	**Water**							
Batch R4752484								
WG3130115-29 MB								
Total Suspended Solids			<2.0		mg/L		2	13-AUG-19
TC,EC-QT97-ENDPT-WP	**Water**							
Batch R4744249								
WG3126324-2 DUP		**L2323983-1**						
Total Coliforms		>24200000	24200000		MPN/100mL	0.1	65	07-AUG-19
Escherichia Coli		3260000	2250000		MPN/100mL	37	65	07-AUG-19
WG3126324-1 MB								
Total Coliforms			<1		MPN/100mL		1	07-AUG-19
Escherichia Coli			<1		MPN/100mL		1	07-AUG-19

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.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	06-AUG-19 10:30	08-AUG-19 12:00	0.25	49	hours	EHTR-FM
Bacteriological Tests							
Fecal Coliform to endpoint by MPN QT97							
	1	06-AUG-19 10:30	07-AUG-19 18:50	30	32	hours	EHTL
Total and E. coli to endpoint by QT97							
	1	06-AUG-19 10:30	07-AUG-19 18:50	30	32	hours	EHTL

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 L2323983 were received on 07-AUG-19 14:00.

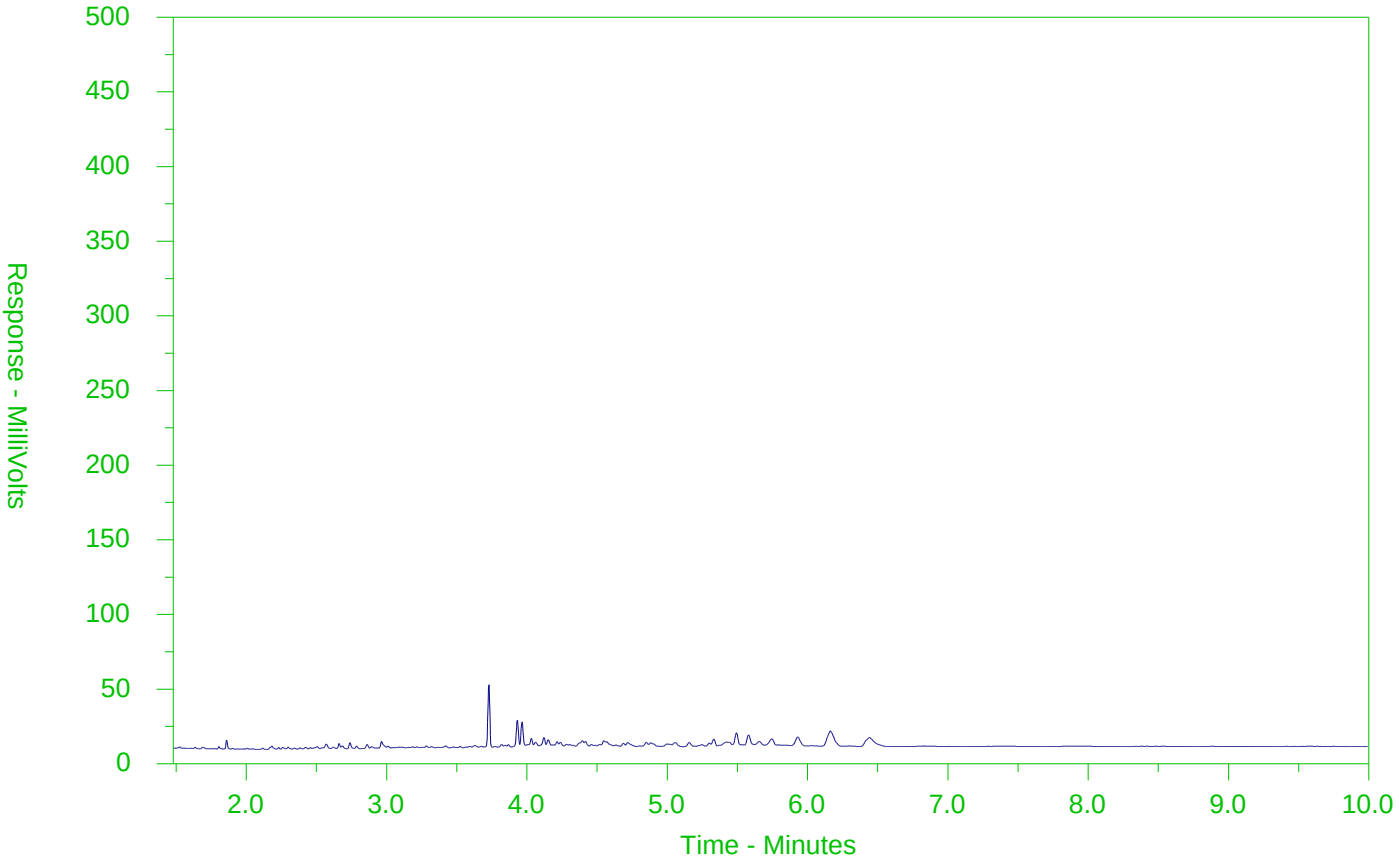
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where 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: L2323983-1
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 the 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.

ALS Environmental

Chain of Custody / Analytical Request Form

1 800 668 9878

L2323983-COFC

COC # _____

Page 1 of 1

Report To

Company:	Nunavut CGS - Rankin Inlet (W8133)
Contact:	SIMON DOIRON
Address:	Box 490
	Rankin Inlet , NU, X0C 0G0
Phone:	867-645-8155 Cell# :
Invoice To	Same as Report ? ☑ Yes ☐ No
Hardcopy of Invoice with Report?	☐ Yes ☐ No
Company:	
Contact:	
Address:	
Phone:	Fax:
Lab Work Order # (lab use only)	

Fax

Email 1: sdoiron@gov.nu.ca
Email 2: mlusty@gov.nu.ca
Email 3: aanderson@gov.nu.ca

Client / Project Information

Job #: Rankin Inlet WWTP- Monthly Effluent
PO / AFE:
LSD:
Quote #:

ALS Contact: Craig Riddell **Sampled By:** Amanda Anderson

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
- ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	Aug 6	10:30	Waste	x	x	x	x	x	15

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	06/Aug/19	10:30	DK	AUG 07 2019	2:00	15.8 °C				

GENF 18.01 Front

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

Date Received: 13-AUG-19
Report Date: 23-AUG-19 11:42 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2327566

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2327566-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 12-AUG-19 @ 13:15							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		16-AUG-19	R4762569
Toluene	<0.0010		0.0010	mg/L		16-AUG-19	R4762569
Ethyl benzene	<0.00050		0.00050	mg/L		16-AUG-19	R4762569
o-Xylene	<0.00050		0.00050	mg/L		16-AUG-19	R4762569
m+p-Xylenes	<0.00040		0.00040	mg/L		16-AUG-19	R4762569
F1 (C6-C10)	<0.10		0.10	mg/L		16-AUG-19	R4762569
Surrogate: 4-Bromofluorobenzene (SS)	89.0		70-130	%		16-AUG-19	R4762569
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.12		0.10	mg/L	15-AUG-19	15-AUG-19	R4757751
F3 (C16-C34)	1.86		0.25	mg/L	15-AUG-19	15-AUG-19	R4757751
F4 (C34-C50)	0.78		0.25	mg/L	15-AUG-19	15-AUG-19	R4757751
Surrogate: 2-Bromobenzotrifluoride	96.6		60-140	%	15-AUG-19	15-AUG-19	R4757751
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		21-AUG-19	
F2-Naphth	0.11		0.10	mg/L		21-AUG-19	
F3-PAH	1.86		0.25	mg/L		21-AUG-19	
Total Hydrocarbons (C6-C50)	2.76		0.38	mg/L		21-AUG-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		21-AUG-19	
Miscellaneous Parameters							
Fecal Coliforms	677000		1	MPN/100mL		13-AUG-19	R4752760
Total and E. coli to endpoint by QT97							
Total Coliforms	15500000		1	MPN/100mL		13-AUG-19	R4752766
Escherichia Coli	1020000		1	MPN/100mL		13-AUG-19	R4752766
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.00327		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
2-Methyl Naphthalene	0.00692		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Acenaphthene	0.000114	EMPC	0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Acenaphthylene	0.000026		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Anthracene	<0.000010		0.000010	mg/L	16-AUG-19	16-AUG-19	R4757673
Acridine	<0.000020		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Benzo(a)anthracene	<0.000010		0.000010	mg/L	16-AUG-19	16-AUG-19	R4757673
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	16-AUG-19	16-AUG-19	R4757673
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	16-AUG-19	16-AUG-19	R4757673
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	16-AUG-19	16-AUG-19	R4757673
Chrysene	<0.000020		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	16-AUG-19	16-AUG-19	R4757673
Fluoranthene	<0.000020		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Fluorene	0.000210		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	16-AUG-19	16-AUG-19	R4757673
Naphthalene	0.00376		0.000050	mg/L	16-AUG-19	16-AUG-19	R4757673
Phenanthrene	<0.000050		0.000050	mg/L	16-AUG-19	16-AUG-19	R4757673
Pyrene	<0.000010		0.000010	mg/L	16-AUG-19	16-AUG-19	R4757673
Quinoline	<0.000020		0.000020	mg/L	16-AUG-19	16-AUG-19	R4757673
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	16-AUG-19	16-AUG-19	R4757673
Surrogate: Acenaphthene d10	102.1		60-130	%	16-AUG-19	16-AUG-19	R4757673
Surrogate: Acridine d9	91.2		60-130	%	16-AUG-19	16-AUG-19	R4757673
Surrogate: Chrysene d12	94.9		60-130	%	16-AUG-19	16-AUG-19	R4757673
Surrogate: Naphthalene d8	93.4		50-130	%	16-AUG-19	16-AUG-19	R4757673
Surrogate: Phenanthrene d10	100.5		60-130	%	16-AUG-19	16-AUG-19	R4757673

