2018 FIRST QUARTER REPORT
FOR GN-CGS RANKIN INLET

QUARTER BEING REPORTED: January – March 2018

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

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

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

Month Reported	Quantity of Water Obtained from all Sources (m^3)	Quantity of Sewage Waste Discharged (Estimated, m^3)
January	70,682	64,037
February	61,563	59,009
March	68,092	69,325
QUARTER TOTAL	200,337	192,371

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 sampling results for GRA-3 (Appendix A).

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. There was **no open water** during the quarter being reported.

List of Appendixes

Appendix A: Summary of GRA-3 Sampling Parameters – 1 page
Appendix B: Certificate of Analysis, January 25, 2018 – 17 pages
Certificate of Analysis, February 20, 2018 – 17 pages
Email from Operations and Maintenance

Appendix A: Summary of GRA-3 Sampling Parameters

GN-CGS Rankin Inlet Monitoring Stations and Sampling Parameters for Licence No. 3AM-GRA1624

Category	Environment Canada FAD Parameters	Unit	25-Jan-18	20-Feb-18	01/03/2018 *	2018 Statistics		
						Min	Max	Average
Physical/Chemical	TSS	mg/L	117	65.9	/	65.9	117	91.45
	BOD5	mg/L	173	89	/	89	173	131.00
	CBOD	mg/L	146	82	/	82	146	114.00
	Hardness	mg/L	125	136	/	125	136	130.50
	Alkalinity - Bicarbonate (HCO3)	mg/L	157	141	/	141	157	149.00
	Alkalinity - Carbonate (CO3)	mg/L	<0.60	<0.60	/			
	Alkalinity - Hydroxide (OH)	mg/L	<0.34	<0.34	/			
	Alkalinity - Total (as CaCO3)	mg/L	128	115	/	115	128	121.50
	Conductivity	uS/cm	569	598	/	569	598	583.50
	pH	pH Units	6.91	7.02	/	6.91	7.02	6.97
Bacteriological	Fecal Coliform	MPN/100 mL	>24200	>24200	/			
	Total Coliform	MPN/100 mL	/	/	/			
	E. Coli	MPN/100 mL	/	/	/			
Nutrients	Ammonia-N	mg/L	5.9	4.45	/	4.45	5.9	5.18
	Nitrate-N [NO3-N]	mg/L	<0.020	<0.020	/			
	Nitrite-N [NO2-N]	mg/L	<0.010	0.016	/	0.016	0.016	0.02
	Total Nitrogen	mg/L	/	/	/			
	Total Organic Carbon (TOC)	mg/L	106	61.2	/	61.2	106	83.60
	Total Phosphorous	mg/L	2.87	1.35	/	1.35	2.87	2.11
Major Ions	Calcium (Ca)	mg/L	35	39.7	/	35	39.7	37.35
	Chloride (Cl)	ug/L	80.9	88.4	/	80.9	88.4	84.65
	Fluoride (F)	mg/L	/	/	/			
	Magnesium (Mg)	mg/L	9.04	8.95	/	8.95	9.04	9.00
	Potassium (K)	mg/L	9.76	8.82	/	8.82	9.76	9.29
	Sodium	mg/L	46.8	51.4	/	46.8	51.4	49.10
	Sulphate (SO4)	mg/L	34.8	40.9	/	34.8	40.9	37.85
Metals (Total)	Aluminum (Al)	ug/L	0.136	0.234	/	0.136	0.234	0.19
	Antimony (Sb)	ug/L	/	/	/			
	Arsenic (As)	ug/L	0.00107	0.00218	/	0.00107	0.00218	0.00
	Barium (Ba)	ug/L	/	/	/			
	Beryllium (Be)	ug/L	/	/	/			
	Cadmium (Cd)	ug/L	0.000057	0.0000428	/	0.0000428	5.7E-05	0.00
	Cesium (Cs)	ug/L	/	/	/			
	Chromium (Cr)	ug/L	0.00089	0.00094	/	0.00089	0.00094	0.00
	Cobalt (Co)	ug/L	0.0002	0.00014	/	0.00014	0.0002	0.00
	Copper (Cu)	ug/L	0.184	0.182	/	0.182	0.184	0.18
	Iron (Fe)	ug/L	0.263	0.141	/	0.141	0.263	0.20
	Lead (Pb)	ug/L	0.00198	0.00113	/	0.00113	0.00198	0.00
	Lithium (Li)	ug/L	/	/	/			
	Manganese (Mn)	ug/L	0.0402	0.034	/	0.034	0.0402	0.04
	Molybdenum (Mo)	ug/L	/	/	/			
	Nickel (Ni)	ug/L	0.00266	0.00247	/	0.00247	0.00266	0.00
	Rubidium (Rb)	ug/L	/	/	/			
	Selenium (Se)	ug/L	/	/	/			
	Silver (Ag)	ug/L	/	/	/			
	Strontium (Sr)	ug/L	/	/	/			
	Thallium (Tl)	ug/L	/	/	/			
	Titanium (Ti)	ug/L	/	/	/			
	Uranium (U)	ug/L	/	/	/			
	Vanadium (V)	ug/L	/	/	/			
	Zinc (Zn)	ug/L	0.077	0.0576	/	0.0576	0.077	0.07
Other	Total phenols	mg/L	0.0095	0.0069	/	0.0069	0.0095	0.01
	Oil and Grease	mg/L	30.5	22.5	/	22.5	30.5	26.50
	Total Potroleum Hydrocarbons	mg/L	14.4	10.6	/	10.6	14.4	12.50

[1]Canadian Environmental Quality Guidelines - Water Quality Guidelines for the Protection of Aquatic Life, Marine
N/G - No Guideline

* March Sampling was not completed by O&M due to weather contraints. Please see attached email

Appendix B: Certificate of Analysis, January 25, 2018 – 17 pages
Certificate of Analysis, February 20, 2018 – 17 pages
Email from Operations and Maintenance

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

Date Received: 30-JAN-18
Report Date: 02-MAR-18 13:59 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2050768

