ANNUAL REPORT
FOR THE HAMLET OF RANKIN INLET

YEAR BEING REPORTED: 2019

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water License No. **3BM-RAN1520** issued to the **Hamlet of Rankin Inlet**.

i) - iii) tabular summaries of all data generated under the "Monitoring Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are results for Monitoring Station RAN-2.

Month Reported	Quantity of Water Obtained from all sources (m^3)	Quantity of Sewage Waste Discharged (Estimated)
January	None	None
February	None	None
March	None	None
April	None	None
May	None	None
June	None	None
July	None	None
August	None	None
September	None	None
October	None	None
November	None	None
December	None	None
ANNUAL TOTAL	None	None

Note: The purpose of this License is the deposit of waste; there is no authorized water use.

ii) a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;

- Batteries have been crated and stacked, as well as stored in a sea can which is now at full capacity. Segregation and clean-up of the wood and metals area has been completed by the Hamlet in the summer of 2019.

iii) a list of unauthorized discharges and summary of follow-up action taken;

Spill	Occurrence Date	Location Description	Product Spilled	Quantity
spill-2019452	03-Nov-19	Between Health Centre and Power Plant		40000
spill-2019480	31-Oct-19	Melvin Bay		Unknown Quantity
spill-2019425	14-Oct-19	414 / 17-13 Ave.	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	200
spill-2019410	01-Oct-19	902 Maniruq 61st	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Unknown Quantity
spill-2019270	05-Jul-19	188-24 Inukshuk Avenue, unit 541b	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	278
spill-2019255	26-Jun-19	Condominiums, 44 - 15th Street		Unknown Quantity
spill-2019216	22-May-19	Box 251	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Unknown Quantity
spill-2019194	02-May-19	CBC Building 101-21 Tariuq Avenue	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Unknown Quantity
spill-2019155	09-Apr-19	Courtyard Condominiums, 44-15 Ayaruaq street	Wastewater (sewage, mine tailings)	800
spill-2019221	01-Mar-19	CBC Building 101-21 Tariuq Avenue	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	2000

iv) a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

- None

v) a summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;

- None

vi) any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

- None

vii) Updates or revisions to the approved Operation and Maintenance Plans.

- None

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

- The 3BM-RAN1520 CIRNAC Inspection took place on July 18th, 2019. A copy of the inspection report has not been received to date.

Appendix A: Weekly Inspections at Monitoring Program Stations – 1 page
Appendix B: Certificate of Analysis June 26, 2019 – 8 pages
Certificate of Analysis July 30, 2019 – 9 pages
Certificate of Analysis October 1, 2019 – 9 pages
Appendix C: Hazardous Materials Spill Database, Rankin Inlet 2019 – 2 pages
Appendix D: Rankin Inlet – Hamlet 2019 Sampling Summary – 1 page

Appendix A

No Weekly Inspections at Monitoring Program Stations Document were received by CGS.

Appendix B

Hamlet of Rankin Inlet
ATTN: TOMMY SHARP
PO Box 310
Rankin Inlet NU X0C 0G0

Date Received: 28-JUN-19
Report Date: 01-AUG-19 10:14 (MT)
Version: FINAL REV. 2

Client Phone: 867-645-2895

Certificate of Analysis

Lab Work Order #: L2301194

Project P.O. #: NOT SUBMITTED
Job Reference: HAMLET OF RANKIN INLET
C of C Numbers:
Legal Site Desc:

Comments:
1-AUG-2019 AMENDED REPORT - Sample ID Corrected to RAN-2

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2301194-1 RAN-2							
Sampled By: TS on 26-JUN-19 @ 09:30							
Matrix: WASTE WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		10-JUL-19	R4696444
Toluene	<0.0010		0.0010	mg/L		10-JUL-19	R4696444
Ethyl benzene	<0.00050		0.00050	mg/L		10-JUL-19	R4696444
o-Xylene	<0.00050		0.00050	mg/L		10-JUL-19	R4696444
m+p-Xylenes	<0.00040		0.00040	mg/L		10-JUL-19	R4696444
F1 (C6-C10)	<0.10		0.10	mg/L		10-JUL-19	R4696444
Surrogate: 4-Bromofluorobenzene (SS)	82.0		70-130	%		10-JUL-19	R4696444
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.18		0.10	mg/L	05-JUL-19	18-JUL-19	R4699009
F3 (C16-C34)	0.37		0.25	mg/L	05-JUL-19	18-JUL-19	R4699009
F4 (C34-C50)	<0.25		0.25	mg/L	05-JUL-19	18-JUL-19	R4699009
Surrogate: 2-Bromobenzotrifluoride	97.1		60-140	%	05-JUL-19	18-JUL-19	R4699009
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		19-JUL-19	
Total Hydrocarbons (C6-C50)	0.55		0.38	mg/L		19-JUL-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		11-JUL-19	
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	103		1.2	mg/L		03-JUL-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		03-JUL-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		03-JUL-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	84.4		1.0	mg/L		02-JUL-19	R4692423
Ammonia by colour							
Ammonia, Total (as N)	3.94		0.10	mg/L		05-JUL-19	R4696524
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	9.7		2.0	mg/L		29-JUN-19	R4695960
Carbonaceous BOD							
BOD Carbonaceous	7.9		2.0	mg/L		29-JUN-19	R4695960
Chloride in Water by IC							
Chloride (Cl)	70.8		0.50	mg/L		29-JUN-19	R4693621
Conductivity							
Conductivity	741		1.0	umhos/cm		02-JUL-19	R4692423
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	<10	PEHR	10	MPN/100mL		28-JUN-19	R4691031
Hardness Calculated							
Hardness (as CaCO3)	174	HTC	0.20	mg/L		09-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)	0.383		0.020	mg/L		29-JUN-19	R4693621
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.429		0.070	mg/L		04-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	0.046		0.010	mg/L		29-JUN-19	R4693621
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		04-JUL-19	R4694505
Phenol (4AAP)							