* 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
L2327566-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 12-AUG-19 @ 13:15							
Matrix: WASTE							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	53.4		1.2	mg/L		16-AUG-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		16-AUG-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		16-AUG-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	43.8		1.0	mg/L		15-AUG-19	R4757241
Ammonia by colour							
Ammonia, Total (as N)	1.99		0.10	mg/L		14-AUG-19	R4756488
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	16.7		6.0	mg/L		14-AUG-19	R4759527
Carbonaceous BOD							
BOD Carbonaceous	13.8		6.0	mg/L		14-AUG-19	R4759527
Chloride in Water by IC							
Chloride (Cl)	35.8		0.50	mg/L		15-AUG-19	R4757306
Conductivity							
Conductivity	241		1.0	umhos/cm		15-AUG-19	R4757241
Hardness Calculated							
Hardness (as CaCO3)	63.8	HTC	0.20	mg/L		22-AUG-19	
Mercury Total							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L	19-AUG-19	22-AUG-19	R4765809
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		15-AUG-19	R4757306
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-AUG-19	R4757306
Oil & Grease - Gravimetric							
Oil and Grease	7.4		5.0	mg/L		20-AUG-19	R4759566
Phenol (4AAP)							
Phenols (4AAP)	0.0021		0.0010	mg/L		14-AUG-19	R4753047
Phosphorus, Total							
Phosphorus (P)-Total	0.482		0.0030	mg/L		15-AUG-19	R4755950
Sulfate in Water by IC							
Sulfate (SO4)	19.3		0.30	mg/L		15-AUG-19	R4757306
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0841		0.0030	mg/L	21-AUG-19	21-AUG-19	R4762873
Arsenic (As)-Total	0.00076		0.00010	mg/L	21-AUG-19	21-AUG-19	R4762873
Cadmium (Cd)-Total	0.0000242		0.0000050	mg/L	21-AUG-19	21-AUG-19	R4762873
Calcium (Ca)-Total	18.4		0.050	mg/L	21-AUG-19	21-AUG-19	R4762873
Chromium (Cr)-Total	0.00037		0.00010	mg/L	21-AUG-19	21-AUG-19	R4762873
Cobalt (Co)-Total	0.00019		0.00010	mg/L	21-AUG-19	21-AUG-19	R4762873
Copper (Cu)-Total	0.0549		0.00050	mg/L	21-AUG-19	21-AUG-19	R4762873
Iron (Fe)-Total	0.126		0.010	mg/L	21-AUG-19	21-AUG-19	R4762873
Lead (Pb)-Total	0.00109		0.000050	mg/L	21-AUG-19	21-AUG-19	R4762873
Magnesium (Mg)-Total	4.33		0.0050	mg/L	21-AUG-19	21-AUG-19	R4762873
Manganese (Mn)-Total	0.0438		0.00010	mg/L	21-AUG-19	21-AUG-19	R4762873
Nickel (Ni)-Total	0.00099		0.00050	mg/L	21-AUG-19	21-AUG-19	R4762873
Potassium (K)-Total	3.46		0.050	mg/L	21-AUG-19	21-AUG-19	R4762873
Sodium (Na)-Total	21.3		0.050	mg/L	21-AUG-19	21-AUG-19	R4762873
Zinc (Zn)-Total	0.0265		0.0030	mg/L	21-AUG-19	21-AUG-19	R4762873

* 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
L2327566-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 12-AUG-19 @ 13:15							
Matrix: WASTE							
Total Organic Carbon by Combustion							
Total Organic Carbon	18.2		0.50	mg/L		16-AUG-19	R4758901
Total Suspended Solids							
Total Suspended Solids	43.5		2.0	mg/L		19-AUG-19	R4759865
pH							
pH	7.27		0.10	pH units		15-AUG-19	R4757241

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
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.

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 transfered 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-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.

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.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-ENDPT-WP	Water	Total and E. coli to endpoint by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Total coliforms and Escherichia coli bacteria are simultaneously determined by mixing serial dilutions 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

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 R4757241								
WG3134736-30 DUP		**L2327566-1**						
Alkalinity, Total (as CaCO3)		43.8	43.6		mg/L	0.5	20	15-AUG-19
WG3134736-29 LCS								
Alkalinity, Total (as CaCO3)			100.9		%		85-115	15-AUG-19
WG3134736-26 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	15-AUG-19
BOD-CBOD-WP	**Water**							
Batch R4759527								
WG3132087-7 LCS								
BOD Carbonaceous			95.2		%		85-115	14-AUG-19
WG3132087-6 MB								
BOD Carbonaceous			<2.0		mg/L		2	14-AUG-19
BOD-WP	**Water**							
Batch R4759527								
WG3132087-7 LCS								
Biochemical Oxygen Demand			96.0		%		85-115	14-AUG-19
WG3132087-6 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	14-AUG-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4762569								
WG3134039-2 LCS								
Benzene			90.3		%		70-130	15-AUG-19
Toluene			91.8		%		70-130	15-AUG-19
Ethyl benzene			99.7		%		70-130	15-AUG-19
o-Xylene			93.4		%		70-130	15-AUG-19
m+p-Xylenes			96.8		%		70-130	15-AUG-19
WG3134039-3 LCS								
F1 (C6-C10)			105.3		%		70-130	16-AUG-19
WG3134039-1 MB								
Benzene			<0.00050		mg/L		0.0005	16-AUG-19
Toluene			<0.0010		mg/L		0.001	16-AUG-19
Ethyl benzene			<0.00050		mg/L		0.0005	16-AUG-19
o-Xylene			<0.00050		mg/L		0.0005	16-AUG-19
m+p-Xylenes			<0.00040		mg/L		0.0004	16-AUG-19
F1 (C6-C10)			<0.10		mg/L		0.1	16-AUG-19
Surrogate: 4-Bromofluorobenzene (SS)			91.0		%		70-130	16-AUG-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Workorder: L2327566 Report Date: 23-AUG-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4758901								
WG3136582-6 LCS								
Total Organic Carbon			101.5		%		80-120	16-AUG-19
WG3136582-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-AUG-19
CL-IC-N-WP	**Water**							
Batch R4757306								
WG3133622-2 LCS								
Chloride (Cl)			99.0		%		90-110	15-AUG-19
WG3133622-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	15-AUG-19
EC-WP	**Water**							
Batch R4757241								
WG3134736-30 DUP		**L2327566-1**						
Conductivity		241	240		umhos/cm	0.4	10	15-AUG-19
WG3134736-28 LCS								
Conductivity			98.0		%		90-110	15-AUG-19
WG3134736-26 MB								
Conductivity			<1.0		umhos/cm		1	15-AUG-19
F2-F4-FID-WP	**Water**							
Batch R4757751								
WG3133697-2 LCS								
F2 (C10-C16)			89.6		%		70-130	15-AUG-19
F3 (C16-C34)			89.9		%		70-130	15-AUG-19
F4 (C34-C50)			94.7		%		70-130	15-AUG-19
WG3133697-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	15-AUG-19
F3 (C16-C34)			<0.25		mg/L		0.25	15-AUG-19
F4 (C34-C50)			<0.25		mg/L		0.25	15-AUG-19
Surrogate: 2-Bromobenzotrifluoride			97.5		%		60-140	15-AUG-19
FC-QT97-ENDPT-WP	**Water**							
Batch R4752760								
WG3131725-2 DUP		**L2327566-1**						
Fecal Coliforms		677000	546000		MPN/100mL	21	65	13-AUG-19
WG3131725-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	13-AUG-19
HG-T-CVAA-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WP	**Water**							
Batch R4765809								
WG3141537-2 LCS								
Mercury (Hg)-Total			98.0		%		80-120	22-AUG-19
WG3141537-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	22-AUG-19
MET-T-CCMS-WP	**Water**							
Batch R4762873								
WG3139155-2 LCS								
Aluminum (Al)-Total			106.4		%		80-120	21-AUG-19
Arsenic (As)-Total			105.1		%		80-120	21-AUG-19
Cadmium (Cd)-Total			106.1		%		80-120	21-AUG-19
Calcium (Ca)-Total			107.7		%		80-120	21-AUG-19
Chromium (Cr)-Total			109.2		%		80-120	21-AUG-19
Cobalt (Co)-Total			109.0		%		80-120	21-AUG-19
Copper (Cu)-Total			112.1		%		80-120	21-AUG-19
Iron (Fe)-Total			102.5		%		80-120	21-AUG-19
Lead (Pb)-Total			96.3		%		80-120	21-AUG-19
Magnesium (Mg)-Total			117.0		%		80-120	21-AUG-19
Manganese (Mn)-Total			106.2		%		80-120	21-AUG-19
Nickel (Ni)-Total			103.2		%		80-120	21-AUG-19
Potassium (K)-Total			102.6		%		80-120	21-AUG-19
Sodium (Na)-Total			115.0		%		80-120	21-AUG-19
Zinc (Zn)-Total			108.7		%		80-120	21-AUG-19
WG3139155-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	21-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	21-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	21-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	21-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	21-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	21-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	21-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	21-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	21-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	21-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	21-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	21-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	21-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4762873								
WG3139155-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	21-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	21-AUG-19
NH3-COL-WP	**Water**							
Batch R4756488								
WG3133870-14 LCS								
Ammonia, Total (as N)			102.1		%		85-115	14-AUG-19
WG3133870-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	14-AUG-19
NO2-IC-N-WP	**Water**							
Batch R4757306								
WG3133622-2 LCS								
Nitrite (as N)			99.2		%		90-110	15-AUG-19
WG3133622-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	15-AUG-19
NO3-IC-N-WP	**Water**							
Batch R4757306								
WG3133622-2 LCS								
Nitrate (as N)			98.6		%		90-110	15-AUG-19
WG3133622-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	15-AUG-19
OG-GRAV-WP	**Water**							
Batch R4759566								
WG3134989-2 LCS								
Oil and Grease			95.1		%		70-130	20-AUG-19
WG3134989-1 MB								
Oil and Grease			<5.0		mg/L		5	20-AUG-19
P-T-COL-WP	**Water**							
Batch R4755950								
WG3132843-2 LCS								
Phosphorus (P)-Total			102.0		%		80-120	15-AUG-19
WG3132843-1 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	15-AUG-19
PAH,PANH-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4757673								
WG3135233-2 LCS								
1-Methyl Naphthalene			92.4		%		60-130	16-AUG-19
2-Methyl Naphthalene			85.3		%		60-130	16-AUG-19
Acenaphthene			94.0		%		60-130	16-AUG-19
Acenaphthylene			83.9		%		60-130	16-AUG-19
Anthracene			77.7		%		60-130	16-AUG-19
Acridine			90.8		%		60-130	16-AUG-19
Benzo(a)anthracene			90.6		%		60-130	16-AUG-19
Benzo(a)pyrene			87.6		%		60-130	16-AUG-19
Benzo(b&j)fluoranthene			88.0		%		60-130	16-AUG-19
Benzo(g,h,i)perylene			102.7		%		60-130	16-AUG-19
Benzo(k)fluoranthene			94.6		%		60-130	16-AUG-19
Chrysene			87.6		%		60-130	16-AUG-19
Dibenzo(a,h)anthracene			96.1		%		60-130	16-AUG-19
Fluoranthene			93.6		%		60-130	16-AUG-19
Fluorene			93.8		%		60-130	16-AUG-19
Indeno(1,2,3-cd)pyrene			87.8		%		60-130	16-AUG-19
Naphthalene			105.1		%		50-130	16-AUG-19
Phenanthrene			104.9		%		60-130	16-AUG-19
Pyrene			91.6		%		60-130	16-AUG-19
Quinoline			93.3		%		60-130	16-AUG-19
WG3135233-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	16-AUG-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	16-AUG-19
Acenaphthene			<0.000020		mg/L		0.00002	16-AUG-19
Acenaphthylene			<0.000020		mg/L		0.00002	16-AUG-19
Anthracene			<0.000010		mg/L		0.00001	16-AUG-19
Acridine			<0.000020		mg/L		0.00002	16-AUG-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	16-AUG-19
Benzo(a)pyrene			<0.000005		mg/L		0.000005	16-AUG-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	16-AUG-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	16-AUG-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	16-AUG-19
Chrysene			<0.000020		mg/L		0.00002	16-AUG-19
Dibenzo(a,h)anthracene			<0.000005		mg/L		0.000005	16-AUG-19