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - MONTHLY EFFLUENT
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
L2050768-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 25-JAN-18 @ 13:30							
Matrix: Wastewater Effluent							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		06-FEB-18	R3956059
Toluene	<0.0010		0.0010	mg/L		06-FEB-18	R3956059
Ethyl benzene	<0.00050		0.00050	mg/L		06-FEB-18	R3956059
o-Xylene	<0.00050		0.00050	mg/L		06-FEB-18	R3956059
m+p-Xylenes	<0.00040		0.00040	mg/L		06-FEB-18	R3956059
F1 (C6-C10)	<0.10		0.10	mg/L		06-FEB-18	R3956059
Surrogate: 4-Bromofluorobenzene (SS)	93.3		70-130	%		06-FEB-18	R3956059
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.46		0.10	mg/L	01-FEB-18	01-FEB-18	R3950611
F3 (C16-C34)	8.89		0.25	mg/L	01-FEB-18	01-FEB-18	R3950611
F4 (C34-C50)	5.01		0.25	mg/L	01-FEB-18	01-FEB-18	R3950611
Surrogate: 2-Bromobenzotrifluoride	93.7		60-140	%	01-FEB-18	01-FEB-18	R3950611
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		02-MAR-18	
F2-Naphth	0.46		0.10	mg/L		02-MAR-18	
F3-PAH	8.89		0.25	mg/L		02-MAR-18	
Total Hydrocarbons (C6-C50)	14.4		0.38	mg/L		02-MAR-18	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		06-FEB-18	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
2-Methyl Naphthalene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Acenaphthene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Acenaphthylene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Anthracene	<0.000050	DLM	0.000050	mg/L	01-FEB-18	01-MAR-18	R3957466
Acridine	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Benzo(a)anthracene	<0.000050	DLM	0.000050	mg/L	01-FEB-18	01-MAR-18	R3957466
Benzo(a)pyrene	<0.000050	DLM	0.000050	mg/L	01-FEB-18	01-MAR-18	R3957466
Benzo(b&j)fluoranthene	<0.000050	DLM	0.000050	mg/L	01-FEB-18	01-MAR-18	R3957466
Benzo(g,h,i)perylene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Benzo(k)fluoranthene	<0.000050	DLM	0.000050	mg/L	01-FEB-18	01-MAR-18	R3957466
Chrysene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Dibenzo(a,h)anthracene	<0.000050	DLM	0.000050	mg/L	01-FEB-18	01-MAR-18	R3957466
Fluoranthene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Fluorene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Indeno(1,2,3-cd)pyrene	<0.00050	DLM	0.00050	mg/L	01-FEB-18	01-MAR-18	R3957466
Naphthalene	<0.00025	DLM	0.00025	mg/L	01-FEB-18	01-MAR-18	R3957466
Phenanthrene	<0.00025	DLM	0.00025	mg/L	01-FEB-18	01-MAR-18	R3957466
Pyrene	<0.00010	DLM	0.00010	mg/L	01-FEB-18	01-MAR-18	R3957466
Quinoline	<0.0010	DLM	0.0010	mg/L	01-FEB-18	01-MAR-18	R3957466
B(a)P Total Potency Equivalent	<0.000084		0.000084	mg/L	01-FEB-18	01-MAR-18	R3957466
Surrogate: Acenaphthene d10	114.1		40-130	%	01-FEB-18	01-MAR-18	R3957466
Surrogate: Acridine d9	99.9		40-130	%	01-FEB-18	01-MAR-18	R3957466
Surrogate: Chrysene d12	83.6		40-130	%	01-FEB-18	01-MAR-18	R3957466
Surrogate: Naphthalene d8	102.7		40-130	%	01-FEB-18	01-MAR-18	R3957466
Surrogate: Phenanthrene d10	111.2		40-130	%	01-FEB-18	01-MAR-18	R3957466
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	157		1.2	mg/L		01-FEB-18	
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
L2050768-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 25-JAN-18 @ 13:30							
Matrix: Wastewater Effluent							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		01-FEB-18	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		01-FEB-18	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	128		1.0	mg/L		31-JAN-18	R3948227
Ammonia by colour							
Ammonia, Total (as N)	5.9		1.0	mg/L		31-JAN-18	R3948640
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	173		50	mg/L		31-JAN-18	R3954930
Carbonaceous BOD							
BOD Carbonaceous	146		50	mg/L		31-JAN-18	R3954930
Chloride in Water by IC							
Chloride (Cl)	80.9		0.50	mg/L		30-JAN-18	R3948647
Conductivity							
Conductivity	569		1.0	umhos/cm		31-JAN-18	R3948227
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	>24200		10	MPN/100mL		30-JAN-18	R3947651
Hardness Calculated							
Hardness (as CaCO3)	125	HTC	0.20	mg/L		05-FEB-18	
Mercury Total							
Mercury (Hg)-Total	0.000026		0.000025	mg/L	05-FEB-18	06-FEB-18	R3956402
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		30-JAN-18	R3948647
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		01-FEB-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		30-JAN-18	R3948647
Oil & Grease - Gravimetric							
Oil and Grease	30.5		5.0	mg/L		07-FEB-18	R3956825
Phenol (4AAP)							
Phenols (4AAP)	0.0095		0.0010	mg/L		02-FEB-18	R3954269
Phosphorus, Total							
Phosphorus (P)-Total	2.87		0.10	mg/L		02-FEB-18	R3952470
Sulfate in Water by IC							
Sulfate (SO4)	34.8		0.30	mg/L		30-JAN-18	R3948647
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.136		0.0030	mg/L	02-FEB-18	02-FEB-18	R3953784
Arsenic (As)-Total	0.00107		0.00010	mg/L	02-FEB-18	02-FEB-18	R3953784
Cadmium (Cd)-Total	0.0000570		0.0000050	mg/L	02-FEB-18	02-FEB-18	R3953784
Calcium (Ca)-Total	35.0		0.050	mg/L	02-FEB-18	02-FEB-18	R3953784
Chromium (Cr)-Total	0.00089		0.00010	mg/L	02-FEB-18	02-FEB-18	R3953784
Cobalt (Co)-Total	0.00020		0.00010	mg/L	02-FEB-18	02-FEB-18	R3953784
Copper (Cu)-Total	0.184		0.00050	mg/L	02-FEB-18	02-FEB-18	R3953784
Iron (Fe)-Total	0.263		0.010	mg/L	02-FEB-18	02-FEB-18	R3953784
Lead (Pb)-Total	0.00198		0.000050	mg/L	02-FEB-18	02-FEB-18	R3953784
Magnesium (Mg)-Total	9.04		0.0050	mg/L	02-FEB-18	02-FEB-18	R3953784
Manganese (Mn)-Total	0.0402		0.00010	mg/L	02-FEB-18	02-FEB-18	R3953784
Nickel (Ni)-Total	0.00266		0.00050	mg/L	02-FEB-18	02-FEB-18	R3953784
Potassium (K)-Total	9.76		0.050	mg/L	02-FEB-18	02-FEB-18	R3953784
Sodium (Na)-Total	46.8		0.050	mg/L	02-FEB-18	02-FEB-18	R3953784
Zinc (Zn)-Total	0.0770		0.0030	mg/L	02-FEB-18	02-FEB-18	R3953784
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
L2050768-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 25-JAN-18 @ 13:30							
Matrix: Wastewater Effluent							
Total Organic Carbon by Combustion							
Total Organic Carbon	106		5.0	mg/L		31-JAN-18	R3948272
Total Suspended Solids							
Total Suspended Solids	117	HTD	3.3	mg/L		05-FEB-18	R3955818
pH							
pH	6.91		0.10	pH units		31-JAN-18	R3948227

* 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).
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.

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-CVAF-WP	Water	Mercury Total	EPA245.7 V2.0

Mercury in filtered and unfiltered waters is oxidized with Bromine monochloride and analyzed by cold-vapour atomic fluorescence spectrometry.