* 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
L2301194-1 RAN-2							
Sampled By: TS on 26-JUN-19 @ 09:30							
Matrix: WASTE WATER							
Phenol (4AAP)							
Phenols (4AAP)	0.0011		0.0010	mg/L		04-JUL-19	R4693880
Phosphorus, Total							
Phosphorus (P)-Total	0.241		0.0030	mg/L		08-JUL-19	R4697472
Sulfate in Water by IC							
Sulfate (SO4)	170		0.30	mg/L		29-JUN-19	R4693621
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0382		0.0030	mg/L	08-JUL-19	08-JUL-19	R4697480
Arsenic (As)-Total	0.00524		0.00010	mg/L	08-JUL-19	08-JUL-19	R4697480
Cadmium (Cd)-Total	0.0000962		0.0000050	mg/L	08-JUL-19	08-JUL-19	R4697480
Calcium (Ca)-Total	43.0		0.050	mg/L	08-JUL-19	08-JUL-19	R4697480
Chromium (Cr)-Total	0.00084		0.00010	mg/L	08-JUL-19	08-JUL-19	R4697480
Cobalt (Co)-Total	0.00482		0.00010	mg/L	08-JUL-19	08-JUL-19	R4697480
Copper (Cu)-Total	0.0307		0.00050	mg/L	08-JUL-19	08-JUL-19	R4697480
Iron (Fe)-Total	1.43		0.010	mg/L	08-JUL-19	08-JUL-19	R4697480
Lead (Pb)-Total	0.00227		0.000050	mg/L	08-JUL-19	08-JUL-19	R4697480
Magnesium (Mg)-Total	16.2		0.0050	mg/L	08-JUL-19	08-JUL-19	R4697480
Manganese (Mn)-Total	0.207		0.00010	mg/L	08-JUL-19	08-JUL-19	R4697480
Nickel (Ni)-Total	0.0158		0.00050	mg/L	08-JUL-19	08-JUL-19	R4697480
Potassium (K)-Total	22.5		0.050	mg/L	08-JUL-19	08-JUL-19	R4697480
Sodium (Na)-Total	77.0		0.050	mg/L	08-JUL-19	08-JUL-19	R4697480
Zinc (Zn)-Total	0.0384		0.0030	mg/L	08-JUL-19	08-JUL-19	R4697480
Total Organic Carbon by Combustion							
Total Organic Carbon	24.2		0.50	mg/L		10-JUL-19	R4707992
Total Suspended Solids							
Total Suspended Solids	13.6		2.0	mg/L		03-JUL-19	R4693447
pH							
pH	8.03		0.10	pH units		02-JUL-19	R4692423

* 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 transfered into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP

Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.

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

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

EC-WP	Water	Conductivity	APHA 2510B

Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511

Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.

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.

PH-WP	Water	pH	APHA 4500H

The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

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

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

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)

Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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:

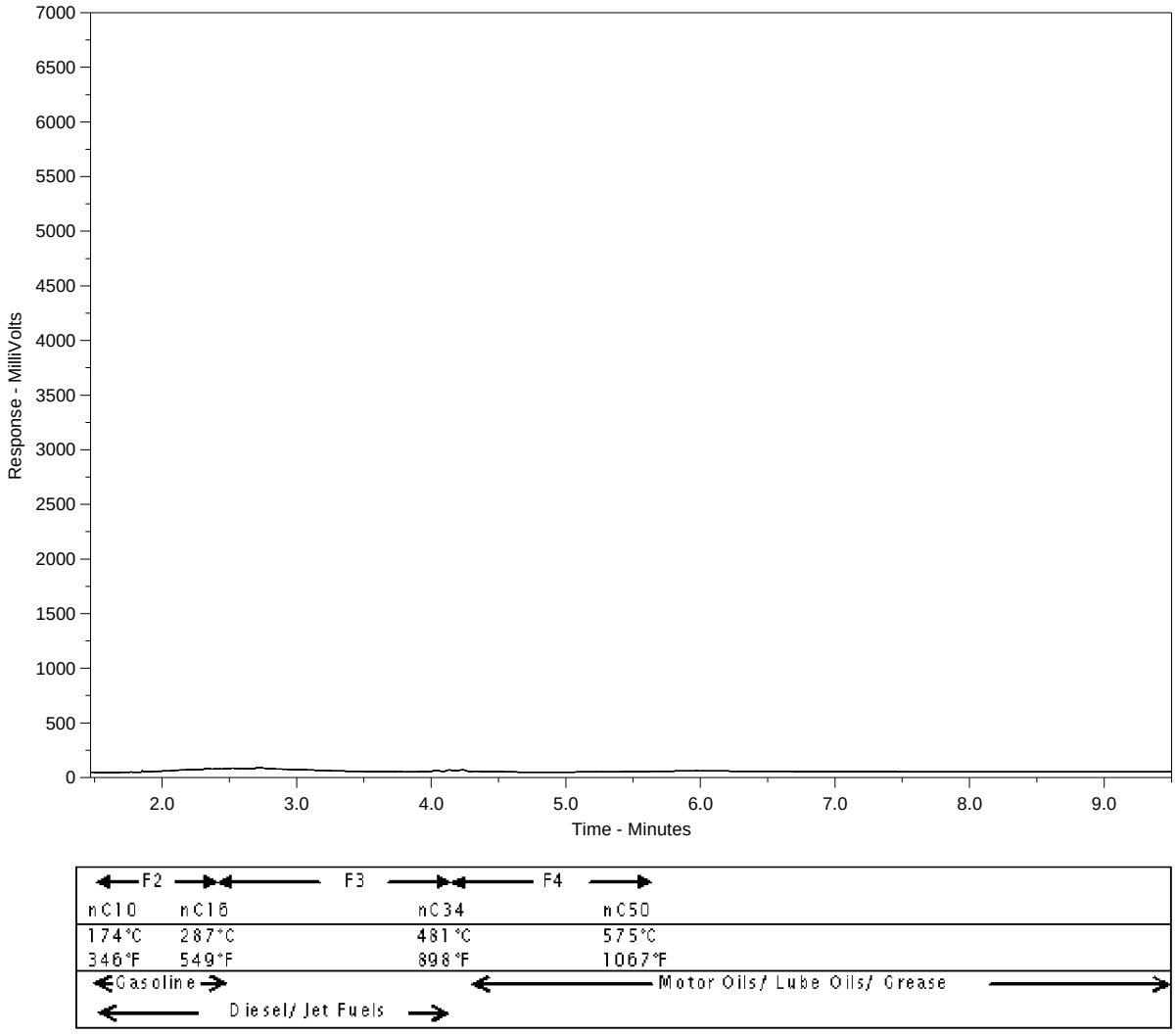
GLOSSARY OF REPORT TERMS

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.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2301194-1
Client Sample ID: RAW-2



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

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2301194-COFC

COC Number: 17 - 747773

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format /
Company:	Hamlet of Rankin Inlet	Select Report Format: ☑ PDF ☑ [illegible] (DIGITAL)
Contact:	Tommy Sharp	Quality Control (QC) Report with Report ☐ YES ☐ NO
Phone:	867-645-2895	☐ Compare Results to Criteria on Report - provide details below if box checked
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Street:	Po Box 30	Email 1 or Fax: works@rankininlet.ca
City/Province:	Rankin Inlet, NU	Email 2: sao@rankininlet.ca
Postal Code:	X0C 0G0	Email 3: cfaulkner@gov.nu.ca
Invoice To	Same as Report To ☑ YES ☐ NO	**Invoice Distribution**
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Company:		Email 1 or Fax
Contact:		Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	W10629	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: Tommy Sharp

Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy, hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	BOD	Routine	CBOD	Total Metals	Total Nutrients	Phenols	Oil + Grease x2	Bacteria	Total Mercury	BTEX, F1 x3	F2-F4 x2	PAH x2			SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	RAN-2	26-Jun-19	9:30 AM	WW	17	✓	✓	✓	F	P	P	P	F	F	P	F	P				

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Nunavut - WW - GRP1 - WP

BTX, F1-F4, PAH

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
10.8							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Tommy S	June 26/19	930	JH	June 28	1:00			

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

Hamlet of Rankin Inlet
ATTN: JUSTIN MERRITT
PO Box 310
Rankin Inlet NU X0C 0G0

Date Received: 31-JUL-19
Report Date: 14-AUG-19 06:59 (MT)
Version: FINAL

Client Phone: 867-645-2895

Certificate of Analysis

Lab Work Order #: L2320122

Project P.O. #: NOT SUBMITTED
Job Reference: HAMLET OF RANKIN INLET WWTP
C of C Numbers:
Legal Site Desc:

Comments: Note: No Sterile Bacteria bottle was received for RAN-2 for Fecal Coliform.

