

2019 SECOND QUARTER REPORT FOR GN-CGS RANKIN INLET

QUARTER BEING REPORTED: April - June 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)
April	62,143.00	Same
May	61,859.00	Same
June	54,221.00	Same
QUARTER TOTAL	178,223.00	178,223.00

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

Month Reported	Solids Removed from the Sewage Treatment Facility (m ³)
January	4
February	4
March	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).

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Below are the results for Monitoring Program Station GRA-7. There was an approximate water volume of 12,536.84.00 m³ transferred from Lower Landing Lake to Nipissar Lake between June 29th and June 30th, 2019.

Month Reported	Water Transferred From Lower Landing Lake to Nipissar (m ³)
April	None
May	None
June	12,536.84
QUARTER TOTAL	12,536.84

- 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.

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

Month Reported	Nipissar Lake Water Elevation (in)
April	No Open Water
May	No Open Water
June	No Reading on Record

List of Appendices

Appendix A: Certificate of Analysis, April 3, 2019 – 18 pages

Certificate of Analysis, May 13, 2019 – 19 pages

Certificate of Analysis, June 4, 2019 – 18 pages

Certificate of Analysis, June 25, 2019 – 27 pages

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

Appendix C: Lower Landing Lake Pumping Volumes GRA-7 – 1 page

**2019 SECOND QUARTER REPORT
FOR GN-CGS RANKIN INLET**

Appendix A: Certificate of Analysis, April 3, 2019
Certificate of Analysis, May 13, 2019
Certificate of Analysis, June 4, 2019
Certificate of Analysis, June 25, 2019



Nunavut Community & Government
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Date Received: 04-APR-19
Report Date: 12-APR-19 15:48 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2253873

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
L2253873-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		05-APR-19	R4592409
Toluene	<0.0010		0.0010	mg/L		05-APR-19	R4592409
Ethyl benzene	<0.00050		0.00050	mg/L		05-APR-19	R4592409
o-Xylene	<0.00050		0.00050	mg/L		05-APR-19	R4592409
m+p-Xylenes	<0.00040		0.00040	mg/L		05-APR-19	R4592409
F1 (C6-C10)	<0.10		0.10	mg/L		05-APR-19	R4592409
Surrogate: 4-Bromofluorobenzene (SS)	102.3		70-130	%		05-APR-19	R4592409
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		11-APR-19	
F2-Naphth	<0.10		0.10	mg/L		11-APR-19	
F3-PAH	0.50		0.25	mg/L		11-APR-19	
Total Hydrocarbons (C6-C50)	0.86		0.38	mg/L		11-APR-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		09-APR-19	
Miscellaneous Parameters							
Fluoride (F)	<0.10	DLM	0.10	mg/L		10-APR-19	R4598472
Total Suspended Solids	76.3		2.0	mg/L		10-APR-19	R4595533
Total Coliform and E.coli by MPN QT97							
Total Coliforms	>2420		1	MPN/100mL		04-APR-19	R4591130
Escherichia Coli	>2420		1	MPN/100mL		04-APR-19	R4591130
F2-F4 (O.Reg.153/04)							
F2 (C10-C16)	<100		100	ug/L	08-APR-19	09-APR-19	R4592938
F3 (C16-C34)	500		250	ug/L	08-APR-19	09-APR-19	R4592938
F4 (C34-C50)	350		250	ug/L	08-APR-19	09-APR-19	R4592938
Chrom. to baseline at nC50	YES				08-APR-19	09-APR-19	R4592938
Surrogate: 2-Bromobenzotrifluoride	92.0		60-140	%	08-APR-19	09-APR-19	R4592938
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
2-Methyl Naphthalene	0.000022		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Acenaphthene	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Acenaphthylene	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Anthracene	<0.000010		0.000010	mg/L	08-APR-19	10-APR-19	R4595667
Acridine	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Benzo(a)anthracene	<0.000010		0.000010	mg/L	08-APR-19	10-APR-19	R4595667
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	08-APR-19	10-APR-19	R4595667
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	08-APR-19	10-APR-19	R4595667
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	08-APR-19	10-APR-19	R4595667
Chrysene	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	08-APR-19	10-APR-19	R4595667
Fluoranthene	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Fluorene	<0.000020		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	08-APR-19	10-APR-19	R4595667
Naphthalene	0.000069		0.000050	mg/L	08-APR-19	10-APR-19	R4595667
Phenanthrene	<0.000050		0.000050	mg/L	08-APR-19	10-APR-19	R4595667
Pyrene	<0.000010		0.000010	mg/L	08-APR-19	10-APR-19	R4595667
Quinoline	0.000028		0.000020	mg/L	08-APR-19	10-APR-19	R4595667
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	08-APR-19	10-APR-19	R4595667
Surrogate: Acenaphthene d10	93.9		60-130	%	08-APR-19	10-APR-19	R4595667
Surrogate: Acridine d9	73.4		60-130	%	08-APR-19	10-APR-19	R4595667
Surrogate: Chrysene d12	91.3		60-130	%	08-APR-19	10-APR-19	R4595667

* 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
L2253873-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD							
Matrix: WASTE							
Polyaromatic Hydrocarbons (PAHs)							
Surrogate: Naphthalene d8	95.8		50-130	%	08-APR-19	10-APR-19	R4595667
Surrogate: Phenanthrene d10	60.8		60-130	%	08-APR-19	10-APR-19	R4595667
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	108		1.2	mg/L		06-APR-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		06-APR-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		06-APR-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	88.7		1.0	mg/L		05-APR-19	R4591781
Ammonia by colour							
Ammonia, Total (as N)	3.20		0.10	mg/L		08-APR-19	R4592829
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	51		20	mg/L		05-APR-19	R4598267
Carbonaceous BOD							
BOD Carbonaceous	50		20	mg/L		05-APR-19	R4598267
Chloride in Water by IC							
Chloride (Cl)	73.5		0.50	mg/L		05-APR-19	R4591802
Conductivity							
Conductivity	494		1.0	umhos/cm		05-APR-19	R4591781
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	>24200		10	MPN/100mL		04-APR-19	R4591122
Hardness Calculated							
Hardness (as CaCO3)	113	HTC	0.20	mg/L		12-APR-19	
Mercury Total							
Mercury (Hg)-Total	0.0000060		0.0000050	mg/L	08-APR-19	10-APR-19	R4593514
Nitrate in Water by IC							
Nitrate (as N)	0.129		0.020	mg/L		05-APR-19	R4591802
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.141		0.070	mg/L		09-APR-19	
Nitrite in Water by IC							
Nitrite (as N)	0.012		0.010	mg/L		05-APR-19	R4591802
Oil & Grease - Gravimetric							
Oil and Grease	11.1		5.0	mg/L		12-APR-19	R4599046
Phenol (4AAP)							
Phenols (4AAP)	0.0051		0.0010	mg/L		08-APR-19	R4592955
Phosphorus, Total							
Phosphorus (P)-Total	1.31		0.0060	mg/L		11-APR-19	R4596067
Sulfate in Water by IC							
Sulfate (SO4)	40.5		0.30	mg/L		05-APR-19	R4591802
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0833		0.0030	mg/L	11-APR-19	11-APR-19	R4597668
Arsenic (As)-Total	0.00112		0.00010	mg/L	11-APR-19	11-APR-19	R4597668
Cadmium (Cd)-Total	0.0000576		0.0000050	mg/L	11-APR-19	11-APR-19	R4597668
Calcium (Ca)-Total	31.9		0.050	mg/L	11-APR-19	11-APR-19	R4597668
Chromium (Cr)-Total	0.00067		0.00010	mg/L	11-APR-19	11-APR-19	R4597668
Cobalt (Co)-Total	0.00013		0.00010	mg/L	11-APR-19	11-APR-19	R4597668
Copper (Cu)-Total	0.168		0.00050	mg/L	11-APR-19	11-APR-19	R4597668
Iron (Fe)-Total	0.258		0.010	mg/L	11-APR-19	11-APR-19	R4597668
Lead (Pb)-Total	0.00162		0.000050	mg/L	11-APR-19	11-APR-19	R4597668
Magnesium (Mg)-Total	8.07		0.0050	mg/L	11-APR-19	11-APR-19	R4597668

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

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2253873-1	RANKIN INLET WWTP - EFFLUENT							
Sampled By:	SD							
Matrix:	WASTE							
Total Metals in Water by CRC ICPMS								
Manganese (Mn)-Total		0.0601		0.00010	mg/L	11-APR-19	11-APR-19	R4597668
Nickel (Ni)-Total		0.00247		0.00050	mg/L	11-APR-19	11-APR-19	R4597668
Potassium (K)-Total		7.88		0.050	mg/L	11-APR-19	11-APR-19	R4597668
Sodium (Na)-Total		40.1		0.050	mg/L	11-APR-19	11-APR-19	R4597668
Zinc (Zn)-Total		0.0593		0.0030	mg/L	11-APR-19	11-APR-19	R4597668
Total Organic Carbon by Combustion								
Total Organic Carbon		47.2		0.50	mg/L		05-APR-19	R4591644
pH								
pH		7.01		0.10	pH units		05-APR-19	R4591781

* 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).
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 transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-SCREEN-WP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other test eg. IC, TDS, TSS, etc			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
F-IC-N-WP	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.			
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.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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-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.			
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 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 aqueous 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 ww - 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: L2253873

Report Date: 12-APR-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP								
Water								
Batch	R4591644							
WG3022438-2	LCS							
Total Organic Carbon			98.7		%		80-120	05-APR-19
Batch	WG3022438-1 MB							
Total Organic Carbon			<0.50		mg/L		0.5	05-APR-19
CL-IC-N-WP								
Water								
Batch	R4591802							
WG3021924-3	DUP	L2253873-1						
Chloride (Cl)		73.5	73.9		mg/L	0.6	20	05-APR-19
Batch	WG3021924-2 LCS							
Chloride (Cl)			101.0		%		90-110	05-APR-19
Batch	WG3021924-1 MB							
Chloride (Cl)			<0.50		mg/L		0.5	05-APR-19
Batch	WG3021924-4 MS							
Chloride (Cl)		L2253873-1	107.6		%		75-125	05-APR-19
EC-WP								
Water								
Batch	R4591781							
WG3022578-13	LCS							
Conductivity			97.7		%		90-110	05-APR-19
Batch	WG3022578-11 MB							
Conductivity			<1.0		umhos/cm		1	05-APR-19
F-IC-N-WP								
Water								
Batch	R4598472							
WG3024887-2	LCS							
Fluoride (F)			102.4		%		90-110	10-APR-19
Batch	WG3024887-1 MB							
Fluoride (F)			<0.020		mg/L		0.02	10-APR-19
F2-F4-WT								
Water								
Batch	R4592938							
WG3023264-2	LCS							
F2 (C10-C16)			98.8		%		65-135	09-APR-19
F3 (C16-C34)			99.0		%		65-135	09-APR-19
F4 (C34-C50)			105.2		%		65-135	09-APR-19
Batch	WG3023264-1 MB							
F2 (C10-C16)			<100		ug/L		100	09-APR-19
F3 (C16-C34)			<250		ug/L		250	09-APR-19
F4 (C34-C50)			<250		ug/L		250	09-APR-19
Surrogate: 2-Bromobenzotrifluoride			88.8		%		60-140	09-APR-19

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC10-QT97-WP								
Batch R4591122								
WG3021366-2 DUP		L2253873-1						
Fecal Coliforms		>24200	>24200		MPN/100mL	0.0	65	04-APR-19
WG3021366-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	04-APR-19
HG-T-CVAA-WP								
Batch R4593514								
WG3024665-2 LCS								
Mercury (Hg)-Total			109.0		%		80-120	10-APR-19
WG3024665-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	10-APR-19
MET-T-CCMS-WP								
Batch R4597668								
WG3025505-2 LCS								
Aluminum (Al)-Total			98.3		%		80-120	11-APR-19
Arsenic (As)-Total			96.2		%		80-120	11-APR-19
Cadmium (Cd)-Total			96.7		%		80-120	11-APR-19
Calcium (Ca)-Total			96.2		%		80-120	11-APR-19
Chromium (Cr)-Total			96.3		%		80-120	11-APR-19
Cobalt (Co)-Total			95.8		%		80-120	11-APR-19
Copper (Cu)-Total			96.3		%		80-120	11-APR-19
Iron (Fe)-Total			90.6		%		80-120	11-APR-19
Lead (Pb)-Total			96.9		%		80-120	11-APR-19
Magnesium (Mg)-Total			105.2		%		80-120	11-APR-19
Manganese (Mn)-Total			97.5		%		80-120	11-APR-19
Nickel (Ni)-Total			95.3		%		80-120	11-APR-19
Potassium (K)-Total			93.7		%		80-120	11-APR-19
Sodium (Na)-Total			97.1		%		80-120	11-APR-19
Zinc (Zn)-Total			94.3		%		80-120	11-APR-19
WG3025505-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	11-APR-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	11-APR-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	11-APR-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	11-APR-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	11-APR-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	11-APR-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	11-APR-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OG-GRAV-WP		Water						
Batch	R4599046							
WG3025093-2	LCS							
Oil and Grease			100.1		%		70-130	12-APR-19
WG3025093-1	MB							
Oil and Grease			<5.0		mg/L		5	12-APR-19
P-T-COL-WP		Water						
Batch	R4596067							
WG3025385-2	LCS							
Phosphorus (P)-Total			97.6		%		80-120	11-APR-19
WG3025385-1	MB							
Phosphorus (P)-Total			<0.0030		mg/L		0.003	11-APR-19
PAH,PANH-WP		Water						
Batch	R4595667							
WG3023337-2	LCS							
1-Methyl Naphthalene			87.1		%		60-130	10-APR-19
2-Methyl Naphthalene			79.9		%		60-130	10-APR-19
Acenaphthene			87.5		%		60-130	10-APR-19
Acenaphthylene			77.5		%		60-130	10-APR-19
Anthracene			70.3		%		60-130	10-APR-19
Acridine			74.9		%		60-130	10-APR-19
Benzo(a)anthracene			84.0		%		60-130	10-APR-19
Benzo(a)pyrene			74.8		%		60-130	10-APR-19
Benzo(b&j)fluoranthene			73.5		%		60-130	10-APR-19
Benzo(g,h,i)perylene			79.8		%		60-130	10-APR-19
Benzo(k)fluoranthene			95.7		%		60-130	10-APR-19
Chrysene			90.9		%		60-130	10-APR-19
Dibenzo(a,h)anthracene			74.2		%		60-130	10-APR-19
Fluoranthene			86.6		%		60-130	10-APR-19
Fluorene			74.0		%		60-130	10-APR-19
Indeno(1,2,3-cd)pyrene			73.9		%		60-130	10-APR-19
Naphthalene			84.1		%		50-130	10-APR-19
Phenanthrene			72.2		%		60-130	10-APR-19
Pyrene			86.0		%		60-130	10-APR-19
Quinoline			112.0		%		60-130	10-APR-19
WG3023337-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	10-APR-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	10-APR-19