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

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

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

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

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

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

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

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

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

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

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

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

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

PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA SW 846/8270-GC/MS

Water is spiked with a surrogate spike mix and extracted using solvent extraction techniques. Analysis is performed by GC/MS in the selected ion monitoring (SIM) mode.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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-WP	Water	Sum of Xylene Isomer Concentrations	CALCULATED RESULT
Total xylenes represents the sum of o-xylene and m&p-xylene.			

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-WP	**Water**							
Batch R3948227								
WG2708723-14 LCS								
Alkalinity, Total (as CaCO3)			102.2		%		85-115	31-JAN-18
WG2708723-11 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	31-JAN-18
BOD-CBOD-WP	**Water**							
Batch R3954930								
WG2708019-2 LCS								
BOD Carbonaceous			102.7		%		85-115	31-JAN-18
WG2708019-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	31-JAN-18
BOD-WP	**Water**							
Batch R3954930								
WG2708019-2 LCS								
Biochemical Oxygen Demand			102.6		%		85-115	31-JAN-18
WG2708019-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	31-JAN-18
BTEXS+F1-HSMS-WP	**Water**							
Batch R3956059								
WG2709720-2 LCS								
Benzene			85.5		%		70-130	06-FEB-18
Toluene			94.0		%		70-130	06-FEB-18
Ethyl benzene			96.2		%		70-130	06-FEB-18
o-Xylene			99.4		%		70-130	06-FEB-18
m+p-Xylenes			103.8		%		70-130	06-FEB-18
WG2709720-3 LCS								
F1 (C6-C10)			112.6		%		70-130	06-FEB-18
WG2709720-1 MB								
Benzene			<0.00050		mg/L		0.0005	06-FEB-18
Toluene			<0.0010		mg/L		0.001	06-FEB-18
Ethyl benzene			<0.00050		mg/L		0.0005	06-FEB-18
o-Xylene			<0.00030		mg/L		0.0003	06-FEB-18
m+p-Xylenes			<0.00040		mg/L		0.0004	06-FEB-18
F1 (C6-C10)			<0.10		mg/L		0.1	06-FEB-18
Surrogate: 4-Bromofluorobenzene (SS)			90.9		%		70-130	06-FEB-18
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R3948272								
WG2708761-2 LCS								
Total Organic Carbon			97.0		%		80-120	31-JAN-18
WG2708761-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	31-JAN-18
CL-IC-N-WP	**Water**							
Batch R3948647								
WG2707482-2 LCS								
Chloride (Cl)			99.8		%		90-110	30-JAN-18
WG2707482-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	30-JAN-18
EC-WP	**Water**							
Batch R3948227								
WG2708723-13 LCS								
Conductivity			101.2		%		90-110	31-JAN-18
WG2708723-11 MB								
Conductivity			<1.0		umhos/cm		1	31-JAN-18
F2-F4-FID-WP	**Water**							
Batch R3950611								
WG2708911-2 LCS								
F2 (C10-C16)			92.6		%		70-130	01-FEB-18
F3 (C16-C34)			92.5		%		70-130	01-FEB-18
F4 (C34-C50)			109.3		%		70-130	01-FEB-18
WG2708911-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	01-FEB-18
F3 (C16-C34)			<0.25		mg/L		0.25	01-FEB-18
F4 (C34-C50)			<0.25		mg/L		0.25	01-FEB-18
Surrogate: 2-Bromobenzotrifluoride			91.2		%		60-140	01-FEB-18
FC10-QT97-WP	**Water**							
Batch R3947651								
WG2707684-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	30-JAN-18
HG-T-CVAF-WP	**Water**							
Batch R3956402								
WG2712171-2 LCS								
Mercury (Hg)-Total			101.6		%		80-120	06-FEB-18
WG2712171-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAF-WP	**Water**							
Batch R3956402								
WG2712171-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	06-FEB-18
MET-T-CCMS-WP	**Water**							
Batch R3953784								
WG2709937-2 LCS								
Aluminum (Al)-Total			103.5		%		80-120	02-FEB-18
Arsenic (As)-Total			101.7		%		80-120	02-FEB-18
Cadmium (Cd)-Total			102.2		%		80-120	02-FEB-18
Calcium (Ca)-Total			99.9		%		80-120	02-FEB-18
Chromium (Cr)-Total			100.5		%		80-120	02-FEB-18
Cobalt (Co)-Total			101.3		%		80-120	02-FEB-18
Copper (Cu)-Total			101.8		%		80-120	02-FEB-18
Iron (Fe)-Total			101.3		%		80-120	02-FEB-18
Lead (Pb)-Total			101.3		%		80-120	02-FEB-18
Magnesium (Mg)-Total			107.9		%		80-120	02-FEB-18
Manganese (Mn)-Total			101.9		%		80-120	02-FEB-18
Nickel (Ni)-Total			100.1		%		80-120	02-FEB-18
Potassium (K)-Total			101.7		%		80-120	02-FEB-18
Sodium (Na)-Total			101.6		%		80-120	02-FEB-18
Zinc (Zn)-Total			99.2		%		80-120	02-FEB-18
WG2709937-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	02-FEB-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-FEB-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	02-FEB-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-FEB-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	02-FEB-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-FEB-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	02-FEB-18
Iron (Fe)-Total			<0.010		mg/L		0.01	02-FEB-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-FEB-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-FEB-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	02-FEB-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-FEB-18
Potassium (K)-Total			<0.050		mg/L		0.05	02-FEB-18
Sodium (Na)-Total			<0.050		mg/L		0.05	02-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R3953784								
WG2709937-1 MB								
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-FEB-18
NH3-COL-WP	**Water**							
Batch R3948640								
WG2708804-6 LCS								
Ammonia, Total (as N)			100.0		%		85-115	31-JAN-18
WG2708804-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	31-JAN-18
NO2-IC-N-WP	**Water**							
Batch R3948647								
WG2707482-2 LCS								
Nitrite (as N)			97.5		%		90-110	30-JAN-18
WG2707482-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	30-JAN-18
NO3-IC-N-WP	**Water**							
Batch R3948647								
WG2707482-2 LCS								
Nitrate (as N)			99.2		%		90-110	30-JAN-18
WG2707482-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	30-JAN-18
OG-GRAV-WP	**Water**							
Batch R3956825								
WG2711031-2 LCS								
Oil and Grease			96.9		%		70-130	07-FEB-18
WG2711031-1 MB								
Oil and Grease			<5.0		mg/L		5	07-FEB-18
P-T-COL-WP	**Water**							
Batch R3952470								
WG2708353-2 LCS								
Phosphorus (P)-Total			97.2		%		80-120	02-FEB-18
WG2708353-1 MB								
Phosphorus (P)-Total			<0.010		mg/L		0.01	02-FEB-18
PAH,PANH-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R3957466								
WG2710729-2 LCS								
1-Methyl Naphthalene			84.9		%		60-130	01-FEB-18
2-Methyl Naphthalene			70.6		%		60-130	01-FEB-18
Acenaphthene			95.9		%		60-130	01-FEB-18
Acenaphthylene			96.5		%		60-130	01-FEB-18
Anthracene			92.1		%		60-130	01-FEB-18
Acridine			117.1		%		60-130	01-FEB-18
Benzo(a)anthracene			121.6		%		60-130	01-FEB-18
Benzo(a)pyrene			92.1		%		60-130	01-FEB-18
Benzo(b&j)fluoranthene			112.1		%		60-130	01-FEB-18
Benzo(g,h,i)perylene			103.1		%		60-130	01-FEB-18
Benzo(k)fluoranthene			96.9		%		60-130	01-FEB-18
Chrysene			115.4		%		60-130	01-FEB-18
Dibenzo(a,h)anthracene			119.0		%		60-130	01-FEB-18
Fluoranthene			100.8		%		60-130	01-FEB-18
Fluorene			88.9		%		60-130	01-FEB-18
Indeno(1,2,3-cd)pyrene			103.0		%		60-130	01-FEB-18
Naphthalene			117.4		%		50-130	01-FEB-18
Phenanthrene			97.4		%		60-130	01-FEB-18
Pyrene			103.8		%		60-130	01-FEB-18
Quinoline			75.5		%		60-130	01-FEB-18
WG2710729-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	01-FEB-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	01-FEB-18
Acenaphthene			<0.000020		mg/L		0.00002	01-FEB-18
Acenaphthylene			<0.000020		mg/L		0.00002	01-FEB-18
Anthracene			<0.000010		mg/L		0.00001	01-FEB-18
Acridine			<0.000020		mg/L		0.00002	01-FEB-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	01-FEB-18
Benzo(a)pyrene			<0.000005		mg/L		0.000005	01-FEB-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	01-FEB-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	01-FEB-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	01-FEB-18
Chrysene			<0.000020		mg/L		0.00002	01-FEB-18
Dibenzo(a,h)anthracene			<0.000005		mg/L		0.000005	01-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R3957466								
WG2710729-1 MB								
Fluoranthene			<0.000020		mg/L		0.00002	01-FEB-18
Fluorene			<0.000020		mg/L		0.00002	01-FEB-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	01-FEB-18
Naphthalene			<0.000050		mg/L		0.00005	01-FEB-18
Phenanthrene			<0.000050		mg/L		0.00005	01-FEB-18
Pyrene			<0.000010		mg/L		0.00001	01-FEB-18
Quinoline			<0.000020		mg/L		0.00002	01-FEB-18
Surrogate: Acenaphthene d10			89.8		%		40-130	01-FEB-18
Surrogate: Acridine d9			81.2		%		40-130	01-FEB-18
Surrogate: Chrysene d12			98.3		%		40-130	01-FEB-18
Surrogate: Naphthalene d8			61.0		%		40-130	01-FEB-18
Surrogate: Phenanthrene d10			92.1		%		40-130	01-FEB-18
PH-WP	**Water**							
Batch R3948227								
WG2708723-12 LCS								
pH			7.41		pH units		7.3-7.5	31-JAN-18
PHENOLS-4AAP-WT	**Water**							
Batch R3954269								
WG2709675-2 LCS								
Phenols (4AAP)			110.8		%		85-115	02-FEB-18
WG2709675-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	02-FEB-18
SO4-IC-N-WP	**Water**							
Batch R3948647								
WG2707482-2 LCS								
Sulfate (SO4)			100.8		%		90-110	30-JAN-18
WG2707482-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	30-JAN-18
SOLIDS-TOTSUS-WP	**Water**							
Batch R3955818								
WG2710723-6 LCS								
Total Suspended Solids			100.0		%		85-115	05-FEB-18
WG2710723-5 MB								
Total Suspended Solids			<2.0		mg/L		2	05-FEB-18