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2320122-1 RAN-2							
Sampled By: CF on 30-JUL-19 @ 14:19							
Matrix: WW							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		03-AUG-19	R4739804
Toluene	<0.0010		0.0010	mg/L		03-AUG-19	R4739804
Ethyl benzene	<0.00050		0.00050	mg/L		03-AUG-19	R4739804
o-Xylene	<0.00050		0.00050	mg/L		03-AUG-19	R4739804
m+p-Xylenes	<0.00040		0.00040	mg/L		03-AUG-19	R4739804
F1 (C6-C10)	<0.10		0.10	mg/L		03-AUG-19	R4739804
Surrogate: 4-Bromofluorobenzene (SS)	96.4		70-130	%		03-AUG-19	R4739804
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.41		0.10	mg/L	01-AUG-19	02-AUG-19	R4739024
F3 (C16-C34)	0.59		0.25	mg/L	01-AUG-19	02-AUG-19	R4739024
F4 (C34-C50)	<0.25		0.25	mg/L	01-AUG-19	02-AUG-19	R4739024
Surrogate: 2-Bromobenzotrifluoride	95.5		60-140	%	01-AUG-19	02-AUG-19	R4739024
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		07-AUG-19	
F2-Naphth	0.41		0.10	mg/L		07-AUG-19	
F3-PAH	0.59		0.25	mg/L		07-AUG-19	
Total Hydrocarbons (C6-C50)	1.01		0.38	mg/L		07-AUG-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		06-AUG-19	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Acenaphthene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Acenaphthylene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Anthracene	<0.000010		0.000010	mg/L	01-AUG-19	01-AUG-19	R4742210
Acridine	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Benzo(a)anthracene	<0.000010		0.000010	mg/L	01-AUG-19	01-AUG-19	R4742210
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	01-AUG-19	01-AUG-19	R4742210
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	01-AUG-19	01-AUG-19	R4742210
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	01-AUG-19	01-AUG-19	R4742210
Chrysene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	01-AUG-19	01-AUG-19	R4742210
Fluoranthene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Fluorene	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	01-AUG-19	01-AUG-19	R4742210
Naphthalene	<0.000050		0.000050	mg/L	01-AUG-19	01-AUG-19	R4742210
Phenanthrene	<0.000050		0.000050	mg/L	01-AUG-19	01-AUG-19	R4742210
Pyrene	<0.000020	DLM	0.000010	mg/L	01-AUG-19	01-AUG-19	R4742210
Quinoline	<0.000020		0.000020	mg/L	01-AUG-19	01-AUG-19	R4742210
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	01-AUG-19	01-AUG-19	R4742210
Surrogate: Acenaphthene d10	73.4		60-130	%	01-AUG-19	01-AUG-19	R4742210
Surrogate: Acridine d9	74.1		60-130	%	01-AUG-19	01-AUG-19	R4742210
Surrogate: Chrysene d12	94.2		60-130	%	01-AUG-19	01-AUG-19	R4742210
Surrogate: Naphthalene d8	75.6		50-130	%	01-AUG-19	01-AUG-19	R4742210
Surrogate: Phenanthrene d10	76.1		60-130	%	01-AUG-19	01-AUG-19	R4742210
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	577		1.2	mg/L		01-AUG-19	
Alkalinity, Carbonate							

* 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
L2320122-1 RAN-2							
Sampled By: CF on 30-JUL-19 @ 14:19							
Matrix: WW							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		01-AUG-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		01-AUG-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	473		1.0	mg/L		31-JUL-19	R4734401
Ammonia by colour							
Ammonia, Total (as N)	13.2		1.0	mg/L		31-JUL-19	R4735088
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	13.8		6.0	mg/L		31-JUL-19	R4739685
Carbonaceous BOD							
BOD Carbonaceous	8.8		2.0	mg/L		31-JUL-19	R4739685
Chloride in Water by IC							
Chloride (Cl)	240		10	mg/L		31-JUL-19	R4738653
Conductivity							
Conductivity	2600		1.0	umhos/cm		31-JUL-19	R4734401
Hardness Calculated							
Hardness (as CaCO3)	747	HTC	0.20	mg/L		14-AUG-19	
Mercury Total							
Mercury (Hg)-Total	0.0000230		0.0000050	mg/L	07-AUG-19	08-AUG-19	R4744895
Nitrate in Water by IC							
Nitrate (as N)	1.74		0.40	mg/L		31-JUL-19	R4738653
Nitrate+Nitrite							
Nitrate and Nitrite as N	1.97		0.45	mg/L		03-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	0.23		0.20	mg/L		31-JUL-19	R4738653
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		02-AUG-19	R4738743
Phenol (4AAP)							
Phenols (4AAP)	0.0020		0.0010	mg/L		01-AUG-19	R4737245
Phosphorus, Total							
Phosphorus (P)-Total	0.285		0.0030	mg/L		02-AUG-19	R4737930
Sulfate in Water by IC							
Sulfate (SO4)	615		6.0	mg/L		31-JUL-19	R4738653
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0436		0.0030	mg/L	08-AUG-19	08-AUG-19	R4746362
Arsenic (As)-Total	0.00715		0.00010	mg/L	08-AUG-19	08-AUG-19	R4746362
Cadmium (Cd)-Total	0.000284		0.0000050	mg/L	08-AUG-19	08-AUG-19	R4746362
Calcium (Ca)-Total	216		0.050	mg/L	08-AUG-19	08-AUG-19	R4746362
Chromium (Cr)-Total	0.00373		0.00010	mg/L	08-AUG-19	08-AUG-19	R4746362
Cobalt (Co)-Total	0.0141		0.00010	mg/L	08-AUG-19	08-AUG-19	R4746362
Copper (Cu)-Total	0.0919		0.00050	mg/L	08-AUG-19	08-AUG-19	R4746362
Iron (Fe)-Total	4.90		0.010	mg/L	08-AUG-19	08-AUG-19	R4746362
Lead (Pb)-Total	0.00311		0.000050	mg/L	08-AUG-19	08-AUG-19	R4746362
Magnesium (Mg)-Total	50.7		0.0050	mg/L	08-AUG-19	08-AUG-19	R4746362
Manganese (Mn)-Total	1.83		0.0010	mg/L	08-AUG-19	12-AUG-19	R4752398
Nickel (Ni)-Total	0.0394		0.00050	mg/L	08-AUG-19	08-AUG-19	R4746362
Potassium (K)-Total	63.2		0.050	mg/L	08-AUG-19	08-AUG-19	R4746362
Sodium (Na)-Total	240		0.050	mg/L	08-AUG-19	08-AUG-19	R4746362
Zinc (Zn)-Total	0.154		0.0030	mg/L	08-AUG-19	08-AUG-19	R4746362
Total Organic Carbon by Combustion							
Total Organic Carbon	60.4		2.5	mg/L		08-AUG-19	R4745065
Total Suspended Solids							

* 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
L2320122-1 RAN-2							
Sampled By: CF on 30-JUL-19 @ 14:19							
Matrix: WW							
Total Suspended Solids							
Total Suspended Solids	21.2		6.0	mg/L		06-AUG-19	R4741955
pH							
pH	8.15		0.10	pH units		31-JUL-19	R4734401

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
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 transfered into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP

Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.