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4595667							
WG3023337-1 MB								
Acenaphthene			<0.000020		mg/L		0.00002	10-APR-19
Acenaphthylene			<0.000020		mg/L		0.00002	10-APR-19
Anthracene			<0.000010		mg/L		0.00001	10-APR-19
Acridine			<0.000020		mg/L		0.00002	10-APR-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	10-APR-19
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	10-APR-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	10-APR-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	10-APR-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	10-APR-19
Chrysene			<0.000020		mg/L		0.00002	10-APR-19
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	10-APR-19
Fluoranthene			<0.000020		mg/L		0.00002	10-APR-19
Fluorene			<0.000020		mg/L		0.00002	10-APR-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	10-APR-19
Naphthalene			<0.000050		mg/L		0.00005	10-APR-19
Phenanthrene			<0.000050		mg/L		0.00005	10-APR-19
Pyrene			<0.000010		mg/L		0.00001	10-APR-19
Quinoline			<0.000020		mg/L		0.00002	10-APR-19
Surrogate: Acenaphthene d10			85.1		%		60-130	10-APR-19
Surrogate: Acridine d9			69.7		%		60-130	10-APR-19
Surrogate: Chrysene d12			86.0		%		60-130	10-APR-19
Surrogate: Naphthalene d8			81.3		%		50-130	10-APR-19
Surrogate: Phenanthrene d10			61.3		%		60-130	10-APR-19
PH-WP		Water						
Batch	R4591781							
WG3022578-12 LCS								
pH			7.33		pH units		7.3-7.5	05-APR-19
PHENOLS-4AAP-WT		Water						
Batch	R4592955							
WG3023165-18 LCS								
Phenols (4AAP)			96.0		%		85-115	08-APR-19
WG3023165-17 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	08-APR-19
SO4-IC-N-WP		Water						

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WP								
Batch R4591802								
WG3021924-3	DUP	L2253873-1						
Sulfate (SO4)		40.5	40.9		mg/L	1.0	20	05-APR-19
WG3021924-2	LCS							
Sulfate (SO4)			101.3		%		90-110	05-APR-19
WG3021924-1	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	05-APR-19
WG3021924-4	MS	L2253873-1						
Sulfate (SO4)			106.6		%		75-125	05-APR-19
SOLIDS-TOTSUS-WP								
Batch R4595533								
WG3024734-6	LCS							
Total Suspended Solids			98.0		%		85-115	10-APR-19
WG3024734-5	MB							
Total Suspended Solids			<2.0		mg/L		2	10-APR-19
TC,EC-QT97-WP								
Batch R4591130								
WG3021367-2	DUP	L2253873-1						
Total Coliforms		>2420	>2420		MPN/100mL	0.0	65	04-APR-19
Escherichia Coli		>2420	>2420		MPN/100mL	0.0	65	04-APR-19
WG3021367-1	MB							
Total Coliforms			<1		MPN/100mL		1	04-APR-19
Escherichia Coli			<1		MPN/100mL		1	04-APR-19

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Legend:

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

Quality Control Report

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	Not provided	05-APR-19 12:00	0.25	20	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 L2253873 were received on 04-APR-19 16:15.

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.

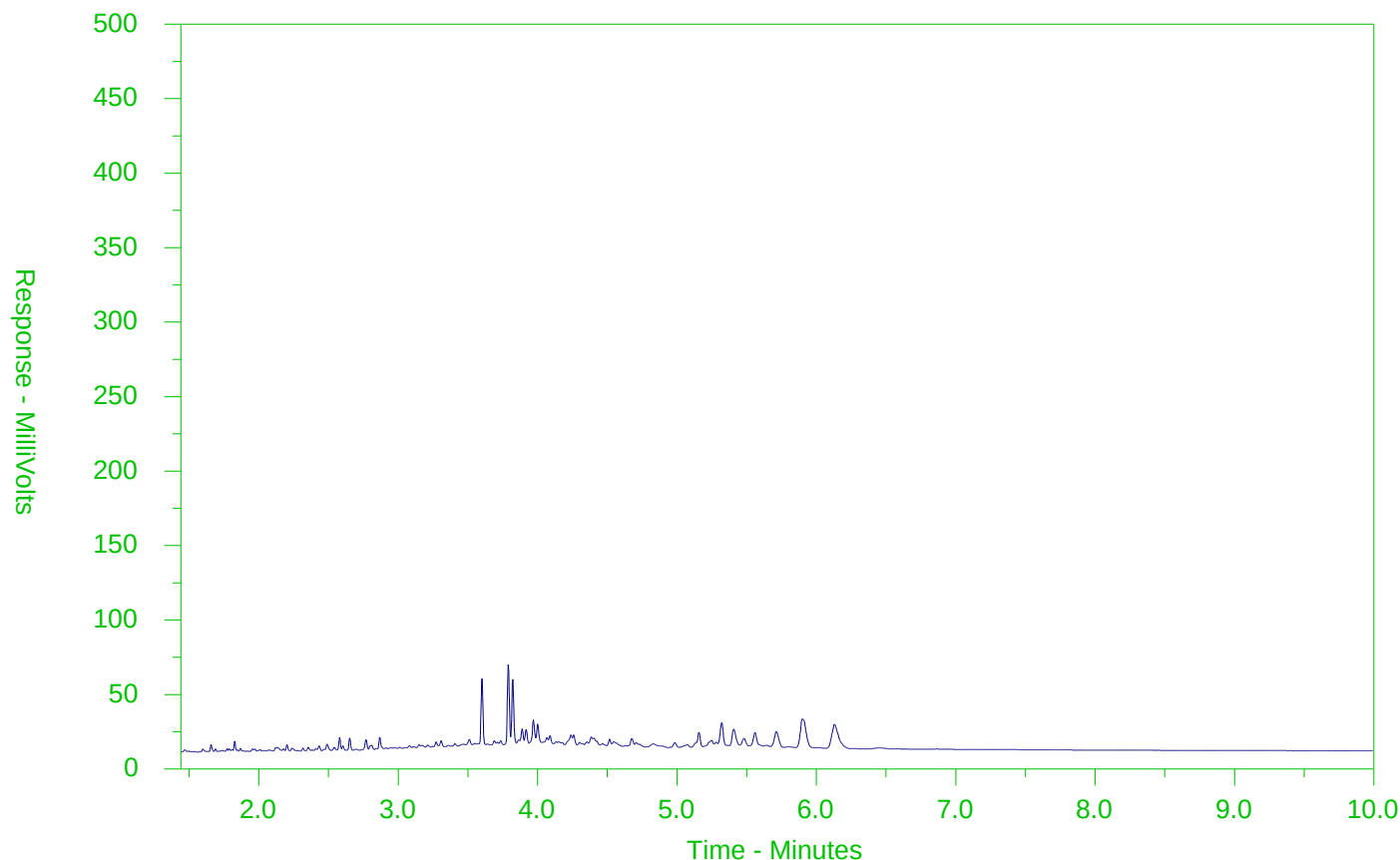
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2253873-1
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.



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

Date Received: 15-MAY-19
Report Date: 28-MAY-19 07:37 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2273673

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
L2273673-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 13-MAY-19							
Matrix: WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		27-MAY-19	R4644890
Toluene	<0.0010		0.0010	mg/L		27-MAY-19	R4644890
Ethyl benzene	<0.00050		0.00050	mg/L		27-MAY-19	R4644890
o-Xylene	<0.00050		0.00050	mg/L		27-MAY-19	R4644890
m+p-Xylenes	0.00044		0.00040	mg/L		27-MAY-19	R4644890
F1 (C6-C10)	<0.10		0.10	mg/L		27-MAY-19	R4644890
Surrogate: 4-Bromofluorobenzene (SS)	106.0		70-130	%		27-MAY-19	R4644890
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.48		0.10	mg/L	17-MAY-19	17-MAY-19	R4637345
F3 (C16-C34)	7.88		0.25	mg/L	17-MAY-19	17-MAY-19	R4637345
F4 (C34-C50)	3.34		0.25	mg/L	17-MAY-19	17-MAY-19	R4637345
Surrogate: 2-Bromobenzotrifluoride	88.5		60-140	%	17-MAY-19	17-MAY-19	R4637345
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		27-MAY-19	
F2-Naphth	0.48		0.10	mg/L		27-MAY-19	
F3-PAH	7.88		0.25	mg/L		27-MAY-19	
Total Hydrocarbons (C6-C50)	11.7		0.38	mg/L		27-MAY-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		27-MAY-19	
Miscellaneous Parameters							
Fluoride (F)	0.132		0.020	mg/L		16-MAY-19	R4637947
Total and E. coli, 1:10 dilution by QT97							
Total Coliforms	>24200		10	MPN/100mL		15-MAY-19	R4636262
Escherichia Coli	>24200	PEHR	10	MPN/100mL		15-MAY-19	R4636262
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000023		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
2-Methyl Naphthalene	0.000041		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Acenaphthene	<0.000020		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Acenaphthylene	<0.000020		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Anthracene	<0.000010		0.000010	mg/L	17-MAY-19	19-MAY-19	R4641977
Acridine	<0.000020		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Benzo(a)anthracene	<0.000010		0.000010	mg/L	17-MAY-19	19-MAY-19	R4641977
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	17-MAY-19	19-MAY-19	R4641977
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	17-MAY-19	19-MAY-19	R4641977
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	17-MAY-19	19-MAY-19	R4641977
Chrysene	<0.000020		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Dibenzo(a,h)anthracene	0.0000051		0.0000050	mg/L	17-MAY-19	19-MAY-19	R4641977
Fluoranthene	<0.000020		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Fluorene	<0.000020		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	17-MAY-19	19-MAY-19	R4641977
Naphthalene	0.000057		0.000050	mg/L	17-MAY-19	19-MAY-19	R4641977
Phenanthrene	<0.000050		0.000050	mg/L	17-MAY-19	19-MAY-19	R4641977
Pyrene	0.000023		0.000010	mg/L	17-MAY-19	19-MAY-19	R4641977
Quinoline	0.000021		0.000020	mg/L	17-MAY-19	19-MAY-19	R4641977
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	17-MAY-19	19-MAY-19	R4641977
Surrogate: Acenaphthene d10	105.3		60-130	%	17-MAY-19	19-MAY-19	R4641977
Surrogate: Acridine d9	113.9		60-130	%	17-MAY-19	19-MAY-19	R4641977
Surrogate: Chrysene d12	113.9		60-130	%	17-MAY-19	19-MAY-19	R4641977
Surrogate: Naphthalene d8	108.4		50-130	%	17-MAY-19	19-MAY-19	R4641977
Surrogate: Phenanthrene d10	116.0		60-130	%	17-MAY-19	19-MAY-19	R4641977

* 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
L2273673-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 13-MAY-19							
Matrix: WATER							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	149		1.2	mg/L		18-MAY-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		18-MAY-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		18-MAY-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	122		1.0	mg/L		17-MAY-19	R4637826
Ammonia by colour							
Ammonia, Total (as N)	7.03		0.20	mg/L		21-MAY-19	R4640491
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	106		20	mg/L		16-MAY-19	R4640272
Carbonaceous BOD							
BOD Carbonaceous	90		20	mg/L		16-MAY-19	R4640272
Chloride in Water by IC							
Chloride (Cl)	77.2		0.50	mg/L		16-MAY-19	R4637947
Conductivity							
Conductivity	557		1.0	umhos/cm		17-MAY-19	R4637826
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	>24200	PEHR	10	MPN/100mL		15-MAY-19	R4636265
Hardness Calculated							
Hardness (as CaCO3)	127	HTC	0.20	mg/L		21-MAY-19	
Mercury Total							
Mercury (Hg)-Total	0.000014	DLM	0.000010	mg/L	21-MAY-19	23-MAY-19	R4642548
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		16-MAY-19	R4637947
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		22-MAY-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		16-MAY-19	R4637947
Oil & Grease - Gravimetric							
Oil and Grease	19.3		5.0	mg/L		23-MAY-19	R4641370
Phenol (4AAP)							
Phenols (4AAP)	0.0099		0.0010	mg/L		21-MAY-19	R4639681
Phosphorus, Total							
Phosphorus (P)-Total	2.40		0.030	mg/L		17-MAY-19	R4637142
Sulfate in Water by IC							
Sulfate (SO4)	33.6		0.30	mg/L		16-MAY-19	R4637947
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.171		0.0030	mg/L	17-MAY-19	17-MAY-19	R4638587
Antimony (Sb)-Total	0.00016		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Arsenic (As)-Total	0.00109		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Barium (Ba)-Total	0.0448		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Bismuth (Bi)-Total	0.00146		0.000050	mg/L	17-MAY-19	17-MAY-19	R4638587
Boron (B)-Total	0.101		0.010	mg/L	17-MAY-19	17-MAY-19	R4638587
Cadmium (Cd)-Total	0.0000595		0.0000050	mg/L	17-MAY-19	17-MAY-19	R4638587
Calcium (Ca)-Total	35.8		0.050	mg/L	17-MAY-19	17-MAY-19	R4638587
Cesium (Cs)-Total	0.000074		0.000010	mg/L	17-MAY-19	17-MAY-19	R4638587
Chromium (Cr)-Total	0.00064		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Cobalt (Co)-Total	0.00020		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Copper (Cu)-Total	0.257		0.00050	mg/L	17-MAY-19	17-MAY-19	R4638587

* 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
L2273673-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 13-MAY-19							
Matrix: WATER							
Total Metals in Water by CRC ICPMS							
Iron (Fe)-Total	0.632		0.010	mg/L	17-MAY-19	17-MAY-19	R4638587
Lead (Pb)-Total	0.00302		0.000050	mg/L	17-MAY-19	17-MAY-19	R4638587
Lithium (Li)-Total	0.0040		0.0010	mg/L	17-MAY-19	17-MAY-19	R4638587
Magnesium (Mg)-Total	9.22		0.0050	mg/L	17-MAY-19	17-MAY-19	R4638587
Manganese (Mn)-Total	0.0620		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Molybdenum (Mo)-Total	0.000743		0.000050	mg/L	17-MAY-19	17-MAY-19	R4638587
Nickel (Ni)-Total	0.00308		0.00050	mg/L	17-MAY-19	17-MAY-19	R4638587
Potassium (K)-Total	8.59		0.050	mg/L	17-MAY-19	17-MAY-19	R4638587
Phosphorus (P)-Total	2.86		0.030	mg/L	17-MAY-19	17-MAY-19	R4638587
Rubidium (Rb)-Total	0.00876		0.00020	mg/L	17-MAY-19	17-MAY-19	R4638587
Selenium (Se)-Total	0.000272		0.000050	mg/L	17-MAY-19	17-MAY-19	R4638587
Silicon (Si)-Total	0.50		0.10	mg/L	17-MAY-19	17-MAY-19	R4638587
Silver (Ag)-Total	0.000029		0.000010	mg/L	17-MAY-19	17-MAY-19	R4638587
Sodium (Na)-Total	44.5		0.050	mg/L	17-MAY-19	17-MAY-19	R4638587
Strontium (Sr)-Total	0.164		0.00020	mg/L	17-MAY-19	17-MAY-19	R4638587
Sulfur (S)-Total	13.8		0.50	mg/L	17-MAY-19	17-MAY-19	R4638587
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	17-MAY-19	17-MAY-19	R4638587
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	17-MAY-19	17-MAY-19	R4638587
Thorium (Th)-Total	<0.00010		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Tin (Sn)-Total	0.00074		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Titanium (Ti)-Total	0.00327		0.00030	mg/L	17-MAY-19	17-MAY-19	R4638587
Tungsten (W)-Total	<0.00010		0.00010	mg/L	17-MAY-19	17-MAY-19	R4638587
Uranium (U)-Total	0.000101		0.000010	mg/L	17-MAY-19	17-MAY-19	R4638587
Vanadium (V)-Total	<0.00050		0.00050	mg/L	17-MAY-19	17-MAY-19	R4638587
Zinc (Zn)-Total	0.0865		0.0030	mg/L	17-MAY-19	17-MAY-19	R4638587
Zirconium (Zr)-Total	0.000591		0.000060	mg/L	17-MAY-19	17-MAY-19	R4638587
Total Organic Carbon by Combustion							
Total Organic Carbon	73.9		2.5	mg/L		22-MAY-19	R4641367
Total Suspended Solids							
Total Suspended Solids	85.3		2.0	mg/L		17-MAY-19	R4639613
pH							
pH	6.86		0.10	pH units		17-MAY-19	R4637826

* 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).
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 transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-SCREEN-WP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other test eg. IC, TDS, TSS, etc			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
F-IC-N-WP	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons. In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1. In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3. Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range: 1. All extraction and analysis holding times were met. 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene. 3. Linearity of gasoline response within 15% throughout the calibration range. Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges: 1. All extraction and analysis holding times were met. 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average. 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors. 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.			
F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511
Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.			
FC10-QT97-WP	Water	Fecal coliforms, 1:10 dilution by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Fecal (thermotolerant) coliform bacteria are determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 44.5 – 0.2°C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.			
HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-T-CVAA-WP	Water	Mercury Total	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.			
MET-T-CCMS-WP	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020B (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.			