Quality Control Report

Workorder: L2327566 Report Date: 23-AUG-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4757673								
WG3135233-1 MB								
Fluoranthene			<0.000020		mg/L		0.00002	16-AUG-19
Fluorene			<0.000020		mg/L		0.00002	16-AUG-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	16-AUG-19
Naphthalene			<0.000050		mg/L		0.00005	16-AUG-19
Phenanthrene			<0.000050		mg/L		0.00005	16-AUG-19
Pyrene			<0.000010		mg/L		0.00001	16-AUG-19
Quinoline			<0.000020		mg/L		0.00002	16-AUG-19
Surrogate: Acenaphthene d10			85.3		%		60-130	16-AUG-19
Surrogate: Acridine d9			75.4		%		60-130	16-AUG-19
Surrogate: Chrysene d12			94.3		%		60-130	16-AUG-19
Surrogate: Naphthalene d8			83.7		%		50-130	16-AUG-19
Surrogate: Phenanthrene d10			78.9		%		60-130	16-AUG-19
PH-WP	**Water**							
Batch R4757241								
WG3134736-30 DUP		**L2327566-1**						
pH		7.27	7.28	J	pH units	0.01	0.2	15-AUG-19
WG3134736-27 LCS								
pH			7.41		pH units		7.3-7.5	15-AUG-19
PHENOLS-4AAP-WT	**Water**							
Batch R4753047								
WG3132612-2 LCS								
Phenols (4AAP)			99.2		%		85-115	14-AUG-19
WG3132612-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	14-AUG-19
SO4-IC-N-WP	**Water**							
Batch R4757306								
WG3133622-2 LCS								
Sulfate (SO4)			100.4		%		90-110	15-AUG-19
WG3133622-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	15-AUG-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4759865								
WG3135103-6 LCS								
Total Suspended Solids			96.1		%		85-115	19-AUG-19
WG3135103-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOTSUS-WP	**Water**							
Batch R4759865								
WG3135103-5 MB								
Total Suspended Solids			<2.0		mg/L		2	19-AUG-19
TC,EC-QT97-ENDPT-WP	**Water**							
Batch R4752766								
WG3131726-2 DUP		**L2327566-1**						
Total Coliforms		15500000	8660000		MPN/100mL	57	65	13-AUG-19
Escherichia Coli		1020000	727000		MPN/100mL	33	65	13-AUG-19
WG3131726-1 MB								
Total Coliforms			<1		MPN/100mL		1	13-AUG-19
Escherichia Coli			<1		MPN/100mL		1	13-AUG-19

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.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	12-AUG-19 13:15	15-AUG-19 12:00	0.25	71	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 L2327566 were received on 13-AUG-19 13:15.

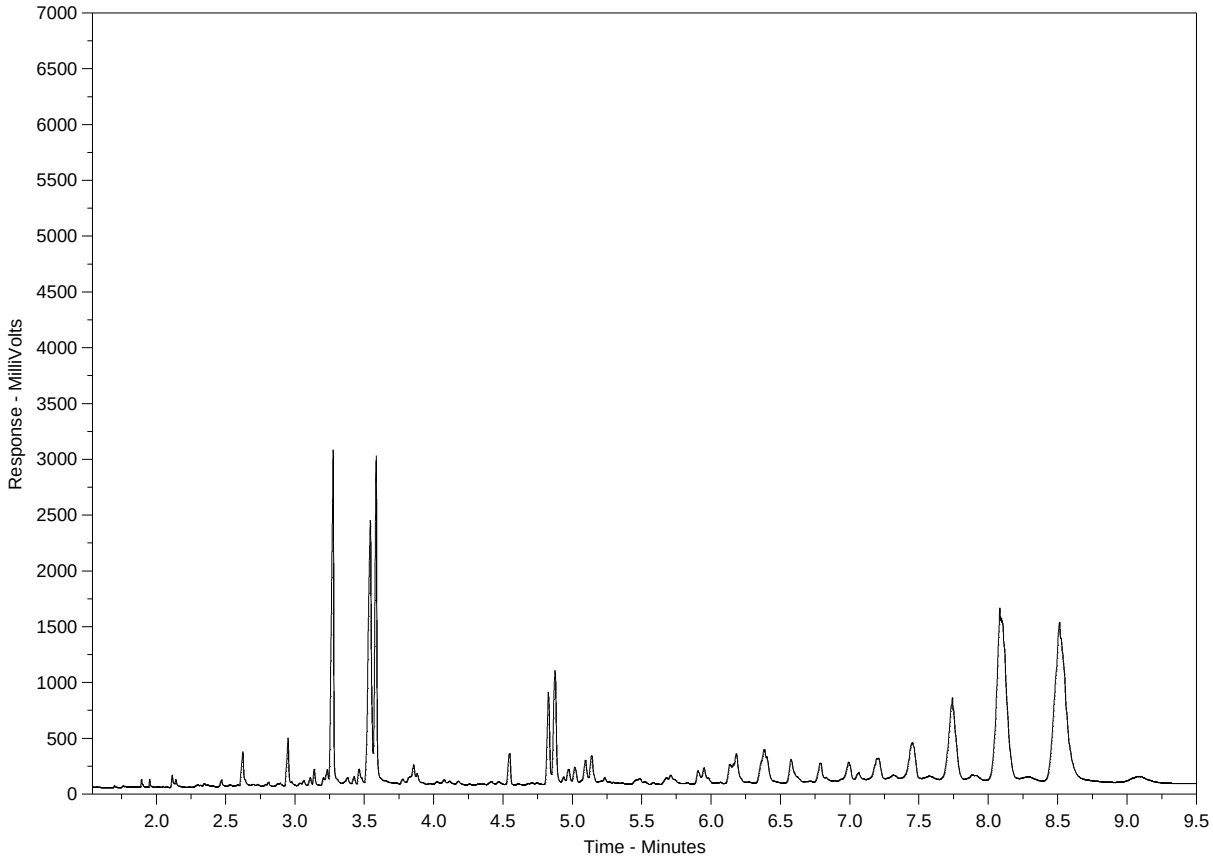
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

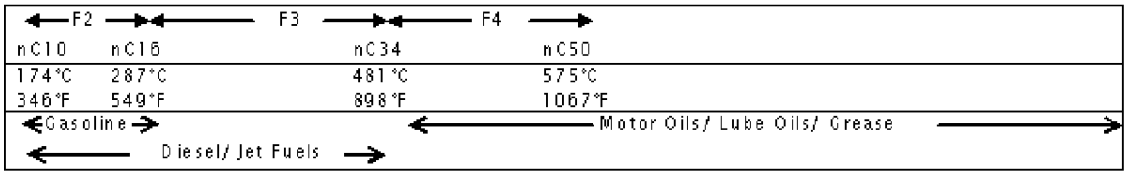
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2327566-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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.

ALS Environmental

Chain of Custody / Analytical Request Form

L2327566-COFC

COC # _____

Report To				Service Requested (Rush for routine analysis subject to availability)
Company:	Nunavut CGS - Rankin Inlet (W8133)			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	SIMON DOIRON			○ 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:	aanderson@gov.nu.ca	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #:	Rankin Inlet WWTP- Monthly Effluent	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		**PO / AFE:**		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		**ALS Contact:** Craig Riddell	**Sampled By:** Amanda Anderson	

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	Aug 12	1:15	Waste	x	x	x	x	x	17 ~~15~~

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	12-Aug-19	1:15	DK	AUG 13 2019	1:15	13.1°C		AUG 13 2019	1:30	

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

Date Received: 21-AUG-19
Report Date: 30-AUG-19 09:06 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2332810

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2332810-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 19-AUG-19 @ 09:15							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		23-AUG-19	R4765656
Toluene	<0.0010		0.0010	mg/L		23-AUG-19	R4765656
Ethyl benzene	<0.00050		0.00050	mg/L		23-AUG-19	R4765656
o-Xylene	<0.00050		0.00050	mg/L		23-AUG-19	R4765656
m+p-Xylenes	<0.00040		0.00040	mg/L		23-AUG-19	R4765656
F1 (C6-C10)	<0.10		0.10	mg/L		23-AUG-19	R4765656
Surrogate: 4-Bromofluorobenzene (SS)	87.0		70-130	%		23-AUG-19	R4765656
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.54		0.10	mg/L	22-AUG-19	22-AUG-19	R4766908
F3 (C16-C34)	13.8		0.25	mg/L	22-AUG-19	22-AUG-19	R4766908
F4 (C34-C50)	4.91		0.25	mg/L	22-AUG-19	22-AUG-19	R4766908
Surrogate: 2-Bromobenzotrifluoride	116.4		60-140	%	22-AUG-19	22-AUG-19	R4766908
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		29-AUG-19	
F2-Naphth	0.54		0.10	mg/L		29-AUG-19	
F3-PAH	13.8		0.25	mg/L		29-AUG-19	
Total Hydrocarbons (C6-C50)	19.3		0.38	mg/L		29-AUG-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		27-AUG-19	
Miscellaneous Parameters							
Fecal Coliforms	81600	PEHR	1	MPN/100mL		21-AUG-19	R4764012
Total and E. coli to endpoint by QT97							
Total Coliforms	4110000	PEHR	1	MPN/100mL		21-AUG-19	R4764034
Escherichia Coli	146000	PEHR	1	MPN/100mL		21-AUG-19	R4764034
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
2-Methyl Naphthalene	<0.000030	DLM	0.000030	mg/L	22-AUG-19	26-AUG-19	R4770079
Acenaphthene	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
Acenaphthylene	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
Anthracene	<0.000010		0.000010	mg/L	22-AUG-19	26-AUG-19	R4770079
Acridine	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
Benzo(a)anthracene	<0.000010		0.000010	mg/L	22-AUG-19	26-AUG-19	R4770079
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	22-AUG-19	26-AUG-19	R4770079
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	22-AUG-19	26-AUG-19	R4770079
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	22-AUG-19	26-AUG-19	R4770079
Chrysene	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	22-AUG-19	26-AUG-19	R4770079
Fluoranthene	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
Fluorene	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	22-AUG-19	26-AUG-19	R4770079
Naphthalene	<0.000050		0.000050	mg/L	22-AUG-19	26-AUG-19	R4770079
Phenanthrene	<0.000050		0.000050	mg/L	22-AUG-19	26-AUG-19	R4770079
Pyrene	<0.000010		0.000010	mg/L	22-AUG-19	26-AUG-19	R4770079
Quinoline	<0.000020		0.000020	mg/L	22-AUG-19	26-AUG-19	R4770079
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	22-AUG-19	26-AUG-19	R4770079
Surrogate: Acenaphthene d10	93.6		60-130	%	22-AUG-19	26-AUG-19	R4770079
Surrogate: Acridine d9	109.4		60-130	%	22-AUG-19	26-AUG-19	R4770079
Surrogate: Chrysene d12	104.8		60-130	%	22-AUG-19	26-AUG-19	R4770079
Surrogate: Naphthalene d8	89.0		50-130	%	22-AUG-19	26-AUG-19	R4770079
Surrogate: Phenanthrene d10	112.3		60-130	%	22-AUG-19	26-AUG-19	R4770079