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

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

EC-WP	Water	Conductivity	APHA 2510B

Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511

Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.

HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-T-CVAA-WP	Water	Mercury Total	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WP	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020B (mod.)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F

Ammonia in water samples forms indophenol when reacted with hypochlorite and phenol. The intensity is amplified by the addition of sodium nitroprusside and measured colourmetrically.

NO2+NO3-CALC-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)

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

NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)

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

OG-GRAV-WP	Water	Oil & Grease - Gravimetric	EPA 1664 (modified)

Water samples are acidified and extracted with hexane; the hexane extract is collected in a pre-weighed vial. The solvent is evaporated and Total Oil & Grease is determined from the weight of the residue in the vial.

P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L

This analysis is carried out using procedures adapted from APHA METHOD 4500-P "Phosphorus". Total Phosphorus is determined colourmetrically after persulphate digestion of the sample.

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

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

PH-WP	Water	pH	APHA 4500H

The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

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

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

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)

Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.

XYLENES-SUM-CALC-	Water	Sum of Xylene Isomer Concentrations	CALCULATED RESULT

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

WP

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:

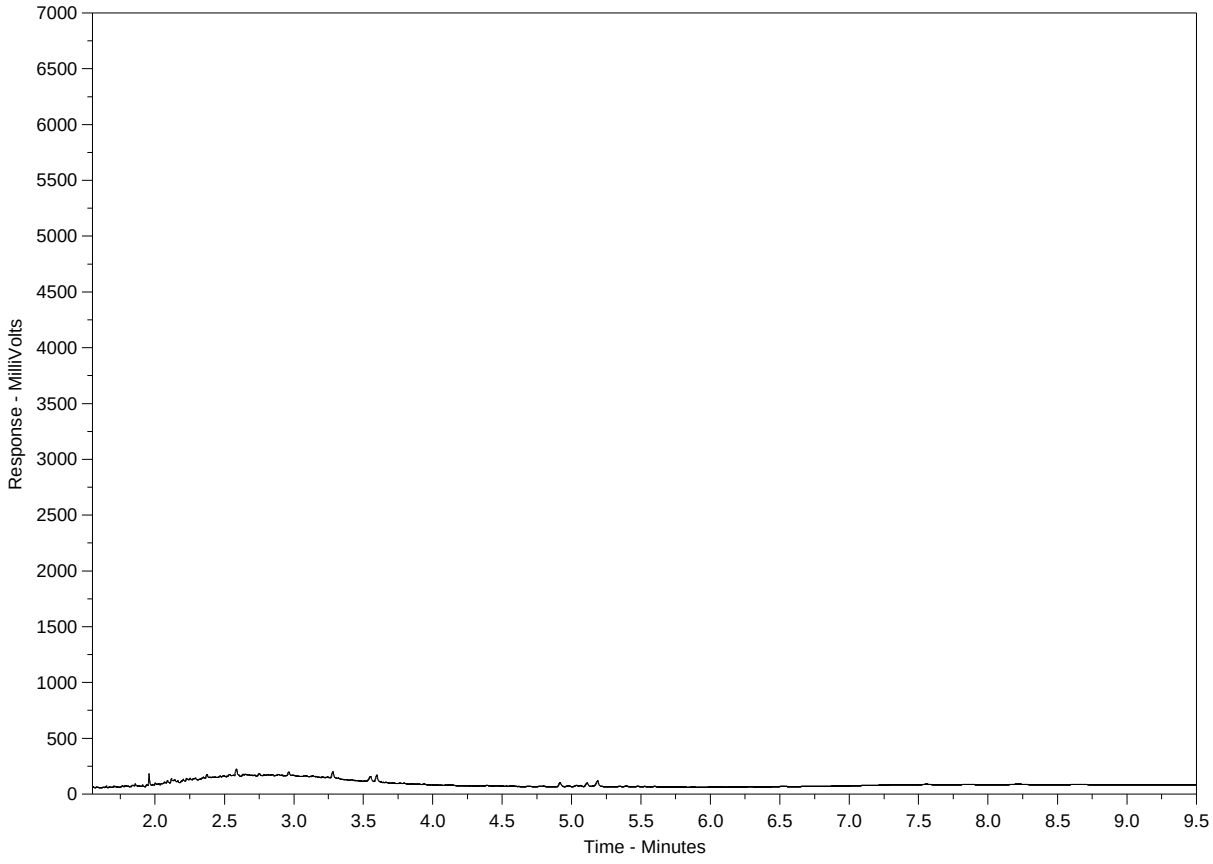
GLOSSARY OF REPORT TERMS

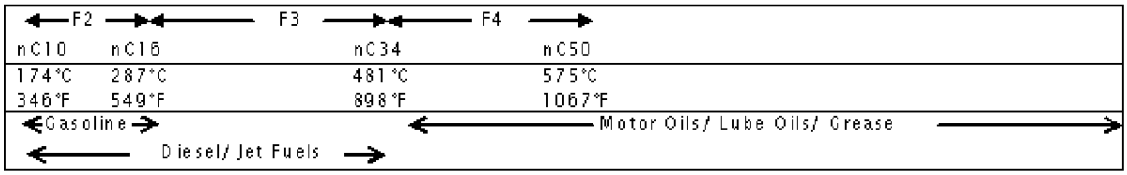
Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2320122-1
Client Sample ID: RAN-2





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

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2320122-COFC

COC Number: 17 - 747774

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)	
Company:	Hamlet of Rankin Inlet	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Justin Merritt	Quality Control (QC) Report with Report	☐ YES ☐ NO	PRIORITY (Business Days) 4 day [P4-20%]	☐ EMERGENCY 1 Business day [E - 100%] ☐
Phone:	867-645-2895	☐ Compare Results to Criteria on Report - provide details below if box checked		3 day [P3-25%] ☐	Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
Company address below will appear on the final report		Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	2 day [P2-50%] ☐	
Street:	Po Box 30	Email 1 or Fax	Jas@rankininlet.ca	Date and Time Required for all E&P TATs:	dd-mmm-yy hh:mm
City/Province:	Rankin Inlet, NU	Email 2	Cfaulkner@gov.nu.ca	For tests that can not be performed according to the service level selected, you will be contacted.	
Postal Code:	X0C 0G0	Email 3			
Invoice To	Same as Report To ☑ YES ☐ NO	**Invoice Distribution**		**Analysis Request**	
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX		
Company:		Email 1 or Fax			
Contact:		Email 2			

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	WO0629	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: Connor Faulkner