Reference Information

Test Method References:

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

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

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

Quality Control Report

Workorder: L2273673

Report Date: 28-MAY-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	Water							
Batch	R4641367							
WG3056392-2 LCS								
Total Organic Carbon			103.5		%		80-120	22-MAY-19
WG3056392-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	22-MAY-19
CL-IC-N-WP	Water							
Batch	R4637947							
WG3051356-2 LCS								
Chloride (Cl)			100.2		%		90-110	16-MAY-19
WG3051356-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	16-MAY-19
EC-WP	Water							
Batch	R4637826							
WG3053365-3 LCS								
Conductivity			98.2		%		90-110	17-MAY-19
WG3053365-1 MB								
Conductivity			<1.0		umhos/cm		1	17-MAY-19
F-IC-N-WP	Water							
Batch	R4637947							
WG3051356-2 LCS								
Fluoride (F)			103.6		%		90-110	16-MAY-19
WG3051356-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	16-MAY-19
F2-F4-FID-WP	Water							
Batch	R4637345							
WG3052255-2 LCS								
F2 (C10-C16)			107.3		%		70-130	17-MAY-19
F3 (C16-C34)			103.6		%		70-130	17-MAY-19
F4 (C34-C50)			104.0		%		70-130	17-MAY-19
WG3052255-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	17-MAY-19
F3 (C16-C34)			<0.25		mg/L		0.25	17-MAY-19
F4 (C34-C50)			<0.25		mg/L		0.25	17-MAY-19
Surrogate: 2-Bromobenzotrifluoride			79.6		%		60-140	17-MAY-19
FC10-QT97-WP	Water							

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC10-QT97-WP								
Water								
Batch	R4636265							
WG3050791-1	MB							
Fecal Coliforms			<1		MPN/100mL		1	15-MAY-19
HG-T-CVAA-WP								
Water								
Batch	R4642548							
WG3057799-2	LCS							
Mercury (Hg)-Total			101.0		%		80-120	23-MAY-19
WG3057799-1	MB							
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	23-MAY-19
MET-T-CCMS-WP								
Water								
Batch	R4638587							
WG3052561-2	LCS							
Aluminum (Al)-Total			111.5		%		80-120	17-MAY-19
Antimony (Sb)-Total			108.6		%		80-120	17-MAY-19
Arsenic (As)-Total			106.0		%		80-120	17-MAY-19
Barium (Ba)-Total			104.5		%		80-120	17-MAY-19
Beryllium (Be)-Total			104.6		%		80-120	17-MAY-19
Bismuth (Bi)-Total			103.1		%		80-120	17-MAY-19
Boron (B)-Total			112.3		%		80-120	17-MAY-19
Cadmium (Cd)-Total			105.8		%		80-120	17-MAY-19
Calcium (Ca)-Total			104.9		%		80-120	17-MAY-19
Cesium (Cs)-Total			104.9		%		80-120	17-MAY-19
Chromium (Cr)-Total			112.9		%		80-120	17-MAY-19
Cobalt (Co)-Total			109.0		%		80-120	17-MAY-19
Copper (Cu)-Total			91.8		%		80-120	17-MAY-19
Iron (Fe)-Total			100.4		%		80-120	17-MAY-19
Lead (Pb)-Total			106.5		%		80-120	17-MAY-19
Lithium (Li)-Total			109.6		%		80-120	17-MAY-19
Magnesium (Mg)-Total			112.5		%		80-120	17-MAY-19
Manganese (Mn)-Total			108.4		%		80-120	17-MAY-19
Molybdenum (Mo)-Total			106.8		%		80-120	17-MAY-19
Nickel (Ni)-Total			106.8		%		80-120	17-MAY-19
Potassium (K)-Total			104.7		%		80-120	17-MAY-19
Phosphorus (P)-Total			119.2		%		80-120	17-MAY-19
Rubidium (Rb)-Total			108.6		%		80-120	17-MAY-19
Selenium (Se)-Total			107.0		%		80-120	17-MAY-19

Quality Control Report

Workorder: L2273673

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4638587							
WG3052561-2	LCS							
Silicon (Si)-Total			106.1		%		80-120	17-MAY-19
Silver (Ag)-Total			105.0		%		80-120	17-MAY-19
Sodium (Na)-Total			109.9		%		80-120	17-MAY-19
Strontium (Sr)-Total			107.3		%		80-120	17-MAY-19
Sulfur (S)-Total			109.8		%		80-120	17-MAY-19
Tellurium (Te)-Total			104.4		%		80-120	17-MAY-19
Thallium (Tl)-Total			104.6		%		80-120	17-MAY-19
Thorium (Th)-Total			103.5		%		80-120	17-MAY-19
Tin (Sn)-Total			105.3		%		80-120	17-MAY-19
Titanium (Ti)-Total			106.6		%		80-120	17-MAY-19
Tungsten (W)-Total			105.7		%		80-120	17-MAY-19
Uranium (U)-Total			108.7		%		80-120	17-MAY-19
Vanadium (V)-Total			109.5		%		80-120	17-MAY-19
Zinc (Zn)-Total			113.3		%		80-120	17-MAY-19
Zirconium (Zr)-Total			104.3		%		80-120	17-MAY-19
WG3052561-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	17-MAY-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	17-MAY-19
Boron (B)-Total			<0.010		mg/L		0.01	17-MAY-19
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	17-MAY-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	17-MAY-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	17-MAY-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	17-MAY-19
Iron (Fe)-Total			<0.010		mg/L		0.01	17-MAY-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	17-MAY-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	17-MAY-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	17-MAY-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	17-MAY-19



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4638587							
WG3052561-1 MB								
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	17-MAY-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	17-MAY-19
Potassium (K)-Total			<0.050		mg/L		0.05	17-MAY-19
Phosphorus (P)-Total			<0.030		mg/L		0.03	17-MAY-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	17-MAY-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	17-MAY-19
Silicon (Si)-Total			<0.10		mg/L		0.1	17-MAY-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	17-MAY-19
Sodium (Na)-Total			<0.050		mg/L		0.05	17-MAY-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	17-MAY-19
Sulfur (S)-Total			<0.50		mg/L		0.5	17-MAY-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	17-MAY-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	17-MAY-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	17-MAY-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	17-MAY-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	17-MAY-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	17-MAY-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	17-MAY-19
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	17-MAY-19
NH3-COL-WP		Water						
Batch	R4640491							
WG3055635-6 LCS								
Ammonia, Total (as N)			102.2		%		85-115	21-MAY-19
WG3055635-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	21-MAY-19
NO2-IC-N-WP		Water						
Batch	R4637947							
WG3051356-2 LCS								
Nitrite (as N)			105.3		%		90-110	16-MAY-19
WG3051356-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	16-MAY-19
NO3-IC-N-WP		Water						

Quality Control Report

Workorder: L2273673

Report Date: 28-MAY-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP		Water						
Batch	R4637947							
WG3051356-2	LCS							
Nitrate (as N)			100.4		%		90-110	16-MAY-19
WG3051356-1	MB							
Nitrate (as N)			<0.020		mg/L		0.02	16-MAY-19
OG-GRAV-WP		Water						
Batch	R4641370							
WG3055181-2	LCS							
Oil and Grease			83.1		%		70-130	23-MAY-19
WG3055181-1	MB							
Oil and Grease			<5.0		mg/L		5	23-MAY-19
P-T-COL-WP		Water						
Batch	R4637142							
WG3051783-2	LCS							
Phosphorus (P)-Total			98.2		%		80-120	17-MAY-19
WG3051783-1	MB							
Phosphorus (P)-Total			<0.0030		mg/L		0.003	17-MAY-19
PAH,PANH-WP		Water						
Batch	R4641977							
WG3052974-2	LCS							
1-Methyl Naphthalene			119.2		%		60-130	19-MAY-19
2-Methyl Naphthalene			110.1		%		60-130	19-MAY-19
Acenaphthene			125.0		%		60-130	19-MAY-19
Acenaphthylene			105.8		%		60-130	19-MAY-19
Anthracene			97.7		%		60-130	19-MAY-19
Acridine			100.4		%		60-130	19-MAY-19
Benzo(a)anthracene			91.9		%		60-130	19-MAY-19
Benzo(a)pyrene			88.7		%		60-130	19-MAY-19
Benzo(b&j)fluoranthene			91.4		%		60-130	19-MAY-19
Benzo(g,h,i)perylene			91.8		%		60-130	19-MAY-19
Benzo(k)fluoranthene			111.8		%		60-130	19-MAY-19
Chrysene			113.2		%		60-130	19-MAY-19
Dibenzo(a,h)anthracene			87.5		%		60-130	19-MAY-19
Fluoranthene			113.9		%		60-130	19-MAY-19
Fluorene			106.2		%		60-130	19-MAY-19
Indeno(1,2,3-cd)pyrene			78.2		%		60-130	19-MAY-19
Naphthalene			122.3		%		50-130	19-MAY-19

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Workorder: L2273673

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-WT								
Batch R4639681								
WG3054396-6	LCS							
Phenols (4AAP)			97.8		%		85-115	21-MAY-19
WG3054396-5	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	21-MAY-19
SO4-IC-N-WP								
Batch R4637947								
WG3051356-2	LCS							
Sulfate (SO4)			100.4		%		90-110	16-MAY-19
WG3051356-1	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	16-MAY-19
SOLIDS-TOTSUS-WP								
Batch R4639613								
WG3051561-44	LCS							
Total Suspended Solids			95.0		%		85-115	17-MAY-19
WG3051561-43	MB							
Total Suspended Solids			<2.0		mg/L		2	17-MAY-19
TC,EC10-QT97-WP								
Batch R4636262								
WG3050808-2	DUP	L2273673-1						
Total Coliforms		>24200	>24200		MPN/100mL	0.0	65	15-MAY-19
Escherichia Coli		>24200	>24200		MPN/100mL	0.0	65	15-MAY-19
WG3050808-1	MB							
Total Coliforms			<1		MPN/100mL		1	15-MAY-19
Escherichia Coli			<1		MPN/100mL		1	15-MAY-19

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Legend:

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

Quality Control Report

Workorder: L2273673

Report Date: 28-MAY-19

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	13-MAY-19	17-MAY-19 12:00	0.25	96	hours	EHTR-FM
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97	1	13-MAY-19	15-MAY-19 17:50	30	54	hours	EHTR
Total and E. coli, 1:10 dilution by QT97	1	13-MAY-19	15-MAY-19 17:50	30	54	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)	1	13-MAY-19	16-MAY-19 07:00	48	67	hours	EHTR
Carbonaceous BOD	1	13-MAY-19	16-MAY-19 07:00	48	67	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 L2273673 were received on 15-MAY-19 12:50.

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.

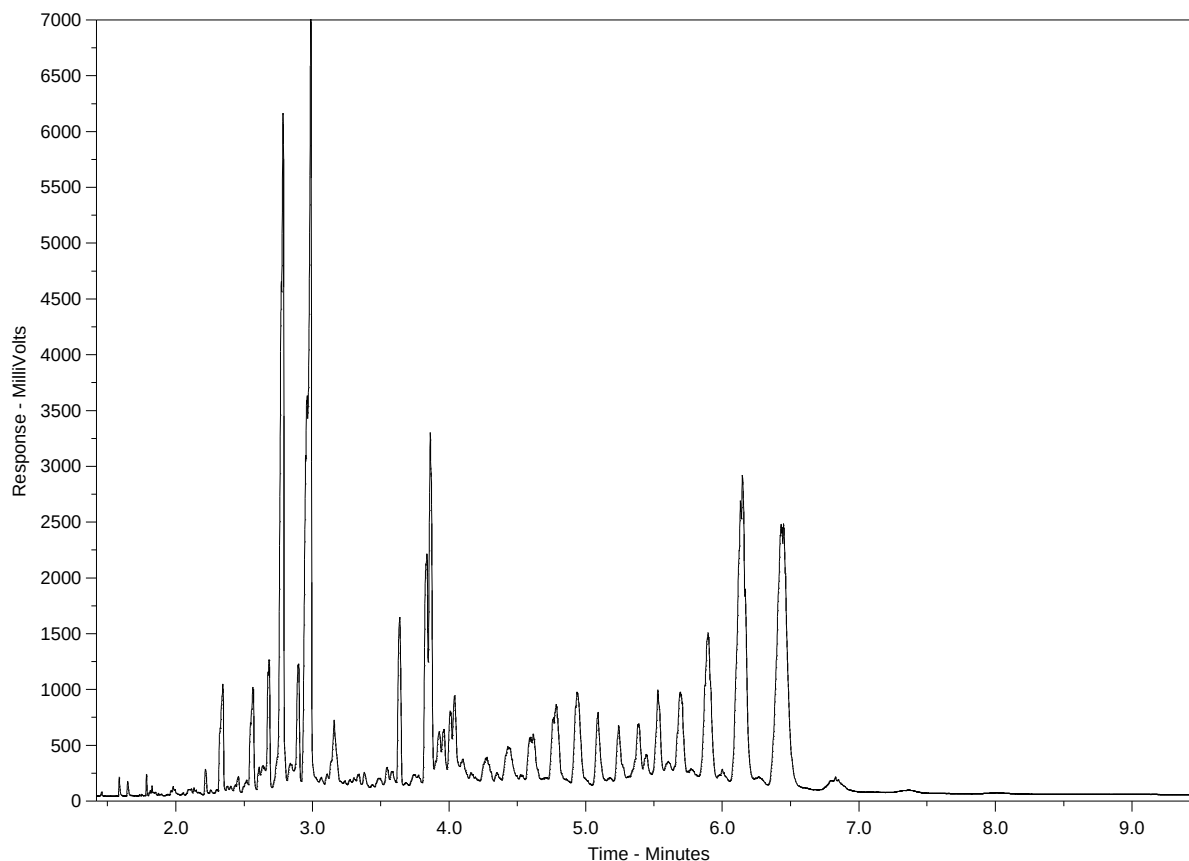
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2273673-1
 Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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