Quality Control Report

Legend:

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

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Total Suspended Solids							
	1	25-JAN-18 13:30	05-FEB-18 10:00	7	11	days	EHT
pH							
	1	25-JAN-18 13:30	31-JAN-18 12:00	0.25	143	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC							
	1	25-JAN-18 13:30	30-JAN-18 13:00	3	5	days	EHTR
Nitrite in Water by IC							
	1	25-JAN-18 13:30	30-JAN-18 13:00	3	5	days	EHTR
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97							
	1	25-JAN-18 13:30	30-JAN-18 15:45	30	122	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)							
	1	25-JAN-18 13:30	31-JAN-18 07:00	48	138	hours	EHTR
Carbonaceous BOD							
	1	25-JAN-18 13:30	31-JAN-18 07:00	48	138	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 L2050768 were received on 30-JAN-18 13:00.

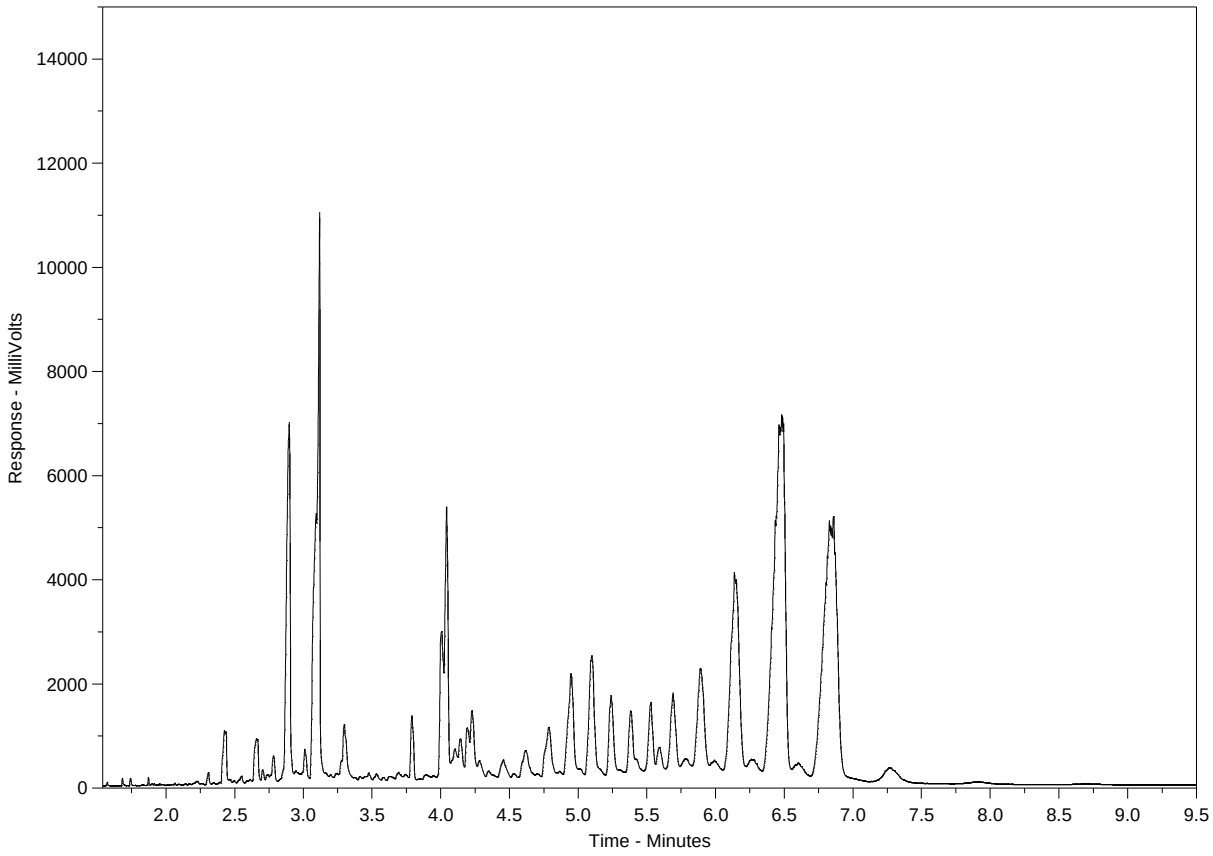
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