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Bod	Routine (BOD)	Mercury - Total	Metal - Total	Nutrients	Phenols	Oil + Grease x2	BTEX, F1 x2	F2-F4 x2	PAH x2	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	RAN-2	30-Jul-19	2:19 PM	WW	16	✓	✓	✓	P	P	P	P	P	P	P	P	

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

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Nunavut - WW - GRAP2 - WP
Are samples for human consumption/ use? ☐ YES ☑ NO	BTX, F1-F4, PAH

SAMPLE CONDITION AS RECEIVED (lab use only)					
Frozen ☐	SIF Observations	Yes ☐	No ☐		
Ice Packs ☐ Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐		
Cooling Initiated ☐					
INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
12.7							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Connor Faulkner	July 30/19	2:19PM	JH	July 31	10:40		JUL 31 2019	

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

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

Hamlet of Rankin Inlet
ATTN: TAMMY SHARP
PO Box 310
Rankin Inlet NU X0C 0G0

Date Received: 02-OCT-19
Report Date: 18-OCT-19 11:26 (MT)
Version: FINAL

Client Phone: 867-645-2895

Certificate of Analysis

Lab Work Order #: L2358336

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

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2358336-1 RAN 2							
Sampled By: CLIENT on 01-OCT-19 @ 13:30							
Matrix: WW							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050	HTD	0.00050	mg/L		17-OCT-19	R4873346
Toluene	<0.0010	HTD	0.0010	mg/L		17-OCT-19	R4873346
Ethyl benzene	<0.00050	HTD	0.00050	mg/L		17-OCT-19	R4873346
o-Xylene	<0.00050	HTD	0.00050	mg/L		17-OCT-19	R4873346
m+p-Xylenes	<0.00040	HTD	0.00040	mg/L		17-OCT-19	R4873346
F1 (C6-C10)	<0.10	HTD	0.10	mg/L		17-OCT-19	R4873346
Surrogate: 4-Bromofluorobenzene (SS)	95.0		70-130	%		17-OCT-19	R4873346
Note: VOC analysis was conducted for a water sample that contained >5% headspace. Results may be biased low.							
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.20	DLIS	0.20	mg/L	07-OCT-19	09-OCT-19	R4871231
F3 (C16-C34)	<0.50	DLIS	0.50	mg/L	07-OCT-19	09-OCT-19	R4871231
F4 (C34-C50)	<0.50	DLIS	0.50	mg/L	07-OCT-19	09-OCT-19	R4871231
Surrogate: 2-Bromobenzotrifluoride	136.7		60-140	%	07-OCT-19	09-OCT-19	R4871231
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		17-OCT-19	
F2-Naphth	<0.20		0.20	mg/L		17-OCT-19	
F3-PAH	<0.50		0.50	mg/L		17-OCT-19	
Total Hydrocarbons (C6-C50)	<0.74		0.74	mg/L		17-OCT-19	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		17-OCT-19	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000034		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
2-Methyl Naphthalene	0.000023		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Acenaphthene	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Acenaphthylene	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Anthracene	<0.000010		0.000010	mg/L	08-OCT-19	11-OCT-19	R4867488
Acridine	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Benzo(a)anthracene	<0.000010		0.000010	mg/L	08-OCT-19	11-OCT-19	R4867488
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	08-OCT-19	11-OCT-19	R4867488
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	08-OCT-19	11-OCT-19	R4867488
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	08-OCT-19	11-OCT-19	R4867488
Chrysene	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	08-OCT-19	11-OCT-19	R4867488
Fluoranthene	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Fluorene	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	08-OCT-19	11-OCT-19	R4867488
Naphthalene	<0.000050		0.000050	mg/L	08-OCT-19	11-OCT-19	R4867488
Phenanthrene	<0.000050		0.000050	mg/L	08-OCT-19	11-OCT-19	R4867488
Pyrene	0.000010		0.000010	mg/L	08-OCT-19	11-OCT-19	R4867488
Quinoline	<0.000020		0.000020	mg/L	08-OCT-19	11-OCT-19	R4867488
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	08-OCT-19	11-OCT-19	R4867488
Surrogate: Acenaphthene d10	94.3		60-130	%	08-OCT-19	11-OCT-19	R4867488
Surrogate: Acridine d9	109.9		60-130	%	08-OCT-19	11-OCT-19	R4867488
Surrogate: Chrysene d12	114.8		60-130	%	08-OCT-19	11-OCT-19	R4867488
Surrogate: Naphthalene d8	93.3		50-130	%	08-OCT-19	11-OCT-19	R4867488
Surrogate: Phenanthrene d10	109.6		60-130	%	08-OCT-19	11-OCT-19	R4867488
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
L2358336-1 RAN 2							
Sampled By: CLIENT on 01-OCT-19 @ 13:30							
Matrix: WW							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	322		1.2	mg/L		16-OCT-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		16-OCT-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		16-OCT-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	264		1.0	mg/L		03-OCT-19	R4858974
Ammonia by colour							
Ammonia, Total (as N)	2.00		0.10	mg/L		09-OCT-19	R4866430
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	2.9		2.0	mg/L		03-OCT-19	R4862279
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		03-OCT-19	R4862279
Chloride in Water by IC							
Chloride (Cl)	99.2		1.0	mg/L		03-OCT-19	R4859075
Conductivity							
Conductivity	1360		1.0	umhos/cm		03-OCT-19	R4858974
Hardness Calculated							
Hardness (as CaCO3)	385	HTC	0.20	mg/L		18-OCT-19	
Mercury Total							
Mercury (Hg)-Total	0.0000070		0.0000050	mg/L	10-OCT-19	10-OCT-19	R4866644
Nitrate in Water by IC							
Nitrate (as N)	6.32		0.040	mg/L		03-OCT-19	R4859075
Nitrate+Nitrite							
Nitrate and Nitrite as N	6.38		0.070	mg/L		04-OCT-19	
Nitrite in Water by IC							
Nitrite (as N)	0.062		0.020	mg/L		03-OCT-19	R4859075
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		10-OCT-19	R4865788
Phenol (4AAP)							
Phenols (4AAP)	0.0013		0.0010	mg/L		04-OCT-19	R4860755
Phosphorus, Total							
Phosphorus (P)-Total	0.160		0.0030	mg/L		04-OCT-19	R4858936
Sulfate in Water by IC							
Sulfate (SO4)	295		0.60	mg/L		03-OCT-19	R4859075
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.565		0.0030	mg/L	09-OCT-19	09-OCT-19	R4866592
Arsenic (As)-Total	0.00284		0.00010	mg/L	09-OCT-19	09-OCT-19	R4866592
Cadmium (Cd)-Total	0.0000806		0.0000050	mg/L	09-OCT-19	09-OCT-19	R4866592
Calcium (Ca)-Total	119		0.050	mg/L	09-OCT-19	09-OCT-19	R4866592
Chromium (Cr)-Total	0.00436		0.00010	mg/L	09-OCT-19	09-OCT-19	R4866592
Cobalt (Co)-Total	0.00577		0.00010	mg/L	09-OCT-19	09-OCT-19	R4866592
Copper (Cu)-Total	0.0290		0.00050	mg/L	09-OCT-19	09-OCT-19	R4866592
Iron (Fe)-Total	1.92		0.010	mg/L	09-OCT-19	09-OCT-19	R4866592
Lead (Pb)-Total	0.00186		0.000050	mg/L	09-OCT-19	09-OCT-19	R4866592
Magnesium (Mg)-Total	21.2		0.0050	mg/L	09-OCT-19	09-OCT-19	R4866592
Manganese (Mn)-Total	0.587		0.00010	mg/L	09-OCT-19	09-OCT-19	R4866592
Nickel (Ni)-Total	0.0197		0.00050	mg/L	09-OCT-19	09-OCT-19	R4866592
Potassium (K)-Total	22.2		0.050	mg/L	09-OCT-19	09-OCT-19	R4866592
Sodium (Na)-Total	70.0		0.050	mg/L	09-OCT-19	09-OCT-19	R4866592
Zinc (Zn)-Total	0.0613		0.0030	mg/L	09-OCT-19	09-OCT-19	R4866592
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
L2358336-1 RAN 2							
Sampled By: CLIENT on 01-OCT-19 @ 13:30							
Matrix: WW							
Total Organic Carbon by Combustion							
Total Organic Carbon	15.8		0.50	mg/L		08-OCT-19	R4862336
Total Suspended Solids							
Total Suspended Solids	35.9		2.0	mg/L		08-OCT-19	R4862539
pH							
pH	8.13		0.10	pH units		03-OCT-19	R4858974