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



GENF 18.01 Front



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

Date Received: 06-JUN-19
Report Date: 19-JUN-19 12:24 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2287018

Project P.O. #: NOT SUBMITTED

Job Reference: RANKIN INLET WWTP 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
L2287018-1 RANKIN INLET WWTP - EFFLUENT Sampled By: CLIENT on 04-JUN-19 Matrix: WASTE BTEX plus F1-F4 BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		12-JUN-19	R4660945
Toluene	<0.0010		0.0010	mg/L		12-JUN-19	R4660945
Ethyl benzene	<0.00050		0.00050	mg/L		12-JUN-19	R4660945
o-Xylene	<0.00050		0.00050	mg/L		12-JUN-19	R4660945
m+p-Xylenes	<0.00040		0.00040	mg/L		12-JUN-19	R4660945
F1 (C6-C10)	<0.10		0.10	mg/L		12-JUN-19	R4660945
Surrogate: 4-Bromofluorobenzene (SS)	88.0		70-130	%		12-JUN-19	R4660945
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.14		0.10	mg/L	07-JUN-19	09-JUN-19	R4663393
F3 (C16-C34)	2.34		0.25	mg/L	07-JUN-19	09-JUN-19	R4663393
F4 (C34-C50)	1.05		0.25	mg/L	07-JUN-19	09-JUN-19	R4663393
Surrogate: 2-Bromobenzotrifluoride	86.5		60-140	%	07-JUN-19	09-JUN-19	R4663393
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		14-JUN-19	
F2-Naphth	0.14		0.10	mg/L		14-JUN-19	
F3-PAH	2.34		0.25	mg/L		14-JUN-19	
Total Hydrocarbons (C6-C50)	3.54		0.38	mg/L		14-JUN-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		14-JUN-19	
Total Coliform and E.coli by MPN QT97							
Total Coliforms	>2420	PEHR	1	MPN/100mL		06-JUN-19	R4661108
Escherichia Coli	>2420	PEHR	1	MPN/100mL		06-JUN-19	R4661108
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Acenaphthene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Acenaphthylene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Anthracene	<0.000010		0.000010	mg/L	12-JUN-19	13-JUN-19	R4669879
Acridine	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Benzo(a)anthracene	<0.000010		0.000010	mg/L	12-JUN-19	13-JUN-19	R4669879
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	12-JUN-19	13-JUN-19	R4669879
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	12-JUN-19	13-JUN-19	R4669879
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	12-JUN-19	13-JUN-19	R4669879
Chrysene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	12-JUN-19	13-JUN-19	R4669879
Fluoranthene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Fluorene	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	12-JUN-19	13-JUN-19	R4669879
Naphthalene	<0.000050		0.000050	mg/L	12-JUN-19	13-JUN-19	R4669879
Phenanthrene	<0.000050		0.000050	mg/L	12-JUN-19	13-JUN-19	R4669879
Pyrene	<0.000010		0.000010	mg/L	12-JUN-19	13-JUN-19	R4669879
Quinoline	<0.000020		0.000020	mg/L	12-JUN-19	13-JUN-19	R4669879
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	12-JUN-19	13-JUN-19	R4669879
Surrogate: Acenaphthene d10	86.3		60-130	%	12-JUN-19	13-JUN-19	R4669879
Surrogate: Acridine d9	94.7		60-130	%	12-JUN-19	13-JUN-19	R4669879
Surrogate: Chrysene d12	94.8		60-130	%	12-JUN-19	13-JUN-19	R4669879
Surrogate: Naphthalene d8	84.3		50-130	%	12-JUN-19	13-JUN-19	R4669879
Surrogate: Phenanthrene d10	94.1		60-130	%	12-JUN-19	13-JUN-19	R4669879
Nunavut WW Group 1							

* 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
L2287018-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 04-JUN-19							
Matrix: WASTE							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	63.8		1.2	mg/L		10-JUN-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		10-JUN-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		10-JUN-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	52.3		1.0	mg/L		07-JUN-19	R4662373
Ammonia by colour							
Ammonia, Total (as N)	2.47		0.20	mg/L		07-JUN-19	R4662823
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	27		20	mg/L		07-JUN-19	R4670223
Carbonaceous BOD							
BOD Carbonaceous	18.6		6.0	mg/L		07-JUN-19	R4670223
Chloride in Water by IC							
Chloride (Cl)	44.6		0.50	mg/L		07-JUN-19	R4663515
Conductivity							
Conductivity	290		1.0	umhos/cm		07-JUN-19	R4662373
Hardness Calculated							
Hardness (as CaCO3)	79.7	HTC	0.20	mg/L		17-JUN-19	
Mercury Total							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L	15-JUN-19	17-JUN-19	R4672470
Nitrate in Water by IC							
Nitrate (as N)	0.072		0.020	mg/L		07-JUN-19	R4663515
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.111		0.070	mg/L		11-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	0.039		0.010	mg/L		07-JUN-19	R4663515
Oil & Grease - Gravimetric							
Oil and Grease	8.3		5.0	mg/L		13-JUN-19	R4668051
Phenol (4AAP)							
Phenols (4AAP)	0.0026		0.0010	mg/L		12-JUN-19	R4668667
Phosphorus, Total							
Phosphorus (P)-Total	0.510		0.0030	mg/L		10-JUN-19	R4665090
Sulfate in Water by IC							
Sulfate (SO4)	20.4		0.30	mg/L		07-JUN-19	R4663515
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.148		0.0030	mg/L	14-JUN-19	14-JUN-19	R4671275
Arsenic (As)-Total	0.00103		0.00010	mg/L	14-JUN-19	14-JUN-19	R4671275
Cadmium (Cd)-Total	0.0000312		0.0000050	mg/L	14-JUN-19	14-JUN-19	R4671275
Calcium (Ca)-Total	22.5		0.050	mg/L	14-JUN-19	14-JUN-19	R4671275
Chromium (Cr)-Total	0.00077		0.00010	mg/L	14-JUN-19	14-JUN-19	R4671275
Cobalt (Co)-Total	0.00026		0.00010	mg/L	14-JUN-19	14-JUN-19	R4671275
Copper (Cu)-Total	0.133		0.00050	mg/L	14-JUN-19	14-JUN-19	R4671275
Iron (Fe)-Total	0.407		0.010	mg/L	14-JUN-19	14-JUN-19	R4671275
Lead (Pb)-Total	0.00354		0.000050	mg/L	14-JUN-19	14-JUN-19	R4671275
Magnesium (Mg)-Total	5.68		0.0050	mg/L	14-JUN-19	14-JUN-19	R4671275
Manganese (Mn)-Total	0.0353		0.00010	mg/L	14-JUN-19	14-JUN-19	R4671275
Nickel (Ni)-Total	0.00314		0.00050	mg/L	14-JUN-19	14-JUN-19	R4671275
Potassium (K)-Total	5.14		0.050	mg/L	14-JUN-19	14-JUN-19	R4671275
Sodium (Na)-Total	24.7		0.050	mg/L	14-JUN-19	14-JUN-19	R4671275
Zinc (Zn)-Total	0.0440		0.0030	mg/L	14-JUN-19	14-JUN-19	R4671275
Total Organic Carbon by Combustion							

* 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
L2287018-1 RANKIN INLET WWTP - EFFLUENT Sampled By: CLIENT on 04-JUN-19 Matrix: WASTE Total Organic Carbon by Combustion Total Organic Carbon Total Suspended Solids Total Suspended Solids pH pH	 13.4 36.5 6.80		 0.50 2.0 0.10	 mg/L mg/L pH units		 18-JUN-19 11-JUN-19 07-JUN-19	 R4674167 R4665046 R4662373

* 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).
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 transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-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.			
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 CaCO ₃ 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.			
SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended solids in aqueous matrices is determined gravimetrically after drying the residue at 103 – 105°C.			
TC,EC-QT97-WP	Water	Total Coliform and E.coli by MPN QT97	APHA 9223B QT97

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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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
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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 ww - 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.

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP								
Water								
Batch	R4674167							
WG3081439-2	LCS							
Total Organic Carbon			104.2		%		80-120	18-JUN-19
WG3081439-1	MB							
Total Organic Carbon			<0.50		mg/L		0.5	18-JUN-19
CL-IC-N-WP								
Water								
Batch	R4663515							
WG3070793-3	DUP	L2287018-1						
Chloride (Cl)		44.6	45.1		mg/L	0.9	20	07-JUN-19
WG3070793-2	LCS							
Chloride (Cl)			98.1		%		90-110	07-JUN-19
WG3070793-1	MB							
Chloride (Cl)			<0.50		mg/L		0.5	07-JUN-19
WG3070793-4	MS	L2287018-1						
Chloride (Cl)			104.3		%		75-125	07-JUN-19
EC-WP								
Water								
Batch	R4662373							
WG3072352-3	LCS							
Conductivity			99.4		%		90-110	07-JUN-19
WG3072352-1	MB							
Conductivity			<1.0		umhos/cm		1	07-JUN-19
F2-F4-FID-WP								
Water								
Batch	R4663393							
WG3070647-2	LCS							
F2 (C10-C16)			103.1		%		70-130	09-JUN-19
F3 (C16-C34)			94.2		%		70-130	09-JUN-19
F4 (C34-C50)			103.4		%		70-130	09-JUN-19
WG3070647-1	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	09-JUN-19
F3 (C16-C34)			<0.25		mg/L		0.25	09-JUN-19
F4 (C34-C50)			<0.25		mg/L		0.25	09-JUN-19
Surrogate: 2-Bromobenzotrifluoride			92.2		%		60-140	09-JUN-19
HG-T-CVAA-WP								
Water								
Batch	R4672470							
WG3080356-2	LCS							
Mercury (Hg)-Total			98.0		%		80-120	17-JUN-19
WG3080356-1	MB							
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	17-JUN-19



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4671275							
WG3077371-2 LCS								
Aluminum (Al)-Total			98.4		%		80-120	14-JUN-19
Arsenic (As)-Total			98.4		%		80-120	14-JUN-19
Cadmium (Cd)-Total			96.6		%		80-120	14-JUN-19
Calcium (Ca)-Total			94.0		%		80-120	14-JUN-19
Chromium (Cr)-Total			95.9		%		80-120	14-JUN-19
Cobalt (Co)-Total			93.9		%		80-120	14-JUN-19
Copper (Cu)-Total			96.2		%		80-120	14-JUN-19
Iron (Fe)-Total			90.5		%		80-120	14-JUN-19
Lead (Pb)-Total			98.5		%		80-120	14-JUN-19
Magnesium (Mg)-Total			106.6		%		80-120	14-JUN-19
Manganese (Mn)-Total			95.4		%		80-120	14-JUN-19
Nickel (Ni)-Total			94.8		%		80-120	14-JUN-19
Potassium (K)-Total			94.4		%		80-120	14-JUN-19
Sodium (Na)-Total			95.3		%		80-120	14-JUN-19
Zinc (Zn)-Total			99.9		%		80-120	14-JUN-19
WG3077371-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	14-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	14-JUN-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	14-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	14-JUN-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	14-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	14-JUN-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	14-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	14-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	14-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	14-JUN-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	14-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	14-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	14-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	14-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	14-JUN-19
NH3-COL-WP		Water						

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-COL-WP	Water							
Batch	R4662823							
WG3072778-14 LCS								
Ammonia, Total (as N)			97.6		%		85-115	07-JUN-19
WG3072778-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	07-JUN-19
NO2-IC-N-WP	Water							
Batch	R4663515							
WG3070793-3 DUP		L2287018-1						
Nitrite (as N)		0.039	0.039		mg/L	1.4	20	07-JUN-19
WG3070793-2 LCS								
Nitrite (as N)			101.0		%		90-110	07-JUN-19
WG3070793-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	07-JUN-19
WG3070793-4 MS		L2287018-1						
Nitrite (as N)			109.6		%		75-125	07-JUN-19
NO3-IC-N-WP	Water							
Batch	R4663515							
WG3070793-3 DUP		L2287018-1						
Nitrate (as N)		0.072	0.071		mg/L	1.9	20	07-JUN-19
WG3070793-2 LCS								
Nitrate (as N)			98.7		%		90-110	07-JUN-19
WG3070793-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	07-JUN-19
WG3070793-4 MS		L2287018-1						
Nitrate (as N)			106.2		%		75-125	07-JUN-19
OG-GRAV-WP	Water							
Batch	R4668051							
WG3074648-2 LCS								
Oil and Grease			91.2		%		70-130	13-JUN-19
WG3074648-1 MB								
Oil and Grease			<5.0		mg/L		5	13-JUN-19
P-T-COL-WP	Water							
Batch	R4665090							
WG3072251-18 LCS								
Phosphorus (P)-Total			99.6		%		80-120	10-JUN-19
WG3072251-17 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	10-JUN-19
PAH,PANH-WP	Water							

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4669879							
WG3076147-2	LCS							
1-Methyl Naphthalene			108.0		%		60-130	13-JUN-19
2-Methyl Naphthalene			99.7		%		60-130	13-JUN-19
Acenaphthene			111.3		%		60-130	13-JUN-19
Acenaphthylene			99.7		%		60-130	13-JUN-19
Anthracene			84.0		%		60-130	13-JUN-19
Acridine			65.7		%		60-130	13-JUN-19
Benzo(a)anthracene			83.6		%		60-130	13-JUN-19
Benzo(a)pyrene			81.5		%		60-130	13-JUN-19
Benzo(b&j)fluoranthene			82.3		%		60-130	13-JUN-19
Benzo(g,h,i)perylene			91.6		%		60-130	13-JUN-19
Benzo(k)fluoranthene			99.5		%		60-130	13-JUN-19
Chrysene			101.1		%		60-130	13-JUN-19
Dibenzo(a,h)anthracene			81.6		%		60-130	13-JUN-19
Fluoranthene			102.7		%		60-130	13-JUN-19
Fluorene			100.1		%		60-130	13-JUN-19
Indeno(1,2,3-cd)pyrene			83.9		%		60-130	13-JUN-19
Naphthalene			111.4		%		50-130	13-JUN-19
Phenanthrene			112.0		%		60-130	13-JUN-19
Pyrene			101.0		%		60-130	13-JUN-19
Quinoline			103.9		%		60-130	13-JUN-19
WG3076147-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	13-JUN-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	13-JUN-19
Acenaphthene			<0.000020		mg/L		0.00002	13-JUN-19
Acenaphthylene			<0.000020		mg/L		0.00002	13-JUN-19
Anthracene			<0.000010		mg/L		0.00001	13-JUN-19
Acridine			<0.000020		mg/L		0.00002	13-JUN-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	13-JUN-19
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	13-JUN-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	13-JUN-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	13-JUN-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	13-JUN-19
Chrysene			<0.000020		mg/L		0.00002	13-JUN-19
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	13-JUN-19