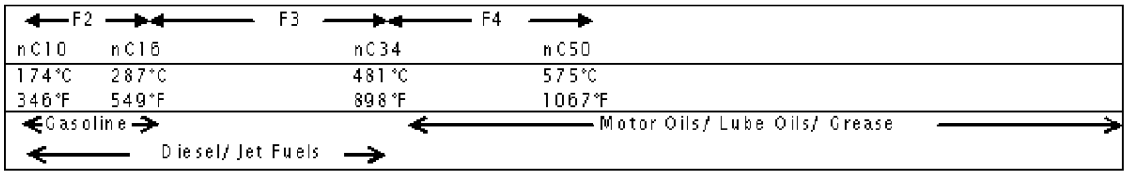
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide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

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2050768-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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

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

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

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

ALS Environmental

L2050768-COFC

COC # _____

Page ____ of ____

Report To				Service Requested (Rush for routine analysis subject to availability)
Company:	Nunavut CGS - Rankin Inlet (W8133)	☑ Standard		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	SIMON DOIRON	☑ PDF	☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	Box 490	Email 1:	sdoiron@gov.nu.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Rankin Inlet , NU, X0C 0G0	Email 2:	mlusty@gov.nu.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-645-8155 Cell# :	Email 3:		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #:	Rankin Inlet WWTP- Monthly Effluent	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		ALS Contact:	Craig Riddell	Sampled By: Simon Doiron

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

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Matthew Hewey	25/01/2018	13:30	AAL	26/1/18	1:06	10.1 °C				

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

Date Received: 22-FEB-18
Report Date: 13-MAR-18 14:23 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2059534

Project P.O. #: NOT SUBMITTED
Job Reference: RANKIN INLET WWTP - MONTHLY EFFLUENT
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
L2059534-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 20-FEB-18 @ 15:30							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		28-FEB-18	R3972140
Toluene	<0.0010		0.0010	mg/L		28-FEB-18	R3972140
Ethyl benzene	<0.00050		0.00050	mg/L		28-FEB-18	R3972140
o-Xylene	<0.00050		0.00050	mg/L		28-FEB-18	R3972140
m+p-Xylenes	<0.00040		0.00040	mg/L		28-FEB-18	R3972140
F1 (C6-C10)	<0.10		0.10	mg/L		28-FEB-18	R3972140
Surrogate: 4-Bromofluorobenzene (SS)	90.4		70-130	%		28-FEB-18	R3972140
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.47		0.10	mg/L	24-FEB-18	24-FEB-18	R3969309
F3 (C16-C34)	6.32		0.25	mg/L	24-FEB-18	24-FEB-18	R3969309
F4 (C34-C50)	3.79		0.25	mg/L	24-FEB-18	24-FEB-18	R3969309
Surrogate: 2-Bromobenzotrifluoride	88.3		60-140	%	24-FEB-18	24-FEB-18	R3969309
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		13-MAR-18	
F2-Naphth	0.47		0.10	mg/L		13-MAR-18	
F3-PAH	6.32		0.25	mg/L		13-MAR-18	
Total Hydrocarbons (C6-C50)	10.6		0.38	mg/L		13-MAR-18	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		28-FEB-18	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Acenaphthene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Acenaphthylene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Anthracene	<0.000010		0.000010	mg/L	09-MAR-18	12-MAR-18	R3984671
Acridine	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Benzo(a)anthracene	<0.000020	DLCI	0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	09-MAR-18	12-MAR-18	R3984671
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	09-MAR-18	12-MAR-18	R3984671
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	09-MAR-18	12-MAR-18	R3984671
Chrysene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	09-MAR-18	12-MAR-18	R3984671
Fluoranthene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Fluorene	<0.000020		0.000020	mg/L	09-MAR-18	12-MAR-18	R3984671
Indeno(1,2,3-cd)pyrene	<0.00050	DLCI	0.00050	mg/L	09-MAR-18	12-MAR-18	R3984671
Naphthalene	<0.000050		0.000050	mg/L	09-MAR-18	12-MAR-18	R3984671
Phenanthrene	<0.000050		0.000050	mg/L	09-MAR-18	12-MAR-18	R3984671
Pyrene	<0.000010		0.000010	mg/L	09-MAR-18	12-MAR-18	R3984671
Quinoline	<0.00010	DLCI	0.00010	mg/L	09-MAR-18	12-MAR-18	R3984671
B(a)P Total Potency Equivalent	<0.000032		0.000032	mg/L	09-MAR-18	12-MAR-18	R3984671
Surrogate: Acenaphthene d10	103.1		40-130	%	09-MAR-18	12-MAR-18	R3984671
Surrogate: Acridine d9	101.9		40-130	%	09-MAR-18	12-MAR-18	R3984671
Surrogate: Chrysene d12	122.5		40-130	%	09-MAR-18	12-MAR-18	R3984671
Surrogate: Naphthalene d8	106.8		40-130	%	09-MAR-18	12-MAR-18	R3984671
Surrogate: Phenanthrene d10	103.0		40-130	%	09-MAR-18	12-MAR-18	R3984671
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	141		1.2	mg/L		26-FEB-18	
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
L2059534-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 20-FEB-18 @ 15:30							
Matrix: WASTE							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		26-FEB-18	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		26-FEB-18	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	115		1.0	mg/L		23-FEB-18	R3969191
Ammonia by colour							
Ammonia, Total (as N)	4.45		0.10	mg/L		23-FEB-18	R3968832
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	89		20	mg/L		23-FEB-18	R3974527
Carbonaceous BOD							
BOD Carbonaceous	82		20	mg/L		23-FEB-18	R3974527
Chloride in Water by IC							
Chloride (Cl)	88.4		0.50	mg/L		22-FEB-18	R3969550
Conductivity							
Conductivity	598		1.0	umhos/cm		23-FEB-18	R3969191
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	>24200	MBHT	10	MPN/100mL		22-FEB-18	R3968150
Hardness Calculated							
Hardness (as CaCO3)	136	HTC	0.20	mg/L		27-FEB-18	
Mercury Total							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L	22-FEB-18	23-FEB-18	R3969307
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-FEB-18	R3969550
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-FEB-18	
Nitrite in Water by IC							
Nitrite (as N)	0.016		0.010	mg/L		22-FEB-18	R3969550
Oil & Grease - Gravimetric							
Oil and Grease	22.5		5.0	mg/L		03-MAR-18	R3975751
Phenol (4AAP)							
Phenols (4AAP)	0.0069		0.0010	mg/L		23-FEB-18	R3969838
Phosphorus, Total							
Phosphorus (P)-Total	1.35		0.050	mg/L		27-FEB-18	R3971513
Sulfate in Water by IC							
Sulfate (SO4)	40.9		0.30	mg/L		22-FEB-18	R3969550
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.234		0.0030	mg/L	26-FEB-18	26-FEB-18	R3971355
Arsenic (As)-Total	0.00218		0.00010	mg/L	26-FEB-18	26-FEB-18	R3971355
Cadmium (Cd)-Total	0.0000428		0.0000050	mg/L	26-FEB-18	26-FEB-18	R3971355
Calcium (Ca)-Total	39.7		0.050	mg/L	26-FEB-18	26-FEB-18	R3971355
Chromium (Cr)-Total	0.00094		0.00010	mg/L	26-FEB-18	26-FEB-18	R3971355
Cobalt (Co)-Total	0.00014		0.00010	mg/L	26-FEB-18	26-FEB-18	R3971355
Copper (Cu)-Total	0.182		0.00050	mg/L	26-FEB-18	26-FEB-18	R3971355
Iron (Fe)-Total	0.141		0.010	mg/L	26-FEB-18	26-FEB-18	R3971355
Lead (Pb)-Total	0.00113		0.000050	mg/L	26-FEB-18	26-FEB-18	R3971355
Magnesium (Mg)-Total	8.95		0.0050	mg/L	26-FEB-18	26-FEB-18	R3971355
Manganese (Mn)-Total	0.0340		0.00010	mg/L	26-FEB-18	26-FEB-18	R3971355
Nickel (Ni)-Total	0.00247		0.00050	mg/L	26-FEB-18	26-FEB-18	R3971355
Potassium (K)-Total	8.82		0.050	mg/L	26-FEB-18	26-FEB-18	R3971355
Sodium (Na)-Total	51.4		0.050	mg/L	26-FEB-18	26-FEB-18	R3971355
Zinc (Zn)-Total	0.0576		0.0030	mg/L	26-FEB-18	26-FEB-18	R3971355
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
L2059534-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 20-FEB-18 @ 15:30							
Matrix: WASTE							
Total Organic Carbon by Combustion							
Total Organic Carbon	61.2		2.5	mg/L		26-FEB-18	R3971401
Total Suspended Solids							
Total Suspended Solids	65.9		2.0	mg/L		26-FEB-18	R3972120
pH							
pH	7.02		0.10	pH units		23-FEB-18	R3969191