* 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
L2332810-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 19-AUG-19 @ 09:15							
Matrix: WASTE							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	43.6		1.2	mg/L		23-AUG-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		23-AUG-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		23-AUG-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	35.7		1.0	mg/L		22-AUG-19	R4765529
Ammonia by colour							
Ammonia, Total (as N)	1.26		0.10	mg/L		21-AUG-19	R4765054
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	11.8		2.0	mg/L		21-AUG-19	R4769412
Carbonaceous BOD							
BOD Carbonaceous	9.9		2.0	mg/L		21-AUG-19	R4769412
Chloride in Water by IC							
Chloride (Cl)	33.1		0.50	mg/L		22-AUG-19	R4769733
Conductivity							
Conductivity	216		1.0	umhos/cm		22-AUG-19	R4765529
Hardness Calculated							
Hardness (as CaCO3)	117	HTC	0.20	mg/L		30-AUG-19	
Mercury Total							
Mercury (Hg)-Total	<0.000025	DLM	0.000025	mg/L	23-AUG-19	24-AUG-19	R4768415
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-AUG-19	R4769733
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		28-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-AUG-19	R4769733
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		27-AUG-19	R4769771
Phenol (4AAP)							
Phenols (4AAP)	0.0026		0.0010	mg/L		26-AUG-19	R4769626
Phosphorus, Total							
Phosphorus (P)-Total	0.395		0.0030	mg/L		23-AUG-19	R4766335
Sulfate in Water by IC							
Sulfate (SO4)	17.8		0.30	mg/L		22-AUG-19	R4769733
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.150		0.0030	mg/L	29-AUG-19	29-AUG-19	R4777903
Arsenic (As)-Total	0.00172		0.00010	mg/L	29-AUG-19	29-AUG-19	R4777903
Cadmium (Cd)-Total	0.000104		0.0000050	mg/L	29-AUG-19	29-AUG-19	R4777903
Calcium (Ca)-Total	34.9		0.050	mg/L	29-AUG-19	29-AUG-19	R4777903
Chromium (Cr)-Total	0.00113		0.00010	mg/L	29-AUG-19	29-AUG-19	R4777903
Cobalt (Co)-Total	0.00054		0.00010	mg/L	29-AUG-19	29-AUG-19	R4777903
Copper (Cu)-Total	0.178		0.00050	mg/L	29-AUG-19	29-AUG-19	R4777903
Iron (Fe)-Total	0.359		0.010	mg/L	29-AUG-19	29-AUG-19	R4777903
Lead (Pb)-Total	0.00207		0.000050	mg/L	29-AUG-19	29-AUG-19	R4777903
Magnesium (Mg)-Total	7.12		0.0050	mg/L	29-AUG-19	29-AUG-19	R4777903
Manganese (Mn)-Total	0.0893		0.00010	mg/L	29-AUG-19	29-AUG-19	R4777903
Nickel (Ni)-Total	0.00607		0.00050	mg/L	29-AUG-19	29-AUG-19	R4777903
Potassium (K)-Total	10.2		0.050	mg/L	29-AUG-19	29-AUG-19	R4777903
Sodium (Na)-Total	31.9		0.050	mg/L	29-AUG-19	29-AUG-19	R4777903
Zinc (Zn)-Total	0.123		0.0030	mg/L	29-AUG-19	29-AUG-19	R4777903

* 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
L2332810-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: AA on 19-AUG-19 @ 09:15							
Matrix: WASTE							
Total Organic Carbon by Combustion							
Total Organic Carbon	8.84		0.50	mg/L		27-AUG-19	R4771648
Total Suspended Solids							
Total Suspended Solids	7.9		2.0	mg/L		26-AUG-19	R4769437
pH							
pH	7.68		0.10	pH units		22-AUG-19	R4765529

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

Reference Information

Qualifiers for Individual Samples Listed:

Lab Sample ID	Client Sample ID	Qualifier	Description
L2332810-1	RANKIN INLET WWTP - EFFI	PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
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.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

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 transfered 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-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.

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.

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-ENDPT-WP	Water	Total and E. coli to endpoint by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing serial dilutions 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

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 R4765529								
WG3141365-24 LCS								
Alkalinity, Total (as CaCO3)			108.5		%		85-115	22-AUG-19
WG3141365-21 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	22-AUG-19
BOD-CBOD-WP	**Water**							
Batch R4769412								
WG3138274-12 LCS								
BOD Carbonaceous			97.7		%		85-115	21-AUG-19
WG3138274-11 MB								
BOD Carbonaceous			<2.0		mg/L		2	21-AUG-19
BOD-WP	**Water**							
Batch R4769412								
WG3138274-12 LCS								
Biochemical Oxygen Demand			104.7		%		85-115	21-AUG-19
WG3138274-11 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	21-AUG-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4765656								
WG3140670-2 LCS								
Benzene			85.2		%		70-130	22-AUG-19
Toluene			91.7		%		70-130	22-AUG-19
Ethyl benzene			103.4		%		70-130	22-AUG-19
o-Xylene			92.7		%		70-130	22-AUG-19
m+p-Xylenes			100.1		%		70-130	22-AUG-19
WG3140670-3 LCS								
F1 (C6-C10)			103.9		%		70-130	23-AUG-19
WG3140670-1 MB								
Benzene			<0.00050		mg/L		0.0005	22-AUG-19
Toluene			<0.0010		mg/L		0.001	22-AUG-19
Ethyl benzene			<0.00050		mg/L		0.0005	22-AUG-19
o-Xylene			<0.00050		mg/L		0.0005	22-AUG-19
m+p-Xylenes			<0.00040		mg/L		0.0004	22-AUG-19
F1 (C6-C10)			<0.10		mg/L		0.1	22-AUG-19
Surrogate: 4-Bromofluorobenzene (SS)			80.0		%		70-130	22-AUG-19
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R4771648								
WG3145817-3 DUP		**L2332810-1**						
Total Organic Carbon		8.84	8.79		mg/L	0.6	20	27-AUG-19
WG3145817-2 LCS								
Total Organic Carbon			102.4		%		80-120	27-AUG-19
WG3145817-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	27-AUG-19
CL-IC-N-WP	**Water**							
Batch R4769733								
WG3140209-3 DUP		**L2332810-1**						
Chloride (Cl)		33.1	32.5		mg/L	1.7	20	22-AUG-19
WG3140209-2 LCS								
Chloride (Cl)			97.8		%		90-110	22-AUG-19
WG3140209-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	22-AUG-19
WG3140209-4 MS		**L2332810-1**						
Chloride (Cl)			100.6		%		75-125	22-AUG-19
EC-WP	**Water**							
Batch R4765529								
WG3141365-23 LCS								
Conductivity			99.1		%		90-110	22-AUG-19
WG3141365-21 MB								
Conductivity			<1.0		umhos/cm		1	22-AUG-19
F2-F4-FID-WP	**Water**							
Batch R4766908								
WG3140141-2 LCS								
F2 (C10-C16)			87.8		%		70-130	22-AUG-19
F3 (C16-C34)			89.2		%		70-130	22-AUG-19
F4 (C34-C50)			89.8		%		70-130	22-AUG-19
WG3140141-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	22-AUG-19
F3 (C16-C34)			<0.25		mg/L		0.25	22-AUG-19
F4 (C34-C50)			<0.25		mg/L		0.25	22-AUG-19
Surrogate: 2-Bromobenzotrifluoride			94.5		%		60-140	22-AUG-19
FC-QT97-ENDPT-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC-QT97-ENDPT-WP	**Water**							
Batch R4764012								
WG3139598-2 DUP		**L2332810-1**						
Fecal Coliforms		81600	54800		MPN/100mL	39	65	21-AUG-19
WG3139598-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	21-AUG-19
HG-T-CVAA-WP	**Water**							
Batch R4768415								
WG3143109-2 LCS								
Mercury (Hg)-Total			97.0		%		80-120	24-AUG-19
WG3143109-1 MB								
Mercury (Hg)-Total			<0.000005		mg/L		0.000005	24-AUG-19
MET-T-CCMS-WP	**Water**							
Batch R4777903								
WG3147396-2 LCS								
Aluminum (Al)-Total			107.4		%		80-120	29-AUG-19
Arsenic (As)-Total			105.3		%		80-120	29-AUG-19
Cadmium (Cd)-Total			104.5		%		80-120	29-AUG-19
Calcium (Ca)-Total			96.4		%		80-120	29-AUG-19
Chromium (Cr)-Total			103.5		%		80-120	29-AUG-19
Cobalt (Co)-Total			101.4		%		80-120	29-AUG-19
Copper (Cu)-Total			102.3		%		80-120	29-AUG-19
Iron (Fe)-Total			90.9		%		80-120	29-AUG-19
Lead (Pb)-Total			99.2		%		80-120	29-AUG-19
Magnesium (Mg)-Total			117.1		%		80-120	29-AUG-19
Manganese (Mn)-Total			105.6		%		80-120	29-AUG-19
Nickel (Ni)-Total			100.8		%		80-120	29-AUG-19
Potassium (K)-Total			102.4		%		80-120	29-AUG-19
Sodium (Na)-Total			105.2		%		80-120	29-AUG-19
Zinc (Zn)-Total			103.4		%		80-120	29-AUG-19
WG3147396-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	29-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	29-AUG-19
Cadmium (Cd)-Total			<0.000005		mg/L		0.000005	29-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	29-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	29-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	29-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	29-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4777903								
WG3147396-1 MB								
Iron (Fe)-Total			<0.010		mg/L		0.01	29-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	29-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	29-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	29-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	29-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	29-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	29-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	29-AUG-19
NH3-COL-WP	**Water**							
Batch R4765054								
WG3140556-18 LCS								
Ammonia, Total (as N)			102.3		%		85-115	21-AUG-19
WG3140556-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	21-AUG-19
NO2-IC-N-WP	**Water**							
Batch R4769733								
WG3140209-3 DUP		**L2332810-1**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-AUG-19
WG3140209-2 LCS								
Nitrite (as N)			99.8		%		90-110	22-AUG-19
WG3140209-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	22-AUG-19
WG3140209-4 MS		**L2332810-1**						
Nitrite (as N)			100.4		%		75-125	22-AUG-19
NO3-IC-N-WP	**Water**							
Batch R4769733								
WG3140209-3 DUP		**L2332810-1**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	22-AUG-19
WG3140209-2 LCS								
Nitrate (as N)			98.9		%		90-110	22-AUG-19
WG3140209-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	22-AUG-19
WG3140209-4 MS		**L2332810-1**						
Nitrate (as N)			101.0		%		75-125	22-AUG-19
OG-GRAV-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OG-GRAV-WP	**Water**							
Batch R4769771								
WG3143509-2 LCS								
Oil and Grease			83.3		%		70-130	27-AUG-19
WG3143509-1 MB								
Oil and Grease			<5.0		mg/L		5	27-AUG-19
P-T-COL-WP	**Water**							
Batch R4766335								
WG3140690-2 LCS								
Phosphorus (P)-Total			103.0		%		80-120	23-AUG-19
WG3140690-1 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	23-AUG-19
PAH,PANH-WP	**Water**							
Batch R4770079								
WG3140873-2 LCS								
1-Methyl Naphthalene			116.9		%		60-130	26-AUG-19
2-Methyl Naphthalene			108.3		%		60-130	26-AUG-19
Acenaphthene			118.1		%		60-130	26-AUG-19
Acenaphthylene			105.3		%		60-130	26-AUG-19
Anthracene			98.6		%		60-130	26-AUG-19
Acridine			100.3		%		60-130	26-AUG-19
Benzo(a)anthracene			105.5		%		60-130	26-AUG-19
Benzo(a)pyrene			111.5		%		60-130	26-AUG-19
Benzo(b&j)fluoranthene			105.5		%		60-130	26-AUG-19
Benzo(g,h,i)perylene			100.6		%		60-130	26-AUG-19
Benzo(k)fluoranthene			100.9		%		60-130	26-AUG-19
Chrysene			89.6		%		60-130	26-AUG-19
Dibenzo(a,h)anthracene			89.2		%		60-130	26-AUG-19
Fluoranthene			115.3		%		60-130	26-AUG-19
Fluorene			109.0		%		60-130	26-AUG-19
Indeno(1,2,3-cd)pyrene			98.5		%		60-130	26-AUG-19
Naphthalene			99.7		%		50-130	26-AUG-19
Phenanthrene			121.6		%		60-130	26-AUG-19
Pyrene			123.3		%		60-130	26-AUG-19
Quinoline			100.4		%		60-130	26-AUG-19
WG3140873-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	26-AUG-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	26-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4770079								
WG3140873-1 MB								
Acenaphthene			<0.000020		mg/L		0.00002	26-AUG-19
Acenaphthylene			<0.000020		mg/L		0.00002	26-AUG-19
Anthracene			<0.000010		mg/L		0.00001	26-AUG-19
Acridine			<0.000020		mg/L		0.00002	26-AUG-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	26-AUG-19
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	26-AUG-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	26-AUG-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	26-AUG-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	26-AUG-19
Chrysene			<0.000020		mg/L		0.00002	26-AUG-19
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	26-AUG-19
Fluoranthene			<0.000020		mg/L		0.00002	26-AUG-19
Fluorene			<0.000020		mg/L		0.00002	26-AUG-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	26-AUG-19
Naphthalene			<0.000050		mg/L		0.00005	26-AUG-19
Phenanthrene			<0.000050		mg/L		0.00005	26-AUG-19
Pyrene			<0.000010		mg/L		0.00001	26-AUG-19
Quinoline			<0.000020		mg/L		0.00002	26-AUG-19
Surrogate: Acenaphthene d10			117.1		%		60-130	26-AUG-19
Surrogate: Acridine d9			119.3		%		60-130	26-AUG-19
Surrogate: Chrysene d12			111.2		%		60-130	26-AUG-19
Surrogate: Naphthalene d8			117.3		%		50-130	26-AUG-19
Surrogate: Phenanthrene d10			123.5		%		60-130	26-AUG-19
PH-WP	**Water**							
Batch R4765529								
WG3141365-22 LCS								
pH			7.40		pH units		7.3-7.5	22-AUG-19
PHENOLS-4AAP-WT	**Water**							
Batch R4769626								
WG3143546-2 LCS								
Phenols (4AAP)			105.8		%		85-115	26-AUG-19
WG3143546-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	26-AUG-19
SO4-IC-N-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WP	**Water**							
Batch R4769733								
WG3140209-3 DUP		**L2332810-1**						
Sulfate (SO4)		17.8	17.5		mg/L	1.5	20	22-AUG-19
WG3140209-2 LCS								
Sulfate (SO4)			98.6		%		90-110	22-AUG-19
WG3140209-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	22-AUG-19
WG3140209-4 MS		**L2332810-1**						
Sulfate (SO4)			100.2		%		75-125	22-AUG-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4769437								
WG3141927-6 LCS								
Total Suspended Solids			105.5		%		85-115	26-AUG-19
WG3141927-5 MB								
Total Suspended Solids			<2.0		mg/L		2	26-AUG-19
TC,EC-QT97-ENDPT-WP	**Water**							
Batch R4764034								
WG3139603-2 DUP		**L2332810-1**						
Total Coliforms		4110000	2190000		MPN/100mL	61	65	21-AUG-19
Escherichia Coli		146000	146000		MPN/100mL	0.0	65	21-AUG-19
WG3139603-1 MB								
Total Coliforms			<1		MPN/100mL		1	21-AUG-19
Escherichia Coli			<1		MPN/100mL		1	21-AUG-19