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLIS	Detection Limit Adjusted: Insufficient Sample
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-CO3CO3-CALC-WP	Water	Alkalinity, Carbonate	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO3 2-/L.

ALK-HCO3HCO3-CALC-WP	Water	Alkalinity, Bicarbonate	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO3-/L

ALK-OHOH-CALC-WP	Water	Alkalinity, Hydroxide	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.

ALK-TITR-WP	Water	Alkalinity, Total (as CaCO3)	APHA 2320B

The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO3- and H2CO3 endpoints indicated electrometrically.

BOD-CBOD-WP	Water	Carbonaceous BOD	APHA 5210 B

Samples are diluted and seeded, have TCMP added to inhibit nitrogenous demands, and then are incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.

BOD-WP	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B

Samples are diluted and seeded and then incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.

BTEXS+F1-HSMS-WP	Water	BTX plus F1 by GCMS	EPA 8260C / EPA 5021A

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP

Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.

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

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

EC-WP	Water	Conductivity	APHA 2510B

Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511

Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.

HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-T-CVAA-WP	Water	Mercury Total	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WP	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020B (mod.)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F

Ammonia in water samples forms indophenol when reacted with hypochlorite and phenol. The intensity is amplified by the addition of sodium nitroprusside and measured colourmetrically.

NO2+NO3-CALC-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)

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

NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)

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

OG-GRAV-WP	Water	Oil & Grease - Gravimetric	EPA 1664 (modified)

Water samples are acidified and extracted with hexane; the hexane extract is collected in a pre-weighed vial. The solvent is evaporated and Total Oil & Grease is determined from the weight of the residue in the vial.

P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L

This analysis is carried out using procedures adapted from APHA METHOD 4500-P "Phosphorus". Total Phosphorus is determined colourmetrically after persulphate digestion of the sample.

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

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

PH-WP	Water	pH	APHA 4500H

The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

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

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

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)

Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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:

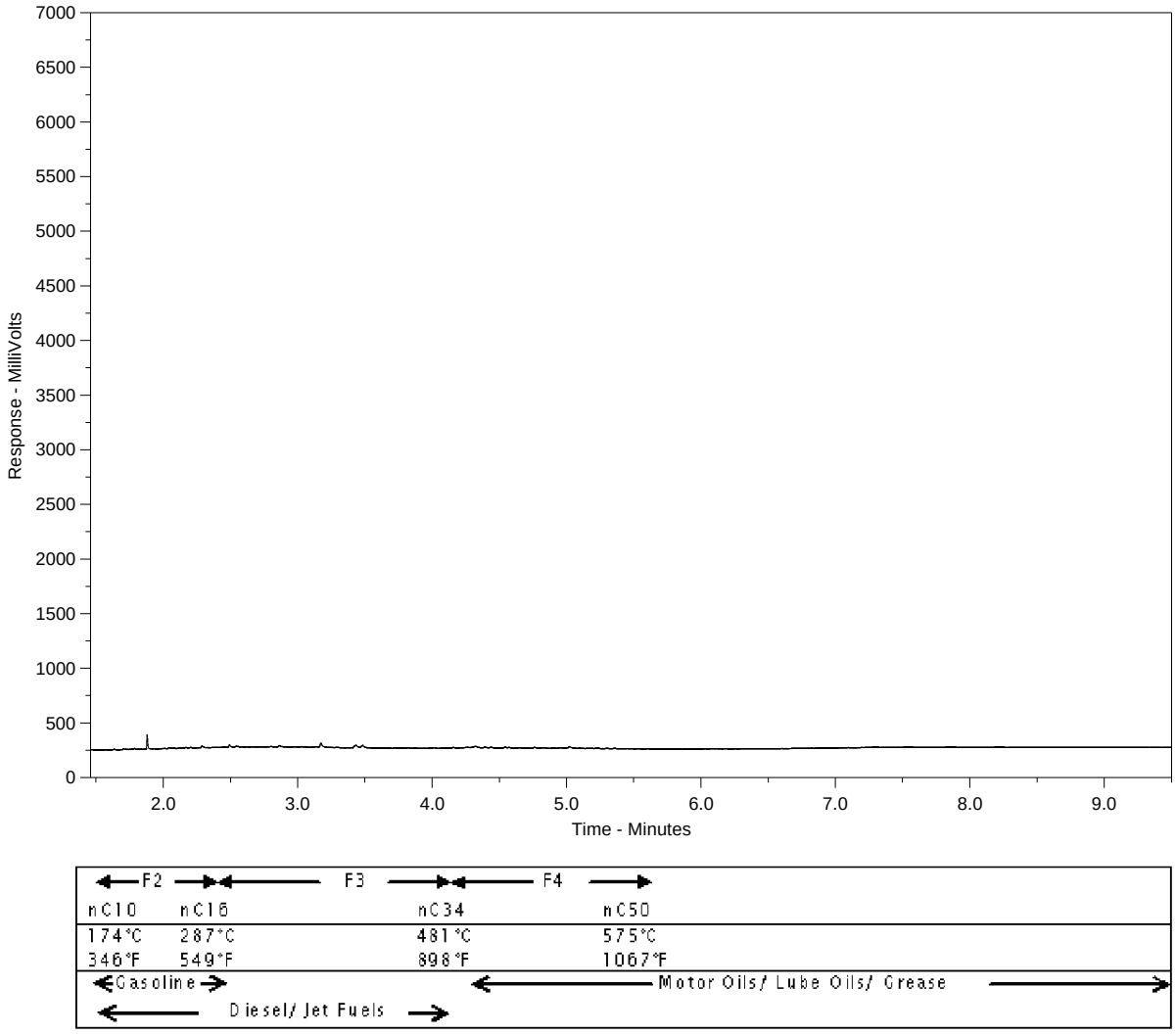
GLOSSARY OF REPORT TERMS

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.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2358336-1
Client Sample ID: RAN 2