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

Reference Information

Sample Parameter Qualifier Key:

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

Test Method References:

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

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

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

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

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

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

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

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

BOD-CBOD-WP	Water	Carbonaceous BOD	APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP	Water	Conductivity	APHA 2510B

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

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

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

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

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

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.

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-CVAF-WP	Water	Mercury Total	EPA245.7 V2.0

Mercury in filtered and unfiltered waters is oxidized with Bromine monochloride and analyzed by cold-vapour atomic fluorescence spectrometry.

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

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

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

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

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

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

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

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

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

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

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

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

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

PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA SW 846/8270-GC/MS

Water is spiked with a surrogate spike mix and extracted using solvent extraction techniques. Analysis is performed by GC/MS in the selected ion monitoring (SIM) mode.

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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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-WP	Water	Sum of Xylene Isomer Concentrations	CALCULATED RESULT
Total xylenes represents the sum of o-xylene and m&p-xylene.			

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-WP	**Water**							
Batch R3969191								
WG2722248-4 LCS								
Alkalinity, Total (as CaCO3)			101.4		%		85-115	23-FEB-18
WG2722248-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	23-FEB-18
BOD-CBOD-WP	**Water**							
Batch R3974527								
WG2721134-2 LCS								
BOD Carbonaceous			98.1		%		85-115	23-FEB-18
WG2721134-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	23-FEB-18
BOD-WP	**Water**							
Batch R3974527								
WG2721134-2 LCS								
Biochemical Oxygen Demand			100.9		%		85-115	23-FEB-18
WG2721134-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	23-FEB-18
BTEXS+F1-HSMS-WP	**Water**							
Batch R3972140								
WG2723127-2 LCS								
Benzene			86.6		%		70-130	27-FEB-18
Toluene			96.9		%		70-130	27-FEB-18
Ethyl benzene			97.9		%		70-130	27-FEB-18
o-Xylene			113.8		%		70-130	27-FEB-18
m+p-Xylenes			107.0		%		70-130	27-FEB-18
WG2723127-3 LCS								
F1 (C6-C10)			100.0		%		70-130	27-FEB-18
WG2723127-1 MB								
Benzene			<0.00050		mg/L		0.0005	27-FEB-18
Toluene			<0.0010		mg/L		0.001	27-FEB-18
Ethyl benzene			<0.00050		mg/L		0.0005	27-FEB-18
o-Xylene			<0.00030		mg/L		0.0003	27-FEB-18
m+p-Xylenes			<0.00040		mg/L		0.0004	27-FEB-18
F1 (C6-C10)			<0.10		mg/L		0.1	27-FEB-18
Surrogate: 4-Bromofluorobenzene (SS)			95.4		%		70-130	27-FEB-18
C-TOC-HTC-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	**Water**							
Batch R3971401								
WG2722899-2 LCS								
Total Organic Carbon			98.1		%		80-120	26-FEB-18
WG2722899-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	26-FEB-18
CL-IC-N-WP	**Water**							
Batch R3969550								
WG2720532-14 LCS								
Chloride (Cl)			99.5		%		90-110	22-FEB-18
WG2720532-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	22-FEB-18
EC-WP	**Water**							
Batch R3969191								
WG2722248-3 LCS								
Conductivity			100.5		%		90-110	23-FEB-18
WG2722248-1 MB								
Conductivity			<1.0		umhos/cm		1	23-FEB-18
F2-F4-FID-WP	**Water**							
Batch R3969309								
WG2721851-2 LCS								
F2 (C10-C16)			93.9		%		70-130	24-FEB-18
F3 (C16-C34)			104.0		%		70-130	24-FEB-18
F4 (C34-C50)			93.5		%		70-130	24-FEB-18
WG2721851-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	24-FEB-18
F3 (C16-C34)			<0.25		mg/L		0.25	24-FEB-18
F4 (C34-C50)			<0.25		mg/L		0.25	24-FEB-18
Surrogate: 2-Bromobenzotrifluoride			89.6		%		60-140	24-FEB-18
FC10-QT97-WP	**Water**							
Batch R3968150								
WG2720727-1 DUP		**L2059534-1**						
Fecal Coliforms		>24200	>24200		MPN/100mL	0.0	65	22-FEB-18
WG2720727-2 MB								
Fecal Coliforms			<1		MPN/100mL		1	22-FEB-18
HG-T-CVAF-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAF-WP	**Water**							
Batch R3969307								
WG2722268-2 LCS								
Mercury (Hg)-Total			101.8		%		80-120	23-FEB-18
WG2722268-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	23-FEB-18
MET-T-CCMS-WP	**Water**							
Batch R3971355								
WG2722338-2 LCS								
Aluminum (Al)-Total			97.3		%		80-120	26-FEB-18
Arsenic (As)-Total			97.2		%		80-120	26-FEB-18
Cadmium (Cd)-Total			97.3		%		80-120	26-FEB-18
Calcium (Ca)-Total			101.7		%		80-120	26-FEB-18
Chromium (Cr)-Total			96.8		%		80-120	26-FEB-18
Cobalt (Co)-Total			97.0		%		80-120	26-FEB-18
Copper (Cu)-Total			97.2		%		80-120	26-FEB-18
Iron (Fe)-Total			94.1		%		80-120	26-FEB-18
Lead (Pb)-Total			104.1		%		80-120	26-FEB-18
Magnesium (Mg)-Total			97.8		%		80-120	26-FEB-18
Manganese (Mn)-Total			100.2		%		80-120	26-FEB-18