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
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	19-AUG-19 09:15	22-AUG-19 12:00	0.25	75	hours	EHTR-FM
Bacteriological Tests							
Fecal Coliform to endpoint by MPN QT97							
	1	19-AUG-19 09:15	21-AUG-19 18:20	30	57	hours	EHTR
Total and E. coli to endpoint by QT97							
	1	19-AUG-19 09:15	21-AUG-19 18:20	30	57	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 L2332810 were received on 21-AUG-19 10:35.

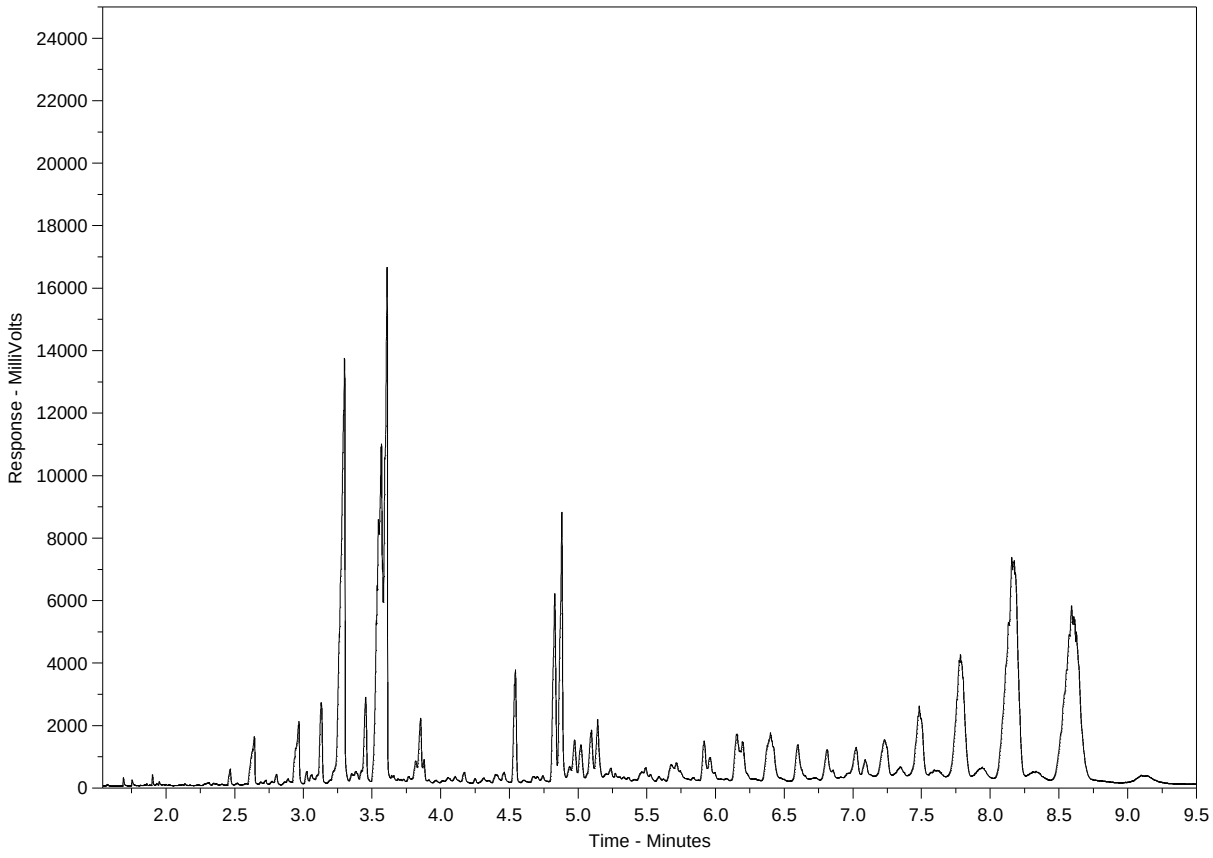
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

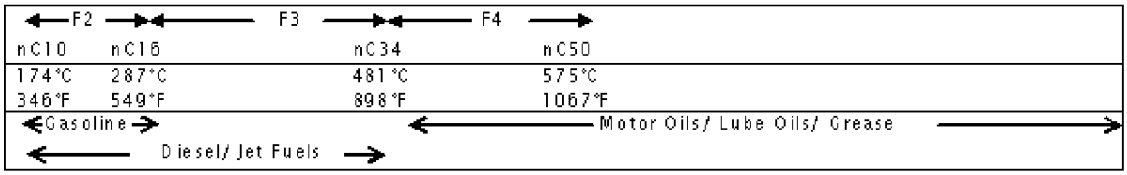
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2332810-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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.