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4669879							
WG3076147-1	MB							
Fluoranthene			<0.000020		mg/L		0.00002	13-JUN-19
Fluorene			<0.000020		mg/L		0.00002	13-JUN-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	13-JUN-19
Naphthalene			<0.000050		mg/L		0.00005	13-JUN-19
Phenanthrene			<0.000050		mg/L		0.00005	13-JUN-19
Pyrene			<0.000010		mg/L		0.00001	13-JUN-19
Quinoline			<0.000020		mg/L		0.00002	13-JUN-19
Surrogate: Acenaphthene d10			74.2		%		60-130	13-JUN-19
Surrogate: Acridine d9			65.8		%		60-130	13-JUN-19
Surrogate: Chrysene d12			76.3		%		60-130	13-JUN-19
Surrogate: Naphthalene d8			71.5		%		50-130	13-JUN-19
Surrogate: Phenanthrene d10			77.1		%		60-130	13-JUN-19
PH-WP		Water						
Batch	R4662373							
WG3072352-2	LCS							
pH			7.38		pH units		7.3-7.5	07-JUN-19
PHENOLS-4AAP-WT		Water						
Batch	R4668667							
WG3074671-2	LCS							
Phenols (4AAP)			108.2		%		85-115	12-JUN-19
WG3074671-1	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	12-JUN-19
SO4-IC-N-WP		Water						
Batch	R4663515							
WG3070793-3	DUP	L2287018-1						
Sulfate (SO4)		20.4	20.3		mg/L	0.3	20	07-JUN-19
WG3070793-2	LCS							
Sulfate (SO4)			100.0		%		90-110	07-JUN-19
WG3070793-1	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	07-JUN-19
WG3070793-4	MS	L2287018-1						
Sulfate (SO4)			105.3		%		75-125	07-JUN-19
SOLIDS-TOTSUS-WP		Water						

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOTSUS-WP								
Batch R4665046								
WG3072270-10 LCS								
Total Suspended Solids			113.2		%		85-115	11-JUN-19
WG3072270-9 MB								
Total Suspended Solids			<2.0		mg/L		2	11-JUN-19
TC,EC-QT97-WP								
Batch R4661108								
WG3070100-2 DUP		L2287018-1						
Total Coliforms		>2420	>2420		MPN/100mL	0.0	65	06-JUN-19
Escherichia Coli		>2420	>2420		MPN/100mL	0.0	65	06-JUN-19
WG3070100-1 MB								
Total Coliforms			<1		MPN/100mL		1	06-JUN-19
Escherichia Coli			<1		MPN/100mL		1	06-JUN-19

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Legend:

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

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	04-JUN-19	07-JUN-19 12:00	0.25	72	hours	EHTR-FM
Bacteriological Tests							
Total Coliform and E.coli by MPN QT97	1	04-JUN-19	06-JUN-19 18:20	30	54	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)	1	04-JUN-19	07-JUN-19 07:00	48	67	hours	EHTR
Carbonaceous BOD	1	04-JUN-19	07-JUN-19 07:00	48	67	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 L2287018 were received on 06-JUN-19 16:35.

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.

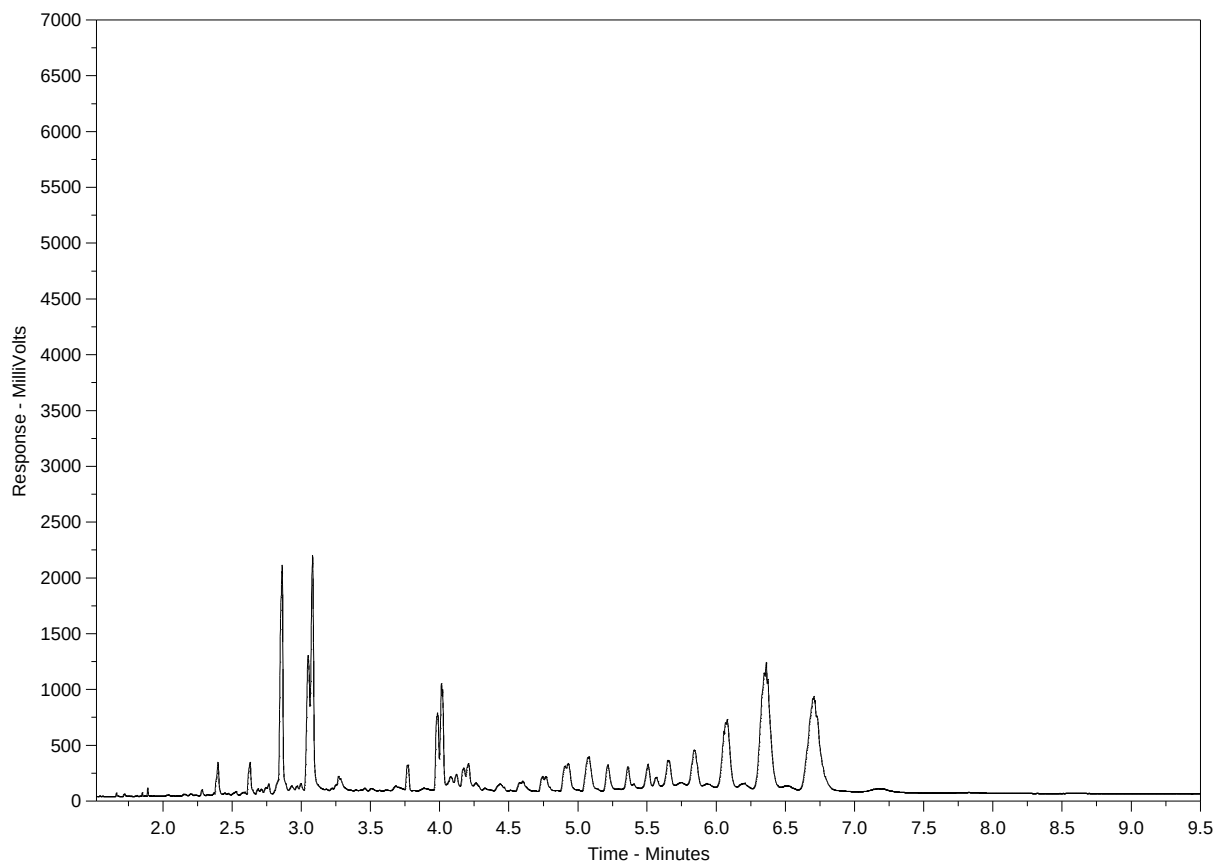
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2287018-1
 Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

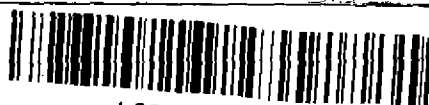
The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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

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

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

Chain



L2287018-COFC

COC #

Page of

Report For

Service Requested (Rush for routine analysis subject to availability)

☒ Standard☐ Other☒ Regular (Standard Turnaround Times - Business Days)☒ PDF☐ Excel☐ Digital☐ Fax☐ 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 TATEmail 1: sdoiron@gov.nu.caEmail 2: mlustv@gov.nu.ca

Email 3:

Analysis Request

Client / Project Information

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

Job #: Rankin Inlet WWTP- Monthly Effluent

PO / AFE:

LSD:

Quote #:

ALS

Contact: Craig Riddell

Sampled By: Simon Delfon

Contact:

BTX,F1-F4-WP

PAH,PAH-WP

NUNAVUT-WW-GRP1-WP

FIC-N-WP

TC,EC-QT97-WP

Number of Containers

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)

Sample

#

Sample Identification

(This description will appear on the report)

Date Sampled

Time Sampled

Sample Type

Waste

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/EIC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Nunavut-WW-GRP1-WP pkg includes 1 L BOD/CBOD, 1 L Routine, 250 ml Metals, 40 ml Mercury Vial, 250 ml Amber Nutrient, 250 ml Amber Phenols, 2 x 250 ml Amber Oil & Grease, 250 ml Bacteria (9 bottles) + 5 Vials for BTX,F1-F4 and 1 L Amber for PAH's = Total of 15 Bottles per sample.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)

SHIPMENT RECEPTION (lab use only)

SHIPMENT VERIFICATION (lab use only)

Released by:

Date (dd-mm-yy)

Time (hh-mm)

Received by:

Date:

Time:

Temperature:

Verified by:

Date:

Time:

Observations:

Yes / No ?

If Yes add SIF

GENF 18.01 Front



Nunavut Community & Government
Services - Rankin Inlet
ATTN: CONNOR FAULKNER
Box 96
Whale Cove NU X0C 0J0

Date Received: 26-JUN-19
Report Date: 17-JUL-19 08:50 (MT)
Version: FINAL

Client Phone: 867-645-8176

Certificate of Analysis

Lab Work Order #: L2299273
Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:



Hua Wo
Chemistry Laboratory Manager

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ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2299273-1 GRA-7							
Sampled By: CF on 25-JUN-19 @ 09:15							
Matrix: WW							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		05-JUL-19	R4696443
Toluene	<0.0010		0.0010	mg/L		05-JUL-19	R4696443
Ethyl benzene	<0.00050		0.00050	mg/L		05-JUL-19	R4696443
o-Xylene	<0.00050		0.00050	mg/L		05-JUL-19	R4696443
m+p-Xylenes	<0.00040		0.00040	mg/L		05-JUL-19	R4696443
F1 (C6-C10)	<0.10		0.10	mg/L		05-JUL-19	R4696443
Surrogate: 4-Bromofluorobenzene (SS)	84.0		70-130	%		05-JUL-19	R4696443
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.10		0.10	mg/L	28-JUN-19	07-JUL-19	R4699009
F3 (C16-C34)	<0.25		0.25	mg/L	28-JUN-19	07-JUL-19	R4699009
F4 (C34-C50)	<0.25		0.25	mg/L	28-JUN-19	07-JUL-19	R4699009
Surrogate: 2-Bromobenzotrifluoride	89.9		60-140	%	28-JUN-19	07-JUL-19	R4699009
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		11-JUL-19	
F2-Naphth	<0.10		0.10	mg/L		11-JUL-19	
F3-PAH	<0.25		0.25	mg/L		11-JUL-19	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		11-JUL-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		09-JUL-19	
Miscellaneous Parameters							
Total Suspended Solids	<2.0		2.0	mg/L		02-JUL-19	R4692638
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Acenaphthene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Acenaphthylene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Anthracene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Acridine	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(a)anthracene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Chrysene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Fluoranthene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Fluorene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Naphthalene	<0.000050		0.000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Phenanthrene	<0.000050		0.000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Pyrene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Quinoline	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	02-JUL-19	03-JUL-19	R4693589
Surrogate: Acenaphthene d10	92.7		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Acridine d9	88.3		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Chrysene d12	105.4		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Naphthalene d8	90.1		50-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Phenanthrene d10	100.3		60-130	%	02-JUL-19	03-JUL-19	R4693589
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	15.6		1.2	mg/L		28-JUN-19	

* 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
L2299273-1 GRA-7							
Sampled By: CF on 25-JUN-19 @ 09:15							
Matrix: WW							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		28-JUN-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		28-JUN-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	12.8		1.0	mg/L		27-JUN-19	R4689958
Ammonia by colour							
Ammonia, Total (as N)	<0.010		0.010	mg/L		02-JUL-19	R4692838
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<2.0		2.0	mg/L		27-JUN-19	R4693417
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		27-JUN-19	R4693417
Chloride in Water by IC							
Chloride (Cl)	14.9		0.50	mg/L		27-JUN-19	R4691095
Conductivity							
Conductivity	96.0		1.0	umhos/cm		27-JUN-19	R4689958
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	<10	MBHT	10	MPN/100mL		26-JUN-19	R4689275
Hardness Calculated							
Hardness (as CaCO3)	24.5	HTC	0.20	mg/L		08-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)	<0.020		0.020	mg/L		27-JUN-19	R4691095
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		27-JUN-19	R4691095
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		28-JUN-19	R4690642
Phenol (4AAP)							
Phenols (4AAP)	0.0011		0.0010	mg/L		28-JUN-19	R4690317
Phosphorus, Total							
Phosphorus (P)-Total	0.0081		0.0030	mg/L		03-JUL-19	R4692701
Sulfate in Water by IC							
Sulfate (SO4)	4.03		0.30	mg/L		27-JUN-19	R4691095
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0143		0.0030	mg/L	05-JUL-19	05-JUL-19	R4695920
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Arsenic (As)-Total	0.00034		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Barium (Ba)-Total	0.0113		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Boron (B)-Total	0.024		0.010	mg/L	05-JUL-19	05-JUL-19	R4695920
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Calcium (Ca)-Total	7.17		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Chromium (Cr)-Total	0.00040		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Copper (Cu)-Total	0.00106		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Iron (Fe)-Total	0.069		0.010	mg/L	05-JUL-19	05-JUL-19	R4695920
Lead (Pb)-Total	<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Lithium (Li)-Total	<0.0010		0.0010	mg/L	05-JUL-19	05-JUL-19	R4695920

* 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
L2299273-1 GRA-7 Sampled By: CF on 25-JUN-19 @ 09:15 Matrix: WW Total Metals in Water by CRC ICPMS							
Magnesium (Mg)-Total	1.59		0.0050	mg/L	05-JUL-19	05-JUL-19	R4695920
Manganese (Mn)-Total	0.00362		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Molybdenum (Mo)-Total	0.000195		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Nickel (Ni)-Total	0.00064		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Potassium (K)-Total	1.20		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Phosphorus (P)-Total	<0.030		0.030	mg/L	05-JUL-19	05-JUL-19	R4695920
Rubidium (Rb)-Total	0.00150		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Selenium (Se)-Total	<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Silicon (Si)-Total	0.24		0.10	mg/L	05-JUL-19	05-JUL-19	R4695920
Silver (Ag)-Total	<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Sodium (Na)-Total	7.81		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Strontium (Sr)-Total	0.0413		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Sulfur (S)-Total	1.53		0.50	mg/L	05-JUL-19	05-JUL-19	R4695920
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Thorium (Th)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Tin (Sn)-Total	0.00120		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Titanium (Ti)-Total	0.00054		0.00030	mg/L	05-JUL-19	05-JUL-19	R4695920
Tungsten (W)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Uranium (U)-Total	0.000029		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Vanadium (V)-Total	<0.00050		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	05-JUL-19	05-JUL-19	R4695920
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Total Organic Carbon by Combustion							
Total Organic Carbon	4.37		0.50	mg/L		05-JUL-19	R4696200
pH							
pH	6.78		0.10	pH units		27-JUN-19	R4689958
L2299273-2 GRA-6 Sampled By: CF on 25-JUN-19 @ 09:40 Matrix: WW BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		05-JUL-19	R4696443
Toluene	<0.0010		0.0010	mg/L		05-JUL-19	R4696443
Ethyl benzene	<0.00050		0.00050	mg/L		05-JUL-19	R4696443
o-Xylene	<0.00050		0.00050	mg/L		05-JUL-19	R4696443
m+p-Xylenes	<0.00040		0.00040	mg/L		05-JUL-19	R4696443
F1 (C6-C10)	<0.10		0.10	mg/L		05-JUL-19	R4696443
Surrogate: 4-Bromofluorobenzene (SS)	102.0		70-130	%		05-JUL-19	R4696443
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.10		0.10	mg/L	28-JUN-19	07-JUL-19	R4699009
F3 (C16-C34)	<0.25		0.25	mg/L	28-JUN-19	07-JUL-19	R4699009
F4 (C34-C50)	<0.25		0.25	mg/L	28-JUN-19	07-JUL-19	R4699009
Surrogate: 2-Bromobenzotrifluoride	82.7		60-140	%	28-JUN-19	07-JUL-19	R4699009
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		11-JUL-19	
F2-Naphth	<0.10		0.10	mg/L		11-JUL-19	
F3-PAH	<0.25		0.25	mg/L		11-JUL-19	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		11-JUL-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		09-JUL-19	