Nickel (Ni)-Total			96.6		%		80-120	26-FEB-18
Potassium (K)-Total			93.3		%		80-120	26-FEB-18
Sodium (Na)-Total			102.3		%		80-120	26-FEB-18
Zinc (Zn)-Total			93.5		%		80-120	26-FEB-18
WG2722338-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	26-FEB-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	26-FEB-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	26-FEB-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	26-FEB-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	26-FEB-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	26-FEB-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	26-FEB-18
Iron (Fe)-Total			<0.010		mg/L		0.01	26-FEB-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	26-FEB-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	26-FEB-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	26-FEB-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	26-FEB-18
Potassium (K)-Total			<0.050		mg/L		0.05	26-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R3971355								
WG2722338-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	26-FEB-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	26-FEB-18
NH3-COL-WP	**Water**							
Batch R3968832								
WG2721860-14 LCS								
Ammonia, Total (as N)			103.6		%		85-115	23-FEB-18
WG2721860-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	23-FEB-18
NO2-IC-N-WP	**Water**							
Batch R3969550								
WG2720532-14 LCS								
Nitrite (as N)			97.7		%		90-110	22-FEB-18
WG2720532-13 MB								
Nitrite (as N)			<0.010		mg/L		0.01	22-FEB-18
NO3-IC-N-WP	**Water**							
Batch R3969550								
WG2720532-14 LCS								
Nitrate (as N)			99.9		%		90-110	22-FEB-18
WG2720532-13 MB								
Nitrate (as N)			<0.020		mg/L		0.02	22-FEB-18
OG-GRAV-WP	**Water**							
Batch R3975751								
WG2723892-2 LCS								
Oil and Grease			94.9		%		70-130	03-MAR-18
WG2723892-1 MB								
Oil and Grease			<5.0		mg/L		5	03-MAR-18
P-T-COL-WP	**Water**							
Batch R3971513								
WG2722401-2 LCS								
Phosphorus (P)-Total			93.6		%		80-120	27-FEB-18
WG2722401-1 MB								
Phosphorus (P)-Total			<0.010		mg/L		0.01	27-FEB-18
PAH,PANH-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R3984671								
WG2730878-2 LCS								
1-Methyl Naphthalene			96.1		%		60-130	12-MAR-18
2-Methyl Naphthalene			93.0		%		60-130	12-MAR-18
Acenaphthene			93.0		%		60-130	12-MAR-18
Acenaphthylene			91.9		%		60-130	12-MAR-18
Anthracene			89.7		%		60-130	12-MAR-18
Acridine			93.6		%		60-130	12-MAR-18
Benzo(a)anthracene			94.8		%		60-130	12-MAR-18
Benzo(a)pyrene			91.5		%		60-130	12-MAR-18
Benzo(b&j)fluoranthene			87.9		%		60-130	12-MAR-18
Benzo(g,h,i)perylene			94.4		%		60-130	12-MAR-18
Benzo(k)fluoranthene			114.8		%		60-130	12-MAR-18
Chrysene			112.8		%		60-130	12-MAR-18
Dibenzo(a,h)anthracene			113.4		%		60-130	12-MAR-18
Fluoranthene			103.5		%		60-130	12-MAR-18
Fluorene			92.9		%		60-130	12-MAR-18
Indeno(1,2,3-cd)pyrene			88.7		%		60-130	12-MAR-18
Naphthalene			86.8		%		50-130	12-MAR-18
Phenanthrene			96.9		%		60-130	12-MAR-18
Pyrene			105.4		%		60-130	12-MAR-18
Quinoline			106.7		%		60-130	12-MAR-18
WG2730878-1 MB								
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	12-MAR-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	12-MAR-18
Acenaphthene			<0.000020		mg/L		0.00002	12-MAR-18
Acenaphthylene			<0.000020		mg/L		0.00002	12-MAR-18
Anthracene			<0.000010		mg/L		0.00001	12-MAR-18
Acridine			<0.000020		mg/L		0.00002	12-MAR-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	12-MAR-18
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	12-MAR-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	12-MAR-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	12-MAR-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	12-MAR-18
Chrysene			<0.000020		mg/L		0.00002	12-MAR-18
Dibenzo(a,h)anthracene			<0.0000050		mg/L		0.000005	12-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	**Water**							
Batch R3984671								
WG2730878-1 MB								
Fluoranthene			<0.000020		mg/L		0.00002	12-MAR-18
Fluorene			<0.000020		mg/L		0.00002	12-MAR-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	12-MAR-18
Naphthalene			<0.000050		mg/L		0.00005	12-MAR-18
Phenanthrene			<0.000050		mg/L		0.00005	12-MAR-18
Pyrene			<0.000010		mg/L		0.00001	12-MAR-18
Quinoline			<0.000020		mg/L		0.00002	12-MAR-18
Surrogate: Acenaphthene d10			92.9		%		40-130	12-MAR-18
Surrogate: Acridine d9			98.5		%		40-130	12-MAR-18
Surrogate: Chrysene d12			120.0		%		40-130	12-MAR-18
Surrogate: Naphthalene d8			86.3		%		40-130	12-MAR-18
Surrogate: Phenanthrene d10			91.5		%		40-130	12-MAR-18
PH-WP	**Water**							
Batch R3969191								
WG2722248-2 LCS								
pH			7.38		pH units		7.3-7.5	23-FEB-18
PHENOLS-4AAP-WT	**Water**							
Batch R3969838								
WG2721363-6 LCS								
Phenols (4AAP)			96.6		%		85-115	23-FEB-18
WG2721363-5 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	23-FEB-18
SO4-IC-N-WP	**Water**							
Batch R3969550								
WG2720532-14 LCS								
Sulfate (SO4)			99.99		%		90-110	22-FEB-18
WG2720532-13 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	22-FEB-18
SOLIDS-TOTSUS-WP	**Water**							
Batch R3972120								
WG2722252-2 LCS								
Total Suspended Solids			102.1		%		85-115	26-FEB-18
WG2722252-1 MB								
Total Suspended Solids			<2.0		mg/L		2	26-FEB-18

Quality Control Report

Legend:

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

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	20-FEB-18 15:30	23-FEB-18 12:00	0.25	68	hours	EHTR-FM
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97							
	1	20-FEB-18 15:30	22-FEB-18 15:25	30	48	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)							
	1	20-FEB-18 15:30	23-FEB-18 07:00	48	64	hours	EHTL
Carbonaceous BOD							
	1	20-FEB-18 15:30	23-FEB-18 07:00	48	64	hours	EHTL
Polycyclic Aromatic Hydrocarbons							
Polyaromatic Hydrocarbons (PAHs)							
	1	20-FEB-18 15:30	09-MAR-18 00:00	14	16	days	EHT

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 L2059534 were received on 22-FEB-18 10:30.