ALS Environmental

Chain of Custody / Analytical R… Canada Tol… F…

L2332810-COFC

COC # _____

Page 1 of 1

Report To				Report Format / Distribution			
Company:	Nunavut CGS - Rankin Inlet (W8133)			☑ S…			
Contact:	SIMON DOIRON			☑ PD…		-Digital	☐ Fax
Address:	Box 490			Email	…@gov.nu.ca		
	Rankin Inlet , NU, X0C 0G0			Email 2:	mlusty@gov.nu.ca		
Phone:	867-645-8155	Cell# :		Email 3:	aanderson@gov.nu.ca		
Invoice To	Same as Report ?	☑ Yes	☐ No	**Client / Project Information**			
Hardcopy of Invoice with Report?		☐ Yes	☐ No	Job #:	Rankin Inlet WWTP- Monthly Effluent		
Company:				**PO / AFE:**			
Contact:				LSD:			
Address:							
Phone:		Fax:		Quote #:			
Lab Work Order # (lab use only)				**ALS Contact:**	Craig Riddell	**Sampled By:**	Amanda Anderson

Service Requested (Rush for routine analysis subject to availability)

- (●) Regular (Standard Turnaround Times - Business Days)
- ( ) Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ( ) Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ( ) Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	Aug 19	9:15	Waste	x	x	x	x	x	15

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	19-Aug-19	9:15	KR	Aug 21/19	10:35	9.9 °C		Aug21	12	

GENF 18.01 Front

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

Date Received: 30-AUG-19
Report Date: 11-SEP-19 13:58 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2339485

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - 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.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339485-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 26-AUG-19 @ 13:15							
Matrix: wastewater							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		04-SEP-19	R4794128
Toluene	<0.0010		0.0010	mg/L		04-SEP-19	R4794128
Ethyl benzene	<0.00050		0.00050	mg/L		04-SEP-19	R4794128
o-Xylene	<0.00050		0.00050	mg/L		04-SEP-19	R4794128
m+p-Xylenes	0.00041		0.00040	mg/L		04-SEP-19	R4794128
F1 (C6-C10)	<0.10		0.10	mg/L		04-SEP-19	R4794128
Surrogate: 4-Bromofluorobenzene (SS)	89.0		70-130	%		04-SEP-19	R4794128
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.34		0.10	mg/L	05-SEP-19	06-SEP-19	R4786789
F3 (C16-C34)	6.63		0.25	mg/L	05-SEP-19	06-SEP-19	R4786789
F4 (C34-C50)	4.18		0.25	mg/L	05-SEP-19	06-SEP-19	R4786789
Surrogate: 2-Bromobenzotrifluoride	99.3		60-140	%	05-SEP-19	06-SEP-19	R4786789
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		11-SEP-19	
F2-Naphth	0.34		0.10	mg/L		11-SEP-19	
F3-PAH	6.63		0.25	mg/L		11-SEP-19	
Total Hydrocarbons (C6-C50)	11.2		0.38	mg/L		11-SEP-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		11-SEP-19	
Miscellaneous Parameters							
Fecal Coliforms	8660000	PEHR	1	MPN/100mL		30-AUG-19	R4781416
Total and E. coli to endpoint by QT97							
Total Coliforms	88800000	PEHR	1	MPN/100mL		30-AUG-19	R4781424
Escherichia Coli	12100000	PEHR	1	MPN/100mL		30-AUG-19	R4781424
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000205		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
2-Methyl Naphthalene	0.000217		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Acenaphthene	0.000070		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Acenaphthylene	<0.000020		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Anthracene	<0.000010		0.000010	mg/L	31-AUG-19	06-SEP-19	R4789969
Acridine	<0.000020		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Benzo(a)anthracene	<0.000010		0.000010	mg/L	31-AUG-19	06-SEP-19	R4789969
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	31-AUG-19	06-SEP-19	R4789969
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	31-AUG-19	06-SEP-19	R4789969
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	31-AUG-19	06-SEP-19	R4789969
Chrysene	<0.000020		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Dibenzo(a,h)anthracene	0.0000100		0.0000050	mg/L	31-AUG-19	06-SEP-19	R4789969
Fluoranthene	<0.000020		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Fluorene	0.000041	EMPC	0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	31-AUG-19	06-SEP-19	R4789969
Naphthalene	0.000270		0.000050	mg/L	31-AUG-19	06-SEP-19	R4789969
Phenanthrene	<0.000050		0.000050	mg/L	31-AUG-19	06-SEP-19	R4789969
Pyrene	<0.000010		0.000010	mg/L	31-AUG-19	06-SEP-19	R4789969
Quinoline	<0.000020		0.000020	mg/L	31-AUG-19	06-SEP-19	R4789969
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	31-AUG-19	06-SEP-19	R4789969
Surrogate: Acenaphthene d10	120.1		60-130	%	31-AUG-19	06-SEP-19	R4789969
Surrogate: Acridine d9	111.0		60-130	%	31-AUG-19	06-SEP-19	R4789969
Surrogate: Chrysene d12	118.7		60-130	%	31-AUG-19	06-SEP-19	R4789969
Surrogate: Naphthalene d8	117.0		50-130	%	31-AUG-19	06-SEP-19	R4789969
Surrogate: Phenanthrene d10	115.0		60-130	%	31-AUG-19	06-SEP-19	R4789969

* 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
L2339485-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 26-AUG-19 @ 13:15							
Matrix: wastewater							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	114		1.2	mg/L		05-SEP-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		05-SEP-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		05-SEP-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	93.7		1.0	mg/L		04-SEP-19	R4783324
Ammonia by colour							
Ammonia, Total (as N)	5.69		0.20	mg/L		09-SEP-19	R4795431
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	124		20	mg/L		31-AUG-19	R4784617
Carbonaceous BOD							
BOD Carbonaceous	99		20	mg/L		31-AUG-19	R4784617
Chloride in Water by IC							
Chloride (Cl)	55.7		0.50	mg/L		31-AUG-19	R4783564
Conductivity							
Conductivity	416		1.0	umhos/cm		04-SEP-19	R4783324
Hardness Calculated							
Hardness (as CaCO3)	100	HTC	0.20	mg/L		10-SEP-19	
Mercury Total							
Mercury (Hg)-Total	0.0000070		0.0000050	mg/L	05-SEP-19	09-SEP-19	R4792194
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		31-AUG-19	R4783564
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		05-SEP-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-AUG-19	R4783564
Oil & Grease - Gravimetric							
Oil and Grease	24.7		5.0	mg/L		09-SEP-19	R4791490
Phenol (4AAP)							
Phenols (4AAP)	0.0097	DLM	0.0050	mg/L		04-SEP-19	R4783340
Phosphorus, Total							
Phosphorus (P)-Total	1.81		0.0060	mg/L		05-SEP-19	R4783693
Sulfate in Water by IC							
Sulfate (SO4)	28.7		0.30	mg/L		31-AUG-19	R4783564
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.275		0.0030	mg/L	09-SEP-19	09-SEP-19	R4791470
Arsenic (As)-Total	0.00115		0.00010	mg/L	09-SEP-19	09-SEP-19	R4791470
Cadmium (Cd)-Total	0.0000700		0.0000050	mg/L	09-SEP-19	09-SEP-19	R4791470
Calcium (Ca)-Total	29.8		0.050	mg/L	09-SEP-19	09-SEP-19	R4791470
Chromium (Cr)-Total	0.00079		0.00010	mg/L	09-SEP-19	09-SEP-19	R4791470
Cobalt (Co)-Total	0.00044		0.00010	mg/L	09-SEP-19	09-SEP-19	R4791470
Copper (Cu)-Total	0.140		0.00050	mg/L	09-SEP-19	09-SEP-19	R4791470
Iron (Fe)-Total	0.285		0.010	mg/L	09-SEP-19	09-SEP-19	R4791470
Lead (Pb)-Total	0.00251		0.000050	mg/L	09-SEP-19	09-SEP-19	R4791470
Magnesium (Mg)-Total	6.32		0.0050	mg/L	09-SEP-19	09-SEP-19	R4791470
Manganese (Mn)-Total	0.0811		0.00010	mg/L	09-SEP-19	09-SEP-19	R4791470
Nickel (Ni)-Total	0.00454		0.00050	mg/L	09-SEP-19	09-SEP-19	R4791470
Potassium (K)-Total	8.02		0.050	mg/L	09-SEP-19	09-SEP-19	R4791470
Sodium (Na)-Total	31.7		0.050	mg/L	09-SEP-19	09-SEP-19	R4791470
Zinc (Zn)-Total	0.0628		0.0030	mg/L	09-SEP-19	09-SEP-19	R4791470

* 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
L2339485-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 26-AUG-19 @ 13:15							
Matrix: wastewater							
Total Organic Carbon by Combustion							
Total Organic Carbon	71.8		2.5	mg/L		09-SEP-19	R4793368
Total Suspended Solids							
Total Suspended Solids	87.4		3.0	mg/L		03-SEP-19	R4782515
pH							
pH	7.22		0.10	pH units		04-SEP-19	R4783324

* 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.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

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 transfered 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-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.

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.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed 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 a positive response are counted. The final result is 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 200.2/6020B (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-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 Phosphorus is determined colourmetrically after persulphate digestion of the sample.

PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

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)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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 aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.			
TC,EC-QT97-ENDPT-WP	Water	Total and E. coli to endpoint by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing serial dilutions 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: L2339485 Report Date: 11-SEP-19