* 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
L2299273-2 GRA-6							
Sampled By: CF on 25-JUN-19 @ 09:40							
Matrix: WW							
Miscellaneous Parameters							
Total Suspended Solids	<2.0		2.0	mg/L		02-JUL-19	R4692638
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Acenaphthene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Acenaphthylene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Anthracene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Acridine	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(a)anthracene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Chrysene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Fluoranthene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Fluorene	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Naphthalene	<0.000050		0.000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Phenanthrene	<0.000050		0.000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Pyrene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Quinoline	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	02-JUL-19	03-JUL-19	R4693589
Surrogate: Acenaphthene d10	77.7		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Acridine d9	79.2		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Chrysene d12	102.0		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Naphthalene d8	78.2		50-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Phenanthrene d10	85.4		60-130	%	02-JUL-19	03-JUL-19	R4693589
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	24.9		1.2	mg/L		28-JUN-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		28-JUN-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		28-JUN-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	20.4		1.0	mg/L		27-JUN-19	R4689958
Ammonia by colour							
Ammonia, Total (as N)	<0.010		0.010	mg/L		02-JUL-19	R4692838
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<2.0		2.0	mg/L		27-JUN-19	R4693417
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		27-JUN-19	R4693417
Chloride in Water by IC							
Chloride (Cl)	16.0		0.50	mg/L		27-JUN-19	R4691095
Conductivity							
Conductivity	101		1.0	umhos/cm		27-JUN-19	R4689958
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	<10	MBHT	10	MPN/100mL		26-JUN-19	R4689275
Hardness Calculated							
Hardness (as CaCO3)	26.8	HTC	0.20	mg/L		08-JUL-19	
Mercury Total							

* 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
L2299273-2 GRA-6							
Sampled By: CF on 25-JUN-19 @ 09:40							
Matrix: WW							
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)	<0.020		0.020	mg/L		27-JUN-19	R4691095
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		27-JUN-19	R4691095
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		28-JUN-19	R4690642
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L		28-JUN-19	R4690317
Phosphorus, Total							
Phosphorus (P)-Total	0.0076		0.0030	mg/L		03-JUL-19	R4692701
Sulfate in Water by IC							
Sulfate (SO4)	4.36		0.30	mg/L		27-JUN-19	R4691095
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0118		0.0030	mg/L	05-JUL-19	05-JUL-19	R4695920
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Arsenic (As)-Total	0.00035		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Barium (Ba)-Total	0.0124		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Boron (B)-Total	0.021		0.010	mg/L	05-JUL-19	05-JUL-19	R4695920
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Calcium (Ca)-Total	7.85		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Chromium (Cr)-Total	0.00025		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Copper (Cu)-Total	0.00092		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Iron (Fe)-Total	0.066		0.010	mg/L	05-JUL-19	05-JUL-19	R4695920
Lead (Pb)-Total	<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Lithium (Li)-Total	<0.0010		0.0010	mg/L	05-JUL-19	05-JUL-19	R4695920
Magnesium (Mg)-Total	1.75		0.0050	mg/L	05-JUL-19	05-JUL-19	R4695920
Manganese (Mn)-Total	0.00340		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Molybdenum (Mo)-Total	0.000204		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Nickel (Ni)-Total	0.00063		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Potassium (K)-Total	1.26		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Phosphorus (P)-Total	<0.030		0.030	mg/L	05-JUL-19	05-JUL-19	R4695920
Rubidium (Rb)-Total	0.00159		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Selenium (Se)-Total	<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Silicon (Si)-Total	0.27		0.10	mg/L	05-JUL-19	05-JUL-19	R4695920
Silver (Ag)-Total	<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Sodium (Na)-Total	8.75		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Strontium (Sr)-Total	0.0451		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Sulfur (S)-Total	1.59		0.50	mg/L	05-JUL-19	05-JUL-19	R4695920
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Thorium (Th)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Tin (Sn)-Total	0.00102		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Titanium (Ti)-Total	0.00051		0.00030	mg/L	05-JUL-19	05-JUL-19	R4695920
Tungsten (W)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Uranium (U)-Total	0.000034		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920

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

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2299273-2	GRA-6							
Sampled By: CF on 25-JUN-19 @ 09:40								
Matrix: WW								
Total Metals in Water by CRC ICPMS								
Vanadium (V)-Total		<0.00050		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Zinc (Zn)-Total		<0.0030		0.0030	mg/L	05-JUL-19	05-JUL-19	R4695920
Zirconium (Zr)-Total		<0.00020		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Total Organic Carbon by Combustion								
Total Organic Carbon		4.53		0.50	mg/L		05-JUL-19	R4696200
pH								
pH		7.28		0.10	pH units		27-JUN-19	R4689958
L2299273-3	GRA-1							
Sampled By: CF on 25-JUN-19 @ 10:00								
Matrix: WW								
BTEX plus F1-F4								
BTX plus F1 by GCMS								
Benzene		<0.00050		0.00050	mg/L		05-JUL-19	R4696443
Toluene		<0.0010		0.0010	mg/L		05-JUL-19	R4696443
Ethyl benzene		<0.00050		0.00050	mg/L		05-JUL-19	R4696443
o-Xylene		<0.00050		0.00050	mg/L		05-JUL-19	R4696443
m+p-Xylenes		<0.00040		0.00040	mg/L		05-JUL-19	R4696443
F1 (C6-C10)		<0.10		0.10	mg/L		05-JUL-19	R4696443
Surrogate: 4-Bromofluorobenzene (SS)		105.0		70-130	%		05-JUL-19	R4696443
CCME PHC F2-F4 in Water								
F2 (C10-C16)		<0.10		0.10	mg/L	28-JUN-19	07-JUL-19	R4699009
F3 (C16-C34)		<0.25		0.25	mg/L	28-JUN-19	07-JUL-19	R4699009
F4 (C34-C50)		<0.25		0.25	mg/L	28-JUN-19	07-JUL-19	R4699009
Surrogate: 2-Bromobenzotrifluoride		84.3		60-140	%	28-JUN-19	07-JUL-19	R4699009
CCME Total Hydrocarbons								
F1-BTEX		<0.10		0.10	mg/L		11-JUL-19	
F2-Naphth		<0.10		0.10	mg/L		11-JUL-19	
F3-PAH		<0.25		0.25	mg/L		11-JUL-19	
Total Hydrocarbons (C6-C50)		<0.38		0.38	mg/L		11-JUL-19	
Sum of Xylene Isomer Concentrations								
Xylenes (Total)		<0.00064		0.00064	mg/L		09-JUL-19	
Miscellaneous Parameters								
Total Suspended Solids		<2.0		2.0	mg/L		02-JUL-19	R4692638
Polyaromatic Hydrocarbons (PAHs)								
1-Methyl Naphthalene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
2-Methyl Naphthalene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Acenaphthene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Acenaphthylene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Anthracene		<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Acridine		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(a)anthracene		<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(a)pyrene		<0.0000050		0.0000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(b&j)fluoranthene		<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(g,h,i)perylene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Benzo(k)fluoranthene		<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Chrysene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Dibenzo(a,h)anthracene		<0.0000050		0.0000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Fluoranthene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Fluorene		<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
Indeno(1,2,3-cd)pyrene		<0.000010		0.00001				

* 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
L2299273-3 GRA-1							
Sampled By: CF on 25-JUN-19 @ 10:00							
Matrix: WW							
Polyaromatic Hydrocarbons (PAHs)							
Phenanthrene	<0.000050		0.000050	mg/L	02-JUL-19	03-JUL-19	R4693589
Pyrene	<0.000010		0.000010	mg/L	02-JUL-19	03-JUL-19	R4693589
Quinoline	<0.000020		0.000020	mg/L	02-JUL-19	03-JUL-19	R4693589
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	02-JUL-19	03-JUL-19	R4693589
Surrogate: Acenaphthene d10	79.4		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Acridine d9	79.8		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Chrysene d12	104.9		60-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Naphthalene d8	81.0		50-130	%	02-JUL-19	03-JUL-19	R4693589
Surrogate: Phenanthrene d10	89.2		60-130	%	02-JUL-19	03-JUL-19	R4693589
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	37.2		1.2	mg/L		28-JUN-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		28-JUN-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		28-JUN-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	30.5		1.0	mg/L		27-JUN-19	R4689958
Ammonia by colour							
Ammonia, Total (as N)	0.040		0.010	mg/L		02-JUL-19	R4692838
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<2.0		2.0	mg/L		27-JUN-19	R4693417
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		27-JUN-19	R4693417
Chloride in Water by IC							
Chloride (Cl)	21.9		0.50	mg/L		27-JUN-19	R4691095
Conductivity							
Conductivity	157		1.0	umhos/cm		27-JUN-19	R4689958
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	<10	MBHT	10	MPN/100mL		26-JUN-19	R4689275
Hardness Calculated							
Hardness (as CaCO3)	45.2	HTC	0.20	mg/L		08-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)	<0.020		0.020	mg/L		27-JUN-19	R4691095
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		27-JUN-19	R4691095
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		28-JUN-19	R4690642
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L		28-JUN-19	R4690317
Phosphorus, Total							
Phosphorus (P)-Total	0.0163		0.0030	mg/L		03-JUL-19	R4692701
Sulfate in Water by IC							
Sulfate (SO4)	14.7		0.30	mg/L		27-JUN-19	R4691095
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0352		0.0030	mg/L	05-JUL-19	05-JUL-19	R4695920
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Arsenic (As)-Total	0.00061		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920

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

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2299273-3 GRA-1								
Sampled By: CF on 25-JUN-19 @ 10:00								
Matrix: WW								
Total Metals in Water by CRC ICPMS								
Barium (Ba)-Total		0.0157		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Beryllium (Be)-Total		<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Bismuth (Bi)-Total		<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Boron (B)-Total		0.032		0.010	mg/L	05-JUL-19	05-JUL-19	R4695920
Cadmium (Cd)-Total		<0.0000050		0.0000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Calcium (Ca)-Total		12.7		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Cesium (Cs)-Total		0.000013		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Chromium (Cr)-Total		0.00044		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Cobalt (Co)-Total		0.00012		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Copper (Cu)-Total		0.00098		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Iron (Fe)-Total		0.071		0.010	mg/L	05-JUL-19	05-JUL-19	R4695920
Lead (Pb)-Total		<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Lithium (Li)-Total		0.0015		0.0010	mg/L	05-JUL-19	05-JUL-19	R4695920
Magnesium (Mg)-Total		3.28		0.0050	mg/L	05-JUL-19	05-JUL-19	R4695920
Manganese (Mn)-Total		0.0446		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Molybdenum (Mo)-Total		0.000379		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Nickel (Ni)-Total		0.00098		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Potassium (K)-Total		1.58		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Phosphorus (P)-Total		<0.030		0.030	mg/L	05-JUL-19	05-JUL-19	R4695920
Rubidium (Rb)-Total		0.00142		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Selenium (Se)-Total		<0.000050		0.000050	mg/L	05-JUL-19	05-JUL-19	R4695920
Silicon (Si)-Total		0.15		0.10	mg/L	05-JUL-19	05-JUL-19	R4695920
Silver (Ag)-Total		<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Sodium (Na)-Total		12.8		0.050	mg/L	05-JUL-19	05-JUL-19	R4695920
Strontium (Sr)-Total		0.0614		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Sulfur (S)-Total		4.79		0.50	mg/L	05-JUL-19	05-JUL-19	R4695920
Tellurium (Te)-Total		<0.00020		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Thallium (Tl)-Total		<0.000010		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Thorium (Th)-Total		<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Tin (Sn)-Total		0.00085		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Titanium (Ti)-Total		0.00188		0.00030	mg/L	05-JUL-19	05-JUL-19	R4695920
Tungsten (W)-Total		<0.00010		0.00010	mg/L	05-JUL-19	05-JUL-19	R4695920
Uranium (U)-Total		0.000086		0.000010	mg/L	05-JUL-19	05-JUL-19	R4695920
Vanadium (V)-Total		<0.00050		0.00050	mg/L	05-JUL-19	05-JUL-19	R4695920
Zinc (Zn)-Total		<0.0030		0.0030	mg/L	05-JUL-19	05-JUL-19	R4695920
Zirconium (Zr)-Total		<0.00020		0.00020	mg/L	05-JUL-19	05-JUL-19	R4695920
Total Organic Carbon by Combustion								
Total Organic Carbon		3.72		0.50	mg/L		05-JUL-19	R4696200
pH								
pH		7.40		0.10	pH units		27-JUN-19	R4689958

* 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 transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-SCREEN-WP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other test eg. IC, TDS, TSS, etc			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
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-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 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

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 aqueous matrices is determined gravimetrically after drying the residue at 103 ± 105°C.			
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 ww - 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.