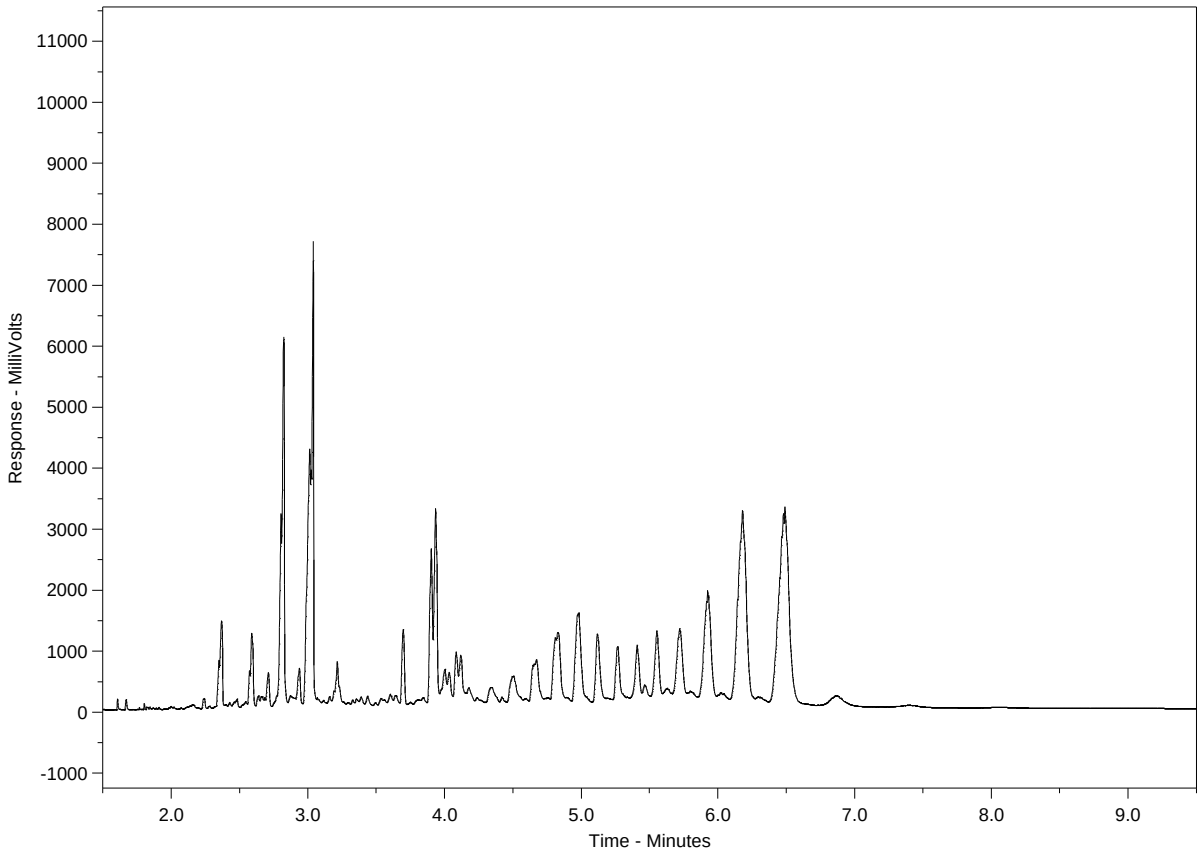
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

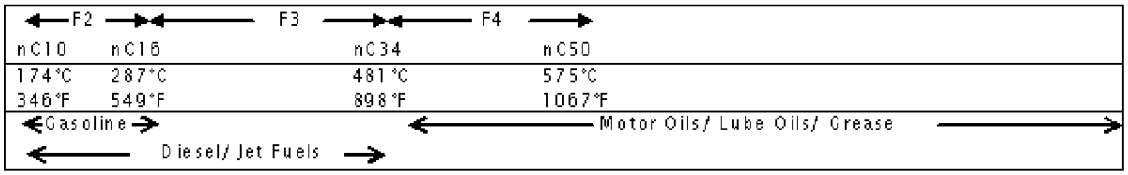
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2059534-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT





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

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

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

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

ALS Environmental

L2059534-COFC

Form

COC # _____

Page ____ of ____

Report To						Service Requested (Rush for routine analysis subject to availability)
Company:	Nunavut CGS - Rankin Inlet (W8133)	☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	SIMON DOIRON	☑ PDF	☐ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	Box 490	Email 1: sdoiron@gov.nu.ca				○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Rankin Inlet , NU, X0C 0G0	Email 2: mlusty@gov.nu.ca				○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-645-8155 Cell# :	Email 3:				**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #: Rankin Inlet WWTP- Monthly Effluent				
Company:		**PO / AFE:**				
Contact:		LSD:				
Address:						
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)	L2059534	**ALS Contact:** Craig Riddell	**Sampled By:** Simon Doiron			

Sample #	Sample Identification (This description will appear on the report)	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	Number of Containers
	Rankin Inlet WWTP - Effluent	Feb 20/18	15:30	Waste	x	x	x	15

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
CGS Rankin Matthew Hewey	20/02/2018	15:30	AAL	22/2/18	10:30	6.6 °C				

GENF 18.01 Front

Collins, Sarah

From: Doiron, Simon
Sent: April-13-18 11:44 AM
To: Collins, Sarah
Cc: Strickland, Joe; Lusty, Megan; Hewey, Matthew
Subject: RE: Rankin Effluent Monitoring - Correct CoC forms

Sarah:

Due to operational issues and weather there was no sampling done in March.

Simon

From: Collins, Sarah
Sent: April 6, 2018 1:40 PM
To: Doiron, Simon; Hewey, Matthew
Cc: Strickland, Joe; Lusty, Megan
Subject: RE: Rankin Effluent Monitoring - Correct CoC forms

Hi Simon,

Was an effluent sample completed in March? I did not receive and confirmation or results from ALS.

If an effluent sample was not completed in March, please complete as soon as possible, and then complete another sample later in the month for April.

Please continue to ensure the attached correct CoC form is being used with these samples.

Thanks,

Sarah

From: Doiron, Simon
Sent: March-02-18 10:32 AM
To: Collins, Sarah; Hewey, Matthew