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 R4783324								
WG3152408-10 DUP		**L2339485-1**						
Alkalinity, Total (as CaCO3)		93.7	95.3		mg/L	1.7	20	04-SEP-19
WG3152408-9 LCS								
Alkalinity, Total (as CaCO3)			102.6		%		85-115	04-SEP-19
WG3152408-6 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	04-SEP-19
BOD-CBOD-WP	**Water**							
Batch R4784617								
WG3149313-2 LCS								
BOD Carbonaceous			103.9		%		85-115	31-AUG-19
WG3149313-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	31-AUG-19
BOD-WP	**Water**							
Batch R4784617								
WG3149313-2 LCS								
Biochemical Oxygen Demand			108.6		%		85-115	31-AUG-19
WG3149313-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	31-AUG-19
BTEXS+F1-HSMS-WP	**Water**							
Batch R4794128								
WG3151995-10 DUP		**L2339485-1**						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	04-SEP-19
Toluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	04-SEP-19
Ethyl benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	04-SEP-19
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	04-SEP-19
m+p-Xylenes		0.00041	0.00041		mg/L	1.4	30	04-SEP-19
F1 (C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	04-SEP-19
WG3151995-8 LCS								
Benzene			89.9		%		70-130	05-SEP-19
Toluene			89.2		%		70-130	05-SEP-19
Ethyl benzene			98.3		%		70-130	05-SEP-19
o-Xylene			89.1		%		70-130	05-SEP-19
m+p-Xylenes			94.3		%		70-130	05-SEP-19
WG3151995-9 LCS								
F1 (C6-C10)			103.5		%		70-130	05-SEP-19
WG3151995-7 MB								
Benzene			<0.00050		mg/L		0.0005	05-SEP-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTEXS+F1-HSMS-WP	**Water**							
Batch R4794128								
WG3151995-7 MB								
Toluene			<0.0010		mg/L		0.001	05-SEP-19
Ethyl benzene			<0.00050		mg/L		0.0005	05-SEP-19
o-Xylene			<0.00050		mg/L		0.0005	05-SEP-19
m+p-Xylenes			<0.00040		mg/L		0.0004	05-SEP-19
F1 (C6-C10)			<0.10		mg/L		0.1	05-SEP-19
Surrogate: 4-Bromofluorobenzene (SS)			84.0		%		70-130	05-SEP-19
C-TOC-HTC-WP	**Water**							
Batch R4793368								
WG3157291-2 LCS								
Total Organic Carbon			102.2		%		80-120	09-SEP-19
WG3157291-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-19
CL-IC-N-WP	**Water**							
Batch R4783564								
WG3149385-2 LCS								
Chloride (Cl)			100.0		%		90-110	31-AUG-19
WG3149385-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	31-AUG-19
EC-WP	**Water**							
Batch R4783324								
WG3152408-10 DUP		**L2339485-1**						
Conductivity		416	415		umhos/cm	0.2	10	04-SEP-19
WG3152408-8 LCS								
Conductivity			98.0		%		90-110	04-SEP-19
WG3152408-6 MB								
Conductivity			<1.0		umhos/cm		1	04-SEP-19
F2-F4-FID-WP	**Water**							
Batch R4786789								
WG3152656-2 LCS								
F2 (C10-C16)			94.8		%		70-130	06-SEP-19
F3 (C16-C34)			91.2		%		70-130	06-SEP-19
F4 (C34-C50)			101.4		%		70-130	06-SEP-19
WG3152656-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	06-SEP-19
F3 (C16-C34)			<0.25		mg/L		0.25	06-SEP-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-FID-WP	**Water**							
Batch R4786789								
WG3152656-1 MB								
F4 (C34-C50)			<0.25		mg/L		0.25	06-SEP-19
Surrogate: 2-Bromobenzotrifluoride			104.9		%		60-140	06-SEP-19
FC-QT97-ENDPT-WP	**Water**							
Batch R4781416								
WG3149047-2 DUP		**L2339485-1**						
Fecal Coliforms		8660000	6870000		MPN/100mL	23	65	30-AUG-19
WG3149047-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	30-AUG-19
HG-T-CVAA-WP	**Water**							
Batch R4792194								
WG3156852-2 LCS								
Mercury (Hg)-Total			96.0		%		80-120	09-SEP-19
WG3156852-1 MB								
Mercury (Hg)-Total			<0.000005		mg/L		0.000005	09-SEP-19
MET-T-CCMS-WP	**Water**							
Batch R4791470								
WG3155977-2 LCS								
Aluminum (Al)-Total			105.2		%		80-120	09-SEP-19
Arsenic (As)-Total			102.6		%		80-120	09-SEP-19
Cadmium (Cd)-Total			101.7		%		80-120	09-SEP-19
Calcium (Ca)-Total			101.3		%		80-120	09-SEP-19
Chromium (Cr)-Total			104.0		%		80-120	09-SEP-19
Cobalt (Co)-Total			102.5		%		80-120	09-SEP-19
Copper (Cu)-Total			102.7		%		80-120	09-SEP-19
Iron (Fe)-Total			94.8		%		80-120	09-SEP-19
Lead (Pb)-Total			101.7		%		80-120	09-SEP-19
Magnesium (Mg)-Total			115.2		%		80-120	09-SEP-19
Manganese (Mn)-Total			104.8		%		80-120	09-SEP-19
Nickel (Ni)-Total			100.3		%		80-120	09-SEP-19
Potassium (K)-Total			93.6		%		80-120	09-SEP-19
Sodium (Na)-Total			103.5		%		80-120	09-SEP-19
Zinc (Zn)-Total			103.2		%		80-120	09-SEP-19
WG3155977-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	09-SEP-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-SEP-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4791470								
WG3155977-1 MB								
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	09-SEP-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-SEP-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	09-SEP-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-SEP-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	09-SEP-19
Iron (Fe)-Total			<0.010		mg/L		0.01	09-SEP-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-SEP-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	09-SEP-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	09-SEP-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-SEP-19
Potassium (K)-Total			<0.050		mg/L		0.05	09-SEP-19
Sodium (Na)-Total			<0.050		mg/L		0.05	09-SEP-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-SEP-19
NH3-COL-WP	**Water**							
Batch R4795431								
WG3157733-2 LCS								
Ammonia, Total (as N)			99.6		%		85-115	09-SEP-19
WG3157733-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	09-SEP-19
NO2-IC-N-WP	**Water**							
Batch R4783564								
WG3149385-2 LCS								
Nitrite (as N)			102.4		%		90-110	31-AUG-19
WG3149385-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	31-AUG-19
NO3-IC-N-WP	**Water**							
Batch R4783564								
WG3149385-2 LCS								
Nitrate (as N)			100.4		%		90-110	31-AUG-19
WG3149385-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	31-AUG-19
OG-GRAV-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OG-GRAV-WP	**Water**							
Batch R4791490								
WG3153149-2 LCS								
Oil and Grease			89.8		%		70-130	09-SEP-19
WG3153149-1 MB								
Oil and Grease			<5.0		mg/L		5	09-SEP-19
P-T-COL-WP	**Water**							
Batch R4783693								
WG3150683-6 LCS								
Phosphorus (P)-Total			100.6		%		80-120	05-SEP-19
WG3150683-5 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	05-SEP-19
WG3150683-8 MS		**L2339485-1**						
Phosphorus (P)-Total			N/A	MS-B	%		-	05-SEP-19
PAH,PANH-WP	**Water**							
Batch R4789969								
WG3150142-2 LCS								
1-Methyl Naphthalene			117.5		%		60-130	06-SEP-19
2-Methyl Naphthalene			110.3		%		60-130	06-SEP-19
Acenaphthene			116.3		%		60-130	06-SEP-19
Acenaphthylene			97.3		%		60-130	06-SEP-19
Anthracene			83.0		%		60-130	06-SEP-19
Acridine			95.7		%		60-130	06-SEP-19
Benzo(a)anthracene			91.6		%		60-130	06-SEP-19
Benzo(a)pyrene			96.7		%		60-130	06-SEP-19
Benzo(b&j)fluoranthene			102.2		%		60-130	06-SEP-19
Benzo(g,h,i)perylene			101.4		%		60-130	06-SEP-19
Benzo(k)fluoranthene			115.9		%		60-130	06-SEP-19
Chrysene			105.3		%		60-130	06-SEP-19
Dibenzo(a,h)anthracene			99.3		%		60-130	06-SEP-19
Fluoranthene			116.6		%		60-130	06-SEP-19
Fluorene			99.2		%		60-130	06-SEP-19
Indeno(1,2,3-cd)pyrene			84.1		%		60-130	06-SEP-19
Naphthalene			119.0		%		50-130	06-SEP-19
Phenanthrene			113.7		%		60-130	06-SEP-19
Pyrene			116.8		%		60-130	06-SEP-19
Quinoline			101.8		%		60-130	06-SEP-19
WG3150142-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R4789969								
WG3150142-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	06-SEP-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	06-SEP-19
Acenaphthene			<0.000020		mg/L		0.00002	06-SEP-19
Acenaphthylene			<0.000020		mg/L		0.00002	06-SEP-19
Anthracene			<0.000010		mg/L		0.00001	06-SEP-19
Acridine			<0.000020		mg/L		0.00002	06-SEP-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	06-SEP-19
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	06-SEP-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	06-SEP-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	06-SEP-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	06-SEP-19
Chrysene			<0.000020		mg/L		0.00002	06-SEP-19
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	06-SEP-19
Fluoranthene			<0.000020		mg/L		0.00002	06-SEP-19
Fluorene			<0.000020		mg/L		0.00002	06-SEP-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	06-SEP-19
Naphthalene			<0.000050		mg/L		0.00005	06-SEP-19
Phenanthrene			<0.000050		mg/L		0.00005	06-SEP-19
Pyrene			<0.000010		mg/L		0.00001	06-SEP-19
Quinoline			<0.000020		mg/L		0.00002	06-SEP-19
Surrogate: Acenaphthene d10			117.9		%		60-130	06-SEP-19
Surrogate: Acridine d9			105.6		%		60-130	06-SEP-19
Surrogate: Chrysene d12			107.4		%		60-130	06-SEP-19
Surrogate: Naphthalene d8			116.7		%		50-130	06-SEP-19
Surrogate: Phenanthrene d10			113.0		%		60-130	06-SEP-19
PH-WP	**Water**							
Batch R4783324								
WG3152408-10 DUP		**L2339485-1**						
pH		7.22	7.23	J	pH units	0.01	0.2	04-SEP-19
WG3152408-7 LCS								
pH			7.36		pH units		7.3-7.5	04-SEP-19
PHENOLS-4AAP-WT	**Water**							

Quality Control Report

Workorder: L2339485 Report Date: 11-SEP-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-WT	**Water**							
Batch R4783340								
WG3151296-6 LCS								
Phenols (4AAP)			96.9		%		85-115	04-SEP-19
WG3151296-5 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	04-SEP-19
SO4-IC-N-WP	**Water**							
Batch R4783564								
WG3149385-2 LCS								
Sulfate (SO4)			101.0		%		90-110	31-AUG-19
WG3149385-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	31-AUG-19
SOLIDS-TOTSUS-WP	**Water**							
Batch R4782515								
WG3148717-14 LCS								
Total Suspended Solids			109.6		%		85-115	03-SEP-19
WG3148717-13 MB								
Total Suspended Solids			<2.0		mg/L		2	03-SEP-19
TC,EC-QT97-ENDPT-WP	**Water**							
Batch R4781424								
WG3149048-2 DUP		**L2339485-1**						
Total Coliforms		88800000	67700000		MPN/100mL	27	65	30-AUG-19
Escherichia Coli		12100000	10800000		MPN/100mL	11	65	30-AUG-19
WG3149048-1 MB								
Total Coliforms			<1		MPN/100mL		1	30-AUG-19
Escherichia Coli			<1		MPN/100mL		1	30-AUG-19

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.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Total Suspended Solids							
	1	26-AUG-19 13:15	03-SEP-19 14:00	7	8	days	EHT
pH							
	1	26-AUG-19 13:15	04-SEP-19 12:00	0.25	215	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC							
	1	26-AUG-19 13:15	31-AUG-19 15:00	3	5	days	EHTR
Nitrite in Water by IC							
	1	26-AUG-19 13:15	31-AUG-19 15:00	3	5	days	EHTR
Bacteriological Tests							
Fecal Coliform to endpoint by MPN QT97							
	1	26-AUG-19 13:15	30-AUG-19 18:25	30	101	hours	EHTR
Total and E. coli to endpoint by QT97							
	1	26-AUG-19 13:15	30-AUG-19 18:25	30	101	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)							
	1	26-AUG-19 13:15	31-AUG-19 07:00	48	114	hours	EHTR
Carbonaceous BOD							
	1	26-AUG-19 13:15	31-AUG-19 07:00	48	114	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 L2339485 were received on 30-AUG-19 16:25.