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Client: Nunavut Community & Government Services - Rankin Inlet

Box 96

Whale Cove NU X0C 0J0

Contact: CONNOR FAULKNER

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-WP								
Water								
Batch	R4689958							
WG3091118-20 DUP		L2299273-2						
Alkalinity, Total (as CaCO ₃)		20.4	20.8		mg/L	1.9	20	27-JUN-19
WG3091118-19 LCS								
Alkalinity, Total (as CaCO ₃)			105.0		%		85-115	27-JUN-19
WG3091118-16 MB								
Alkalinity, Total (as CaCO ₃)			<1.0		mg/L		1	27-JUN-19
BOD-CBOD-WP								
Water								
Batch	R4693417							
WG3089639-7 LCS								
BOD Carbonaceous			90.0		%		85-115	27-JUN-19
WG3089639-6 MB								
BOD Carbonaceous			<2.0		mg/L		2	27-JUN-19
BOD-WP								
Water								
Batch	R4693417							
WG3089639-7 LCS								
Biochemical Oxygen Demand			103.9		%		85-115	27-JUN-19
WG3089639-6 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	27-JUN-19
BTEXS+F1-HSMS-WP								
Water								
Batch	R4696443							
WG3098147-4 DUP		L2299273-1						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	05-JUL-19
Toluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	05-JUL-19
Ethyl benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	05-JUL-19
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	05-JUL-19
m+p-Xylenes		<0.00040	<0.00040	RPD-NA	mg/L	N/A	30	05-JUL-19
F1 (C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	05-JUL-19
WG3098147-2 LCS								
Benzene			92.4		%		70-130	07-JUL-19
Toluene			92.4		%		70-130	07-JUL-19
Ethyl benzene			99.9		%		70-130	07-JUL-19
o-Xylene			105.2		%		70-130	07-JUL-19
m+p-Xylenes			85.4		%		70-130	07-JUL-19
WG3098147-3 LCS								
F1 (C6-C10)			97.2		%		70-130	07-JUL-19
WG3098147-1 MB								
Benzene			<0.00050		mg/L		0.0005	05-JUL-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTEXS+F1-HSMS-WP								
Batch R4696443								
WG3098147-1 MB								
Toluene			<0.0010		mg/L		0.001	05-JUL-19
Ethyl benzene			<0.00050		mg/L		0.0005	05-JUL-19
o-Xylene			<0.00030		mg/L		0.0003	05-JUL-19
m+p-Xylenes			<0.00040		mg/L		0.0004	05-JUL-19
F1 (C6-C10)			<0.10		mg/L		0.1	05-JUL-19
Surrogate: 4-Bromofluorobenzene (SS)			101.0		%		70-130	05-JUL-19
WG3098147-5 MS		L2299273-3						
F1 (C6-C10)			107.2		%		50-150	07-JUL-19
WG3098147-6 MS		L2299273-2						
Benzene			90.8		%		50-150	07-JUL-19
Toluene			88.7		%		50-150	07-JUL-19
Ethyl benzene			97.4		%		50-150	07-JUL-19
o-Xylene			104.7		%		50-150	07-JUL-19
m+p-Xylenes			83.2		%		50-150	07-JUL-19
C-TOC-HTC-WP								
Batch R4696200								
WG3098093-6 LCS								
Total Organic Carbon			99.2		%		80-120	05-JUL-19
WG3098093-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	05-JUL-19
CL-IC-N-WP								
Batch R4691095								
WG3089396-2 LCS								
Chloride (Cl)			100.0		%		90-110	27-JUN-19
WG3089396-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	27-JUN-19
EC-WP								
Batch R4689958								
WG3091118-20 DUP		L2299273-2						
Conductivity		101	101		umhos/cm	0.0	10	27-JUN-19
WG3091118-18 LCS								
Conductivity			97.4		%		90-110	27-JUN-19
WG3091118-16 MB								
Conductivity			<1.0		umhos/cm		1	27-JUN-19
F2-F4-FID-WP								

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-FID-WP								
Water								
Batch	R4699009							
WG3092259-4	LCS							
F2 (C10-C16)			99.6		%		70-130	07-JUL-19
F3 (C16-C34)			100.4		%		70-130	07-JUL-19
F4 (C34-C50)			111.8		%		70-130	07-JUL-19
WG3092259-3	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	07-JUL-19
F3 (C16-C34)			<0.25		mg/L		0.25	07-JUL-19
F4 (C34-C50)			<0.25		mg/L		0.25	07-JUL-19
Surrogate: 2-Bromobenzotrifluoride			89.3		%		60-140	07-JUL-19
FC10-QT97-WP								
Water								
Batch	R4689275							
WG3089240-2	DUP	L2299273-1						
Fecal Coliforms		<10	<10	RPD-NA	MPN/100mL	N/A	65	26-JUN-19
WG3089240-1	MB							
Fecal Coliforms			<1		MPN/100mL		1	26-JUN-19
HG-T-CVAA-WP								
Water								
Batch	R4712816							
WG3106592-3	DUP	L2299273-1						
Mercury (Hg)-Total		<0.0000050	<0.0000050	RPD-NA	mg/L	N/A	20	15-JUL-19
WG3106592-2	LCS							
Mercury (Hg)-Total			91.0		%		80-120	15-JUL-19
WG3106592-1	MB							
Mercury (Hg)-Total			<0.0000050		mg/L		0.000005	15-JUL-19
WG3106592-4	MS	L2299273-2						
Mercury (Hg)-Total			100.0		%		70-130	15-JUL-19
MET-T-CCMS-WP								
Water								
Batch	R4695920							
WG3096575-2	LCS							
Aluminum (Al)-Total			99.8		%		80-120	05-JUL-19
Antimony (Sb)-Total			100.0		%		80-120	05-JUL-19
Arsenic (As)-Total			100.3		%		80-120	05-JUL-19
Barium (Ba)-Total			97.1		%		80-120	05-JUL-19
Beryllium (Be)-Total			99.3		%		80-120	05-JUL-19
Bismuth (Bi)-Total			98.6		%		80-120	05-JUL-19
Boron (B)-Total			98.2		%		80-120	05-JUL-19
Cadmium (Cd)-Total			98.6		%		80-120	05-JUL-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4695920							
WG3096575-2	LCS							
Calcium (Ca)-Total			98.8		%		80-120	05-JUL-19
Cesium (Cs)-Total			95.6		%		80-120	05-JUL-19
Chromium (Cr)-Total			99.2		%		80-120	05-JUL-19
Cobalt (Co)-Total			97.8		%		80-120	05-JUL-19
Copper (Cu)-Total			98.3		%		80-120	05-JUL-19
Iron (Fe)-Total			84.3		%		80-120	05-JUL-19
Lead (Pb)-Total			98.6		%		80-120	05-JUL-19
Lithium (Li)-Total			89.3		%		80-120	05-JUL-19
Magnesium (Mg)-Total			110.9		%		80-120	05-JUL-19
Manganese (Mn)-Total			98.0		%		80-120	05-JUL-19
Molybdenum (Mo)-Total			102.7		%		80-120	05-JUL-19
Nickel (Ni)-Total			98.0		%		80-120	05-JUL-19
Potassium (K)-Total			95.6		%		80-120	05-JUL-19
Phosphorus (P)-Total			102.9		%		80-120	05-JUL-19
Rubidium (Rb)-Total			99.99		%		80-120	05-JUL-19
Selenium (Se)-Total			96.9		%		80-120	05-JUL-19
Silicon (Si)-Total			95.3		%		80-120	05-JUL-19
Silver (Ag)-Total			96.8		%		80-120	05-JUL-19
Sodium (Na)-Total			96.5		%		80-120	05-JUL-19
Strontium (Sr)-Total			97.8		%		80-120	05-JUL-19
Sulfur (S)-Total			99.6		%		80-120	05-JUL-19
Tellurium (Te)-Total			100.4		%		80-120	05-JUL-19
Thallium (Tl)-Total			102.4		%		80-120	05-JUL-19
Thorium (Th)-Total			96.1		%		80-120	05-JUL-19
Tin (Sn)-Total			98.8		%		80-120	05-JUL-19
Titanium (Ti)-Total			98.1		%		80-120	05-JUL-19
Tungsten (W)-Total			98.2		%		80-120	05-JUL-19
Uranium (U)-Total			98.5		%		80-120	05-JUL-19
Vanadium (V)-Total			99.2		%		80-120	05-JUL-19
Zinc (Zn)-Total			98.9		%		80-120	05-JUL-19
Zirconium (Zr)-Total			95.8		%		80-120	05-JUL-19
WG3096575-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-JUL-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4695920							
WG3096575-1 MB								
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	05-JUL-19
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	05-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	05-JUL-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	05-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-JUL-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	05-JUL-19
Phosphorus (P)-Total			<0.030		mg/L		0.03	05-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	05-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	05-JUL-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	05-JUL-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	05-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	05-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	05-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-JUL-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	Water							
Batch	R4695920							
WG3096575-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	05-JUL-19
NH3-COL-WP	Water							
Batch	R4692838							
WG3094584-6 LCS								
Ammonia, Total (as N)			96.6		%		85-115	02-JUL-19
WG3094584-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	02-JUL-19
NO2-IC-N-WP	Water							
Batch	R4691095							
WG3089396-2 LCS								
Nitrite (as N)			101.7		%		90-110	27-JUN-19
WG3089396-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	27-JUN-19
NO3-IC-N-WP	Water							
Batch	R4691095							
WG3089396-2 LCS								
Nitrate (as N)			99.8		%		90-110	27-JUN-19
WG3089396-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	27-JUN-19
OG-GRAV-WP	Water							
Batch	R4690642							
WG3091032-2 LCS								
Oil and Grease			91.2		%		70-130	28-JUN-19
WG3091032-1 MB								
Oil and Grease			<5.0		mg/L		5	28-JUN-19
P-T-COL-WP	Water							
Batch	R4692701							
WG3092371-2 LCS								
Phosphorus (P)-Total			100.2		%		80-120	03-JUL-19
WG3092371-1 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	03-JUL-19
PAH,PANH-WP	Water							

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4693589							
WG3094695-2	LCS							
1-Methyl Naphthalene			97.1		%		60-130	03-JUL-19
2-Methyl Naphthalene			89.4		%		60-130	03-JUL-19
Acenaphthene			96.4		%		60-130	03-JUL-19
Acenaphthylene			83.3		%		60-130	03-JUL-19
Anthracene			86.3		%		60-130	03-JUL-19
Acridine			99.0		%		60-130	03-JUL-19
Benzo(a)anthracene			91.5		%		60-130	03-JUL-19
Benzo(a)pyrene			88.8		%		60-130	03-JUL-19
Benzo(b&j)fluoranthene			89.4		%		60-130	03-JUL-19
Benzo(g,h,i)perylene			89.8		%		60-130	03-JUL-19
Benzo(k)fluoranthene			93.0		%		60-130	03-JUL-19
Chrysene			92.5		%		60-130	03-JUL-19
Dibenzo(a,h)anthracene			109.9		%		60-130	03-JUL-19
Fluoranthene			99.4		%		60-130	03-JUL-19
Fluorene			96.9		%		60-130	03-JUL-19
Indeno(1,2,3-cd)pyrene			85.7		%		60-130	03-JUL-19
Naphthalene			101.9		%		50-130	03-JUL-19
Phenanthrene			112.6		%		60-130	03-JUL-19
Pyrene			99.1		%		60-130	03-JUL-19
Quinoline			105.4		%		60-130	03-JUL-19
WG3094695-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	03-JUL-19
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	03-JUL-19
Acenaphthene			<0.000020		mg/L		0.00002	03-JUL-19
Acenaphthylene			<0.000020		mg/L		0.00002	03-JUL-19
Anthracene			<0.000010		mg/L		0.00001	03-JUL-19
Acridine			<0.000020		mg/L		0.00002	03-JUL-19
Benzo(a)anthracene			<0.000010		mg/L		0.00001	03-JUL-19
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	03-JUL-19
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	03-JUL-19
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	03-JUL-19
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	03-JUL-19
Chrysene			<0.000020		mg/L		0.00002	03-JUL-19
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	03-JUL-19



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4693589							
WG3094695-1	MB							
Fluoranthene			<0.000020		mg/L		0.00002	03-JUL-19
Fluorene			<0.000020		mg/L		0.00002	03-JUL-19
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	03-JUL-19
Naphthalene			<0.000050		mg/L		0.00005	03-JUL-19
Phenanthrene			<0.000050		mg/L		0.00005	03-JUL-19
Pyrene			<0.000010		mg/L		0.00001	03-JUL-19
Quinoline			<0.000020		mg/L		0.00002	03-JUL-19
Surrogate: Acenaphthene d10			84.0		%		60-130	03-JUL-19
Surrogate: Acridine d9			82.4		%		60-130	03-JUL-19
Surrogate: Chrysene d12			107.2		%		60-130	03-JUL-19
Surrogate: Naphthalene d8			86.4		%		50-130	03-JUL-19
Surrogate: Phenanthrene d10			87.1		%		60-130	03-JUL-19
PH-WP		Water						
Batch	R4689958							
WG3091118-20	DUP	L2299273-2						
pH		7.28	7.29	J	pH units	0.01	0.2	27-JUN-19
WG3091118-17	LCS							
pH			7.39		pH units		7.3-7.5	27-JUN-19
PHENOLS-4AAP-WT		Water						
Batch	R4690317							
WG3091117-6	LCS							
Phenols (4AAP)			98.4		%		85-115	28-JUN-19
WG3091117-5	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	28-JUN-19
SO4-IC-N-WP		Water						
Batch	R4691095							
WG3089396-2	LCS							
Sulfate (SO4)			101.1		%		90-110	27-JUN-19
WG3089396-1	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	27-JUN-19
SOLIDS-TOTSUS-WP		Water						
Batch	R4692638							
WG3091740-10	LCS							
Total Suspended Solids			110.6		%		85-115	02-JUL-19
WG3091740-9	MB							



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOTSUS-WP	Water							
Batch	R4692638							
WG3091740-9 MB								
Total Suspended Solids			<2.0		mg/L		2	02-JUL-19

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Legend:

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

Sample Parameter Qualifier Definitions:

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

Quality Control Report

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	25-JUN-19 09:15	27-JUN-19 12:00	0.25	51	hours	EHTR-FM
	2	25-JUN-19 09:40	27-JUN-19 12:00	0.25	50	hours	EHTR-FM
	3	25-JUN-19 10:00	27-JUN-19 12:00	0.25	50	hours	EHTR-FM
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97							
	1	25-JUN-19 09:15	26-JUN-19 17:00	30	32	hours	EHTL
	2	25-JUN-19 09:40	26-JUN-19 17:00	30	31	hours	EHTL
	3	25-JUN-19 10:00	26-JUN-19 17:00	30	31	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 L2299273 were received on 26-JUN-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.