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

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

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

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

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2358336-COFC

COC Number: 17 - 747772

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Hamlet of Rankin Inlet	Select Report Format: ☑ PDF ☑ EXCEL | | EDD (DIGITAL)	Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Tammy Sharp	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐ — EMERGENCY: 1 Business day [E - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
Phone:	867 645 2895	☐ Compare Results to Criteria on Report - provide details below if box checked	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL | | MAIL ☐ FAX	For tests that can not be performed according to the service level selected, you will be contacted.
Street:	PO Box 30	Email 1 or Fax: works@rankininlet.ca	
City/Province:	Rankin Inlet NU	Email 2: SAO@rankininlet.ca	
Postal Code:	X0C-0G0	Email 3: Efavlkner@gov.nu.ca	
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	W10629	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler:

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	BOD	Routine	CBOD	Total metals	Phenol	Oil + Grease	Bacteria	Total Mercury	BTEX F1 x3	F2 - F4 x2	PAH x2	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	RAN-2	01/10/19	130pm	WW														

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	NUNAVUT - WW - GRP1 - WP
Are samples for human consumption/ use? | | YES ☑ NO	FTX, F1 - F4, PAH

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
9.4					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
				Oct 2/19	800		OCT 02 2019	

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2019 FRONT

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

Appendix C

Spills

Occurance Date

Start date

Jan | 1 | 2019

End date

Dec | 31 | 2019

Spill Region

- Any -

Spill Location

--Rankin Inlet

Spill Location Description

Report Number

Items per page

10

Go | Reset

Spill	Occurance Date	Spill Region	Location	Location Description	Product Spilled	Quantity	Measurement	Spill Cause	Lead Agency
spill-2019452	November 3, 2019	Keewatin	Rankin Inlet, Community, Nunavut	Between Health Centre and Power Plant		40000.00	Litres	Breakage	GN - Government of Nunavut
spill-2019480	October 31, 2019	Keewatin	Rankin Inlet, Community, Nunavut	Melvin Bay		Unknown Quantity			INAC - Indigenous and Northern Affairs Canada
spill-2019425	October 14, 2019	Keewatin	Rankin Inlet, Community, Nunavut	414 / 17-13 Ave.	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	200.00	Litres	Tank Leak	GN - Government of Nunavut

spill-2019410	October 1, 2019	Keewatin	Rankin Inlet, Community, Nunavut	902 Maniruq 61st	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Unknown Quantity		Breakage	GN - Government of Nunavut
spill-2019270	July 5, 2019	Keewatin	Rankin Inlet, Community, Nunavut	188-24 Inukshuk Avenue, unit 541b	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	278.00	Litres	Breakage	GN - Government of Nunavut
spill-2019255	June 26, 2019	Keewatin	Rankin Inlet, Community, Nunavut	Condominiums, 44 - 15th Street		Unknown Quantity			GN - Government of Nunavut
spill-2019216	May 22, 2019	Keewatin	Rankin Inlet, Community, Nunavut	Box 251	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Unknown Quantity		Pipe Leaks	GN - Government of Nunavut
spill-2019194	May 2, 2019	Keewatin	Rankin Inlet, Community, Nunavut	CBC Building 101-21 Tariuq Avenue	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Unknown Quantity			GN - Government of Nunavut
spill-2019155	April 9, 2019	Keewatin	Rankin Inlet, Community, Nunavut	Courtyard Condominiums, 44-15 Ayaruaq street	Wastewater (sewage, mine tailings)	800.00	Litres	Breakage	GN - Government of Nunavut
spill-2019221	March 1, 2019	Keewatin	Rankin Inlet, Community, Nunavut	CBC Building 101-21 Tariuq Avenue	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	2000.00	Litres	Fitting Leak	GN - Government of Nunavut