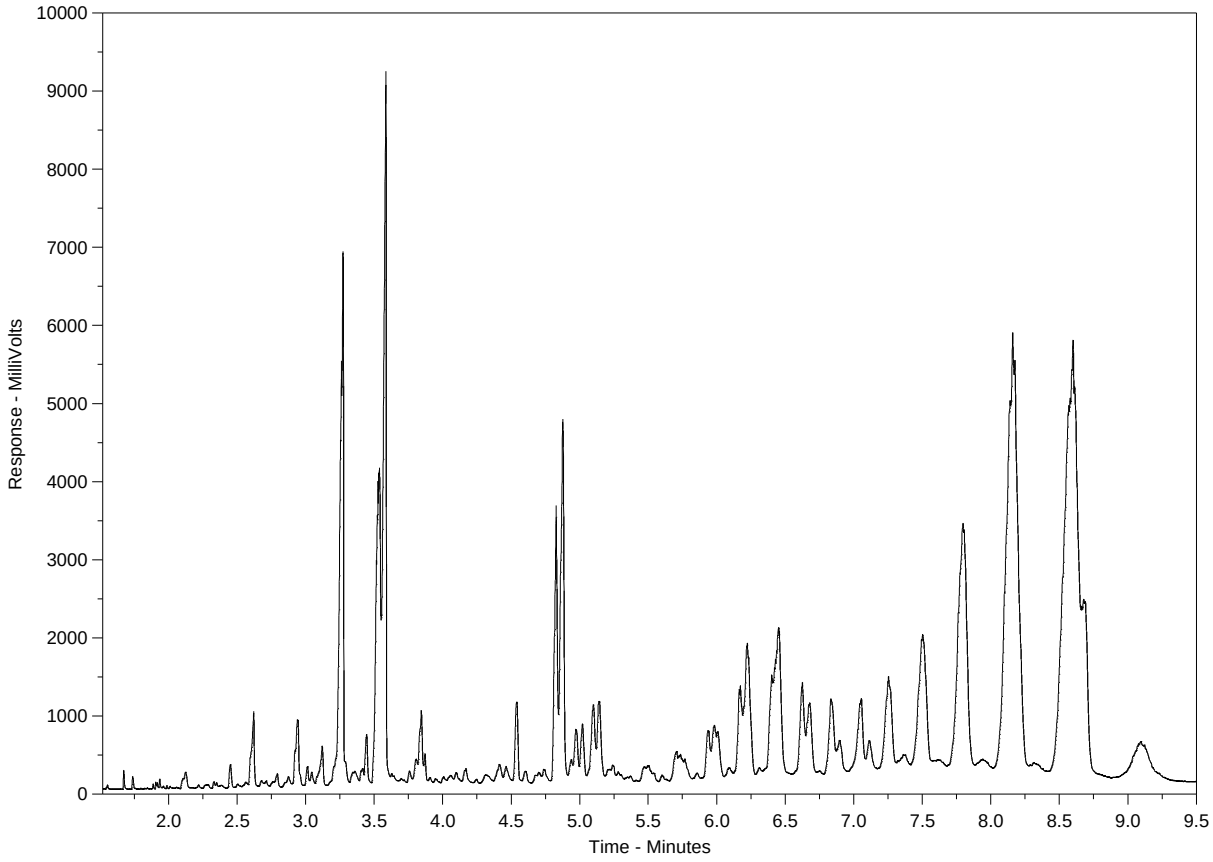
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

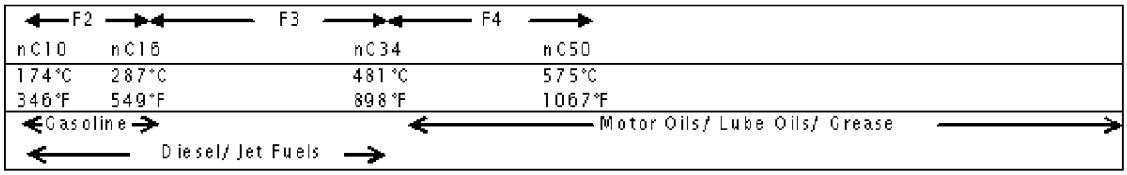
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2339485-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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.

ALS Environmental

Chain of Custody / Analytical Request Form

COC # L2339485

Page 1 of 1

L2339485-COFC

Report To					
Company:	Nunavut CGS - Rankin Inlet (W8133)			☐ Excel ☐ Digital ☐ Fax	
Contact:	SIMON DOIRON				
Address:	Box 490	Email 1:	sdoiron@gov.nu.ca		
	Rankin Inlet , NU, X0C 0G0	Email 2:	mlusty@gov.nu.ca		
Phone:	867-645-8155 Cell# :	Email 3:	aanderson@gov.nu.ca		
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**			
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #:	Rankin Inlet WWTP- Monthly Effluent		
Company:		**PO / AFE:**			
Contact:		LSD:			
Address:					
Phone:	Fax:	Quote #:			
Lab Work Order # (lab use only)		**ALS Contact:**	Craig Riddell	**Sampled By:**	Amanda Anderson

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
- ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	TC,EC-QT97-ENDPT-WP	FC-QT97-ENDPT-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	Aug 26	1:15	Waste	x	x	x	x	x	15

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-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Amanda Anderson	26-Aug-19	1:15	AP	Aug 30/19	425	7.8 °C				

GENF 18.01 Front

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-Jul-19	4,163,805.00	1,576.00	380,544.00	
02-Jul-19	4,165,235.00	1,430.00	381,974.00	
03-Jul-19	4,167,133.00	1,898.00	383,872.00	
04-Jul-19	4,168,885.00	1,752.00	385,624.00	
05-Jul-19	4,170,708.00	1,823.00	387,447.00	
06-Jul-19	4,171,956.92	1,248.92	388,695.92	
07-Jul-19	4,173,583.00	1,626.08	390,322.00	
08-Jul-19	4,175,571.00	1,988.00	392,310.00	
09-Jul-19	4,176,759.00	1,188.00	393,498.00	
10-Jul-19	4,178,467.00	1,708.00	395,206.00	
11-Jul-19	4,180,065.00	1,598.00	396,804.00	
12-Jul-19	4,181,660.00	1,595.00	398,399.00	
13-Jul-19			398,399.00	
14-Jul-19			398,399.00	
15-Jul-19			398,399.00	
16-Jul-19	4,187,569.00	5,909.00	404,308.00	
17-Jul-19	4,189,234.00	1,665.00	405,973.00	
18-Jul-19	4,190,641.00	1,407.00	407,380.00	
19-Jul-19	4,192,194.00	1,553.00	408,933.00	
20-Jul-19	4,193,883.00	1,689.00	410,622.00	
21-Jul-19	4,195,408.00	1,525.00	412,147.00	
22-Jul-19	4,196,858.00	1,450.00	413,597.00	
23-Jul-19	4,198,487.00	1,629.00	415,226.00	
24-Jul-19	4,200,040.00	1,553.00	416,779.00	
25-Jul-19	4,201,620.00	1,580.00	418,359.00	
26-Jul-19	4,203,120.00	1,500.00	419,859.00	
27-Jul-19	4,204,693.00	1,573.00	421,432.00	
28-Jul-19	4,206,138.00	1,445.00	422,877.00	
29-Jul-19	4,207,688.00	1,550.00	424,427.00	
30-Jul-19	4,209,261.00	1,573.00	426,000.00	
31-Jul-19	4,210,865.00	1,604.00	427,604.00	**47,060.00**
01-Aug-19			427,604.00	
02-Aug-19			427,604.00	
03-Aug-19	4,215,496.00	4,631.00	432,235.00	
04-Aug-19	4,217,359.00	1,863.00	434,098.00	
05-Aug-19	4,219,419.00	2,060.00	436,158.00	
06-Aug-19	4,221,699.00	2,280.00	438,438.00	
07-Aug-19	4,223,599.00	1,900.00	440,338.00	
08-Aug-19	4,225,651.00	2,052.00	442,390.00	
09-Aug-19	4,227,688.00	2,037.00	444,427.00	
10-Aug-19	4,229,708.00	2,020.00	446,447.00	
11-Aug-19			446,447.00	
12-Aug-19	4,233,934.00	4,226.00	450,673.00	
13-Aug-19	4,235,866.00	1,932.00	452,605.00	
14-Aug-19	4,237,929.00	2,063.00	454,668.00	
15-Aug-19	4,240,040.00	2,111.00	456,779.00	
16-Aug-19	4,242,310.00	2,270.00	459,049.00	
17-Aug-19	4,244,277.00	1,967.00	461,016.00	**33,412.00**
18-Aug-19			461,016.00	
19-Aug-19			461,016.00	
20-Aug-19			461,016.00	
21-Aug-19			461,016.00	
22-Aug-19			461,016.00	
23-Aug-19			461,016.00	
24-Aug-19			461,016.00	
25-Aug-19			461,016.00	
26-Aug-19			461,016.00	
27-Aug-19			461,016.00	
28-Aug-19			461,016.00	
29-Aug-19			461,016.00	
30-Aug-19			461,016.00	
31-Aug-19			461,016.00	
01-Sep-19			461,016.00	
02-Sep-19			461,016.00	
03-Sep-19			461,016.00	
04-Sep-19			461,016.00	
05-Sep-19			461,016.00	
06-Sep-19			461,016.00	
07-Sep-19			461,016.00	
08-Sep-19			461,016.00	
09-Sep-19			461,016.00	
10-Sep-19			461,016.00	
11-Sep-19			461,016.00	
12-Sep-19			461,016.00	
13-Sep-19			461,016.00	
14-Sep-19			461,016.00	
15-Sep-19			461,016.00	
16-Sep-19			461,016.00	
17-Sep-19			461,016.00	
18-Sep-19	4,244,331.00	54.00	461,070.00	
19-Sep-19			461,070.00	
20-Sep-19	4,247,560.00	3,229.00	464,299.00	
21-Sep-19	4,249,112.00	1,552.00	465,851.00	
22-Sep-19	4,250,282.00	1,170.00	467,021.00	
23-Sep-19	4,252,543.00	2,261.00	469,282.00	
24-Sep-19	4,254,308.00	1,765.00	471,047.00	
25-Sep-19	4,255,884.00	1,576.00	472,623.00	
26-Sep-19	4,257,560.00	1,676.00	474,299.00	
27-Sep-19	4,259,299.00	1,739.00	476,038.00	
28-Sep-19	4,260,870.00	1,571.00	477,609.00	
29-Sep-19	4,262,754.00	1,884.00	479,493.00	
30-Sep-19	4,264,568.00	1,814.00	481,307.00	**20,237.00**

Appendix C: Lower Landing Lake Pumping Volumes GRA-7

The Lower Landing Lake monthly pumping volumes are approximate calculations based on an hourly flow rate of 272.54 m^3/h. The calculation accounts for an hour of maintenance, pump checks, and fuel addition into the pump for an estimated total of 23 pumping hours per day. This is equal to 6,268.42 m^3/day. Due to broken flow meters, inconsistent recording, and missing log sheets, this is the best approach to record keeping for the 2019 pumping season.