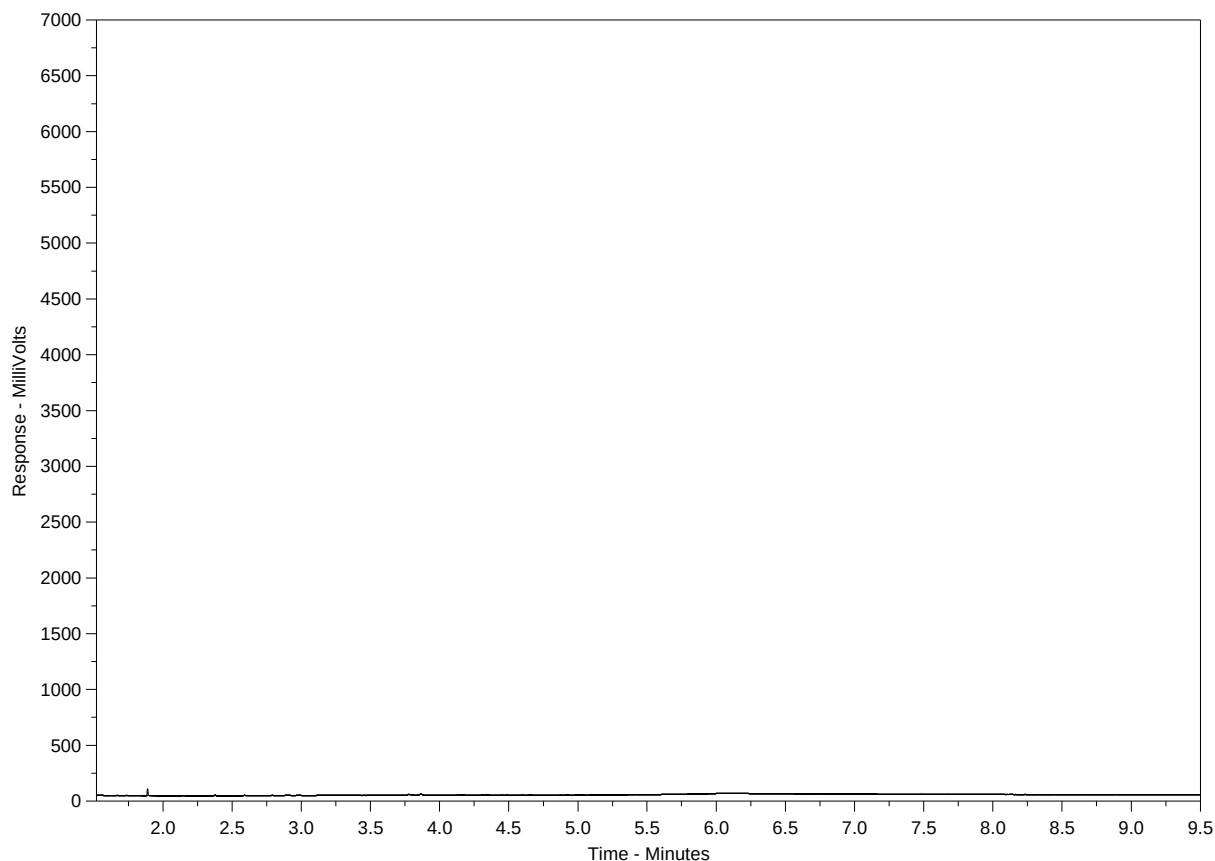
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2299273-1
Client Sample ID: GRA-7



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

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

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

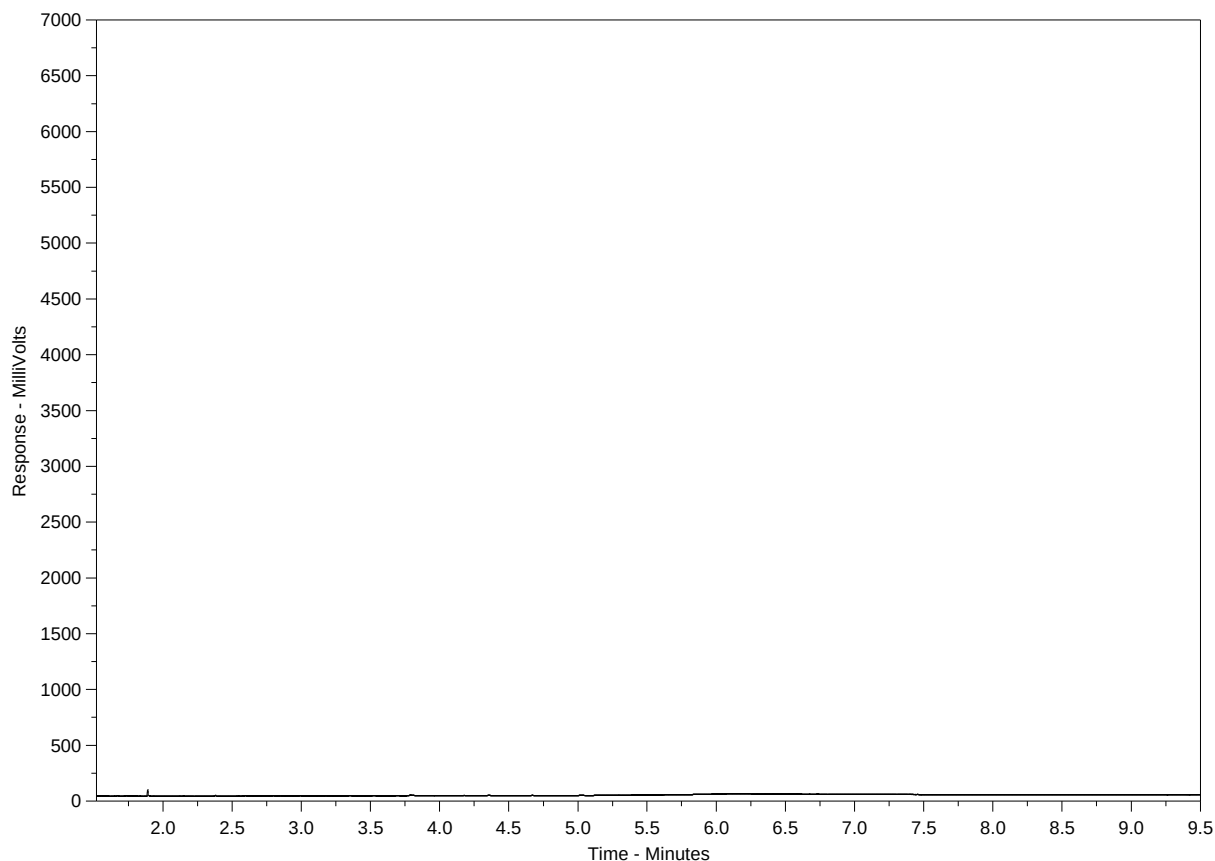
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2299273-2
Client Sample ID: GRA-6



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

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

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

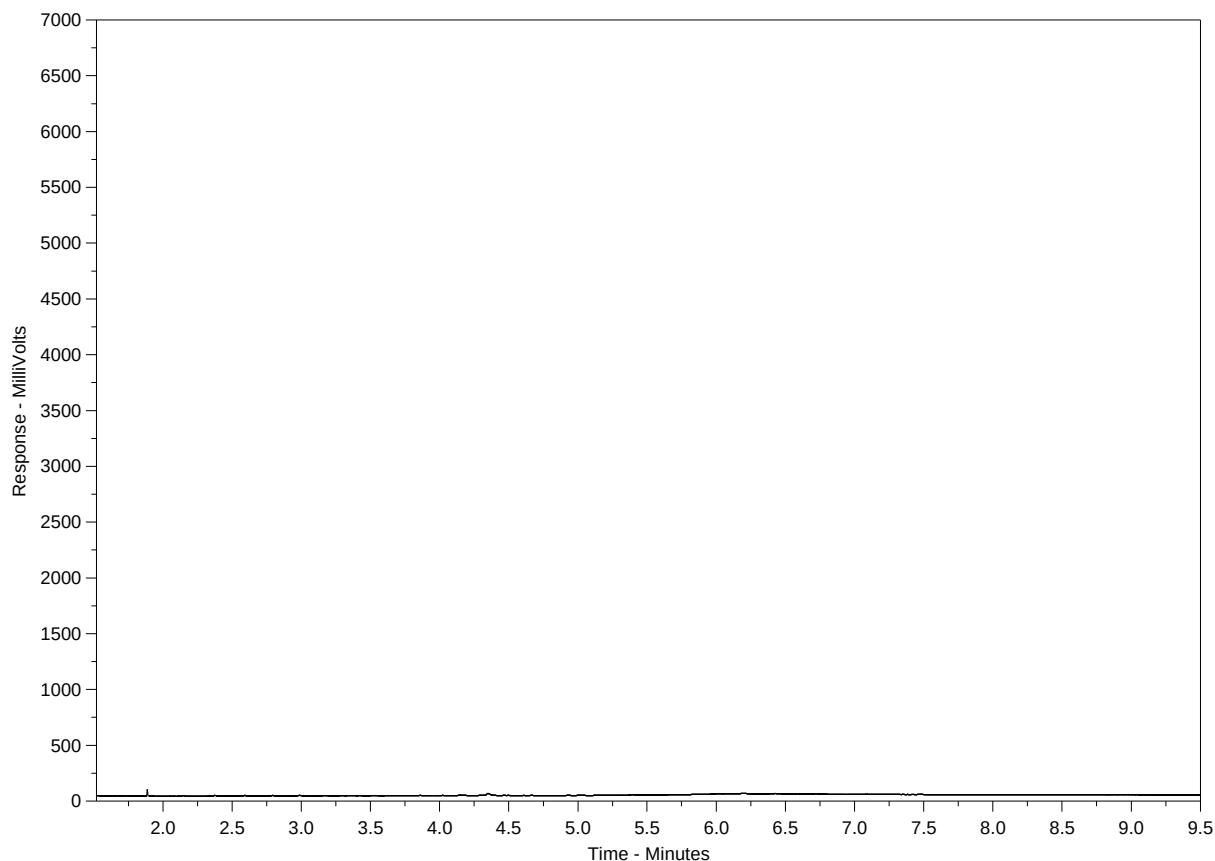
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2299273-3
Client Sample ID: GRA-1



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

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.

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2299273-COFC

COC Number: 17 - 747781

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[illegible]

REFER TO BACK PAGE FOR ALL LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

JUNE 2018 FROM

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

**2019 SECOND QUARTER REPORT
FOR GN-CGS RANKIN INLET**

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



Raw Water Supply From Nipissar Lake

Water Licence No. 3AM-GRA1624

GRA-1

Date	Volume (m ³)	Daily Volume (m ³)	Total Volume (m ³)	Total Monthly Volume (m ³)
01-Apr-19	3,979,958.00	2,220.00	196,697.00	
02-Apr-19	3,982,062.00	2,104.00	198,801.00	
03-Apr-19	3,984,087.00	2,025.00	200,826.00	
04-Apr-19	3,986,244.00	2,157.00	202,983.00	
05-Apr-19	3,988,923.00	2,679.00	205,662.00	
06-Apr-19	3,990,616.00	1,693.00	207,355.00	
07-Apr-19	3,992,669.00	2,053.00	209,408.00	
08-Apr-19	3,994,883.00	2,214.00	211,622.00	
09-Apr-19	3,997,263.00	2,380.00	214,002.00	
10-Apr-19	3,999,351.00	2,088.00	216,090.00	
11-Apr-19	4,001,578.00	2,227.00	218,317.00	
12-Apr-19	4,003,959.00	2,381.00	220,698.00	
13-Apr-19	4,005,492.00	1,533.00	222,231.00	
14-Apr-19	4,007,548.00	2,056.00	224,287.00	
15-Apr-19	4,010,126.00	2,578.00	226,865.00	
16-Apr-19	4,012,301.00	2,175.00	229,040.00	
17-Apr-19	4,014,416.00	2,115.00	231,155.00	
18-Apr-19	4,016,532.00	2,116.00	233,271.00	
19-Apr-19			233,271.00	
20-Apr-19	4,020,435.00	3,903.00	237,174.00	
21-Apr-19	4,022,443.00	2,008.00	239,182.00	
22-Apr-19	4,024,772.00	2,329.00	241,511.00	
23-Apr-19	4,026,926.00	2,154.00	243,665.00	
24-Apr-19	4,029,406.00	2,480.00	246,145.00	
25-Apr-19	4,031,682.00	2,276.00	248,421.00	
26-Apr-19	4,033,841.00	2,159.00	250,580.00	
27-Apr-19	4,035,466.00	1,625.00	252,205.00	
28-Apr-19	4,037,553.00	2,087.00	254,292.00	
29-Apr-19	4,039,879.00	2,326.00	256,618.00	
30-Apr-19	4,042,101.00	2,222.00	258,840.00	62,143.00
01-May-19	4,044,105.00	2,004.00	260,844.00	
02-May-19	4,046,072.00	1,967.00	262,811.00	
03-May-19	4,048,205.00	2,133.00	264,944.00	
04-May-19	4,050,031.00	1,826.00	266,770.00	
05-May-19	4,052,000.00	1,969.00	268,739.00	
06-May-19	4,054,349.00	2,349.00	271,088.00	
07-May-19			271,088.00	
08-May-19	4,057,798.00	3,449.00	274,537.00	
09-May-19			274,537.00	
10-May-19	4,062,333.00	4,535.00	279,072.00	
11-May-19	4,064,238.00	1,905.00	280,977.00	
12-May-19	4,066,437.00	2,199.00	283,176.00	
13-May-19			283,176.00	
14-May-19			283,176.00	
15-May-19	4,072,966.00	6,529.00	289,705.00	
16-May-19			289,705.00	
17-May-19	4,077,236.00	4,270.00	293,975.00	
18-May-19			293,975.00	
19-May-19			293,975.00	
20-May-19			293,975.00	
21-May-19	4,085,276.00	8,040.00	302,015.00	
22-May-19	4,087,208.00	1,932.00	303,947.00	
23-May-19	4,089,354.00	2,146.00	306,093.00	
24-May-19	4,091,314.00	1,960.00	308,053.00	
25-May-19	4,093,429.00	2,115.00	310,168.00	
26-May-19	4,095,443.81	2,014.81	312,182.81	
27-May-19	4,097,490.00	2,046.19	314,229.00	
28-May-19	4,099,673.00	2,183.00	316,412.00	
29-May-19	4,101,765.00	2,092.00	318,504.00	
30-May-19	4,103,869.00	2,104.00	320,608.00	
31-May-19	4,105,964.00	2,095.00	322,703.00	61,859.00
01-Jun-19	4,108,008.00	2,044.00	324,747.00	
02-Jun-19	4,110,004.00	1,996.00	326,743.00	
03-Jun-19	4,112,142.00	2,138.00	328,881.00	
04-Jun-19	4,114,246.00	2,104.00	330,985.00	
05-Jun-19	4,116,838.00	2,592.00	333,577.00	
06-Jun-19	4,118,342.00	1,504.00	335,081.00	
07-Jun-19	4,120,518.00	2,176.00	337,257.00	
08-Jun-19	4,122,375.00	1,857.00	339,114.00	
09-Jun-19	4,124,375.00	2,000.00	341,114.00	
10-Jun-19	4,126,695.00	2,320.00	343,434.00	
11-Jun-19	4,128,604.00	1,909.00	345,343.00	
12-Jun-19	4,130,705.00	2,101.00	347,444.00	
13-Jun-19	4,132,803.00	2,098.00	349,542.00	
14-Jun-19	4,134,950.00	2,147.00	351,689.00	
15-Jun-19	4,136,716.00	1,766.00	353,455.00	
16-Jun-19	4,138,792.00	2,076.00	355,531.00	
17-Jun-19	4,140,930.00	2,138.00	357,669.00	
18-Jun-19	4,142,936.00	2,006.00	359,675.00	
19-Jun-19	4,144,655.00	1,719.00	361,394.00	
20-Jun-19	4,146,287.00	1,632.00	363,026.00	
21-Jun-19	4,148,211.00	1,924.00	364,950.00	
22-Jun-19	4,149,557.00	1,346.00	366,296.00	
23-Jun-19	4,151,074.00	1,517.00	367,813.00	
24-Jun-19	4,152,688.00	1,614.00	369,427.00	
25-Jun-19	4,154,156.00	1,468.00	370,895.00	
26-Jun-19	4,155,593.00	1,437.00	372,332.00	
27-Jun-19	4,157,471.00	1,878.00	374,210.00	
28-Jun-19	4,159,014.00	1,543.00	375,753.00	
29-Jun-19	4,160,632.00	1,618.00	377,371.00	
30-Jun-19	4,162,229.00	1,597.00	378,968.00	54,221.00

**2019 SECOND QUARTER REPORT
FOR GN-CGS RANKIN INLET**

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 $272.54 \text{ m}^3/\text{h}$. 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 $6,268.42 \text{ m}^3/\text{day}$. Due to broken flow meters, inconsistent recording, and missing log sheets, this is the best approach to record keeping for the 2019 pumping season.