Displaying 1 - 10 of 10

CSV

Appendix D

Rankin Inlet-HAMLET
RAN-2

		2014	2015			2016	2017			2018			2019			Statistics		
Parameter	**Unit**	**06-Aug-14**	**25-Jun-15**	**22-Jul-15**	**25-Aug-15**	**29-Jun-16**	**15-Jun-17**	**25-Jul-17**	**16-Aug-17**	**27-Jun-18**	**30-Jul-18**	**15-Aug-18**	**26-Jun-19**	**30-Jul-19**	**01-Oct-19**	**Min**	**Max**	**Average**
Alkalinity																		
Bicarbonate (HCO3)	mg/L	/	150	341	731	353	411	1200	664	205	1010	845	103	577	322	103	1200	531.692
Carbonate (CO3)	mg/L	/	0.60	0.60	0.60	0.60	0.60	0.60	0.60	<0.60	<0.60	<0.60	0.60	0.60	0.60	0.6	0.6	0.6
Hydroxide (OH)	mg/L	/	0.34	0.34	0.34	0.34	0.34	0.34	0.34	<0.34	<0.34	<0.34	0.34	0.34	0.34	0.34	0.34	0.34
Total (as CaCO3)	mg/L	431	123	279	599	289	337	982	544	168	828	692	84.4	473	264	84.4	982	435.243
Ammonia by Colour																		
Total (as N)	mg/L	2.61	1.09	1.53	5.5	37.5	56.5	173	67.7	3.97	53.0	26.1	3.95	13.2	2	1.09	173	31.975
Biochemical Oxygen Demand (BOD)																		
Biochemical Oxygen Demand	mg/L	<6.0	6.7	26.9	53	10.0	8.5	60	9.2	<2.0	72	18.9	9.7	13.8	2.9	2.9	72	24.3
Carbonaceous BOD																		
BOD Carbonaceous	mg/L	/	/	22.5	54	8.5	8.9	62	8.3	3.1	60	15	7.9	8.8	2	2	62	21.75
Chloride in Water by IC																		
Chloride (Cl)	mg/L	408	51.2	123	162	115	98.0	276	270	70.4	340	244	70.8	240	99.2	51.2	408	183.4
Conductivity																		
Conductivity	umhos/cm	3000	630	1310	1730	1410	1370	3180	2500	753	3220	2680	741	2600	1360	630	3220	1891.71
Fecal Coliforms																		
Fecal Coliforms	MPN/100mL	4	4	230	4300	9	60	310	150	80	170	200	10			4	4300	460.583
Hardness Calculated																		
Hardness (as CaCO3)	mg/L	936	234	483	654	393	267	578	801	215	1010	773	174	747	385	174	1010	546.429
Mercury Total																		
Mercury (Hg)	mg/L	/	0.00020	0.00020	0.00020	0.000023	0.0000148	0.000060	0.0000244	0.0000051	0.0000600	0.0000330	0.0000050	0.0000230	0.0000070	0.000005	0.0002	6.6E-05
Nitrate in Water by IC																		
Nitrate (as N)	mg/L	/	0.138	0.10	0.10	0.21	0.054	0.40	0.27	0.486	<0.40	<0.40	0.383	1.74	6.32	0.054	6.32	0.92736
Nitrate + Nitrite																		
Nitrate and Nitrite as N	mg/L	0.35	0.167	0.11	0.11	0.27	0.070	0.45	0.27	0.549	<0.45	<0.45	0.429	1.97	6.38	0.07	6.38	0.92708
Nitrite in Water by IC																		
Nitrite (as N)	mg/L	/	0.030	0.050	0.050	0.060	0.020	0.20	0.10	0.06	<0.20	<0.20	0.046	0.230	0.062	0.02	0.23	0.08291
Oil & Grease - Gravimetric																		
Oil and Grease	mg/L	2.0	2.0	2.0	2.0	5.0	5.0	10.4	5.3	<5.0	<5.0	<5.0	5	5	5	2	10.4	4.42727
Phenol																		
Phenols	mg/L	0.0060	0.0052	0.0029	0.50	0.0047	0.0040	0.013	0.0039	0.0013	0.0333	0.0082	0.0011	0.0020	0.0013	0.0011	0.5	0.04192
Phosphorus, Total																		
Phosphorus (P)	mg/L	/	0.203	0.370	0.904	0.470	0.424	1.03	0.434	0.199	0.622	0.567	0.241	0.285	0.160	0.16	1.03	0.45454
Sulfate in Water by IC																		
Sulfate (SO4)	mg/L	670	122	238	151	257	224	413	630	115	688	466	170	615	295	115	688	361
Total Metals by ICP-MS																		
Aluminium (Al)	mg/L	0.0486	0.0196	0.0472	0.0447	0.0403	0.0453	0.229	0.0582	0.0199	0.0981	0.0703	0.0382	0.0436	0.565	0.0196	0.565	0.098
Arsenic (As)	mg/L	0.00538	0.00238	0.00470	0.00722	0.00532	0.00698	0.0186	0.0108	0.00285	0.0107	0.0113	0.00524	0.00715	0.00284	0.00238	0.0186	0.0072
Cadmium (Cd)	mg/L	0.000077	0.000136	0.000416	0.000060	0.000410	0.000238	0.000710	0.000342	0.00004	0.000670	0.000387	0.0000962	0.000284	0.0000806	0.0000361	0.00071	0.00028
Calcium (Ca)	mg/L	276	77.2	152	204	123	77.9	149	223	60.3	297	226	43	216	119	43	297	160.24
Chromium (Cr)	mg/L	0.0015	0.0010	0.0022	0.0034	0.0015	0.0019	0.00864	0.00481	0.00079	0.00718	0.00433	0.00084	0.00373	0.00436	0.00079	0.00864	0.0033
Cobalt (Co)	mg/L	0.00463	0.00400	0.0139	0.00270	0.00578	0.00441	0.0145	0.00890	0.00309	0.0145	0.01300	0.00482	0.0141	0.00577	0.0027	0.0145	0.0082
Copper (Cu)	mg/L	0.00894	0.01090	0.0269	0.00876	0.0499	0.0606	0.191	0.0690	0.0147	0.121	0.0810	0.0307	0.0919	0.0290	0.00876	0.191	0.057
Iron (Fe)	mg/L	4.42	4.76	8.14	2.96	5.88	4.06	7.64	7.29	1.62	11.0	8.03	1.43	4.90	1.92	1.43	11	5.29
Lead (Pb)	mg/L	0.000755	0.00242	0.00208	0.00112	0.00475	0.00410	0.00563	0.00299	0.000314	0.00893	0.00430	0.00227	0.00311	0.00186	0.000314	0.00893	0.0032
Magnesium (Mg)	mg/L	60.0	9.93	25.4	35.0	20.7	17.7	50.3	59.7	15.6	64.3	50.7	16.2	50.7	21.2	9.93	64.3	35.53
Manganese (Mn)	mg/L	2.04	0.527	2.69	2.08	0.499	0.336	0.846	0.994	0.228	2.92	1.63	0.207	1.83	0.587	0.207	2.92	1.24
Nickel (Ni)	mg/L	0.0219	0.0106	0.0240	0.0137	0.0214	0.0178	0.0529	0.0360	0.0121	0.0440	0.0385	0.0158	0.0394	0.0197	0.0106	0.0529	0.026
Potassium (K)	mg/L	57	12.2	34.0	40.7	27.2	29.0	72.2	70.1	16.1	87.4	64.6	22.5	63.2	22.2	12.2	87.4	44.1714
Sodium (Na)	mg/L	358	37.3	104	128	88.4	91.4	313	300	69.0	308	249	77	240	70	37.3	358	173.79
Zinc (Zn)	mg/L	0.002	0.114	0.194	0.0429	0.187	0.101	0.255	0.0882	0.0247	0.392	0.0939	0.0384	0.154	0.0613	0.002	0.392	0.12
Total Organic Carbon by Combustion																		
Total Organic Carbon	mg/L	/	14.1	48.6	85.5	48.1	36.5	157	83.4	23.0	108	77.9	24.2	60.4	15.8	14.1	157	60.1923
Total Suspended Solids																		
Total Suspended Solids	mg/L	12.0	8.0	15.0	310	10.0	18.0	33.0	12.0	7.2	80	29.7	13.6	21.2	35.9	7.2	310	43.2571
pH																		
pH	pH Units	8.10	7.53	7.92	8.11	7.86	8.12	8.00	7.95	7.85	7.82	7.97	8.03	8.15	8.13	7.53	8.15	7.97
Benzene	mg/L	/	/	/	/	/	0.00050	0.00050	0.00050	<0.00050	<0.00050	<0.00050	0.00050	0.00050	0.00050	0.0005	0.0005	0.0005
Toluene	mg/L	/	/	/	/	/	0.0010	0.0076	0.0010	<0.0010	0.0057	<0.0010	0.0010	0.0010	0.0010	0.001	0.0076	0.00261
Ethyl Benzene	mg/L	/	/	/	/	/	0.00050	0.00245	0.00050	<0.00050	0.00336	<0.00050	0.00050	0.00050	0.00050	0.0005	0.00336	0.0012
o-Xylene	mg/L	/	/	/	/	/	0.00076	0.00457	0.00050	<0.00050	0.00397	<0.00050	0.00050	0.00050	0.00050	0.0005	0.00457	0.0016
F1 (C6-C10)	mg/L	/	/	/	/	/	0.10	0.10	0.10	<0.10	<0.10	<0.10	0.10	0.10	0.10	0.1	0.1	0.1
F2 (C10-C16)	mg/L	/	/	/	/	/	0.36	0.99	0.57	0.14	0.78	0.79	0.18	0.41	0.20	0.14	0.99	0.49111
F3 (C16-C34)	mg/L	/	/	/	/	/	0.62	1.60	1.00	0.30	1.09	0.98	0.37	0.59	0.50	0.3	1.6	0.78
F4 (C34-C50)	mg/L	/	/	/	/	/	0.25	0.25	0.25	<0.25	<0.25	<0.25	0.25	0.25	0.50	0.25	0.5	0.29167
Total Hydrocarbons (C6-C50)	mg/L	/	/	/	/	/	0.98	2.59	1.57	0.45	1.87	1.76	0.55	1.01	0.74	0.45	2.59	1.28