

2018 SECOND QUARTER REPORT FOR GN-CGS RANKIN INLET

QUARTER BEING REPORTED: April - June 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, GRA-6, and GRA-4.

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
April	61,744	61,744
May	72,884	72,884
June	67,438	67,438
QUARTER TOTAL	402,403	394,437

Below are the results for Monitoring Program Station GRA-6. There was a total water volume of 46,850.00 m³ transferred from Char River to Nipissar Lake between June 22 and June 30, 2018.

Month Reported	Water Transferred From Char River to Nipissar (m ³)
April	None
May	None
June	46,850.00
QUARTER TOTAL	46,850.00

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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
April	4
May	4
June	4
QUARTER TOTAL	32

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

Refer to attached 2018 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.

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

Month Reported	Nipissar Lake Water Elevation (in)
April	No Open Water
May	No Open Water
June 18*	132.375

*some ice was still present on Nipissar Lake at the time of the Elevation reading.

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- e) A terms of reference for a Wastewater Effluent Study is complete and a Consultant Contract will be in place by August 31, 2018

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Appendix A: Summary of GRA-3 Sampling Parameters 2018

GN-CGS Rankin Inlet Monitoring Stations and Sampling Parameters for Licence No. 3AM-GRA1624											
Summary of GRA-3 Wastewater Effluent Analysis											
Category	Environment Canada FAD Parameters	Unit	25-Jan-18	20-Feb-18	01/03/2018 *	10-Apr-18	09-May-18	25-Jun-18	2018 Statistics		
									Min	Max	Average
Physical/Chemical	TSS	mg/L	117	65.9	/	62.7	84.1	416	65.9	117	91.45
	BOD5	mg/L	173	89	/	73	66	211	66	211	122.40
	CBOD	mg/L	146	82	/	68	66	167	66	167	105.80
	Hardness	mg/L	125	136	/	166	195	102	102	195	144.80
	Alkalinity - Bicarbonate (HCO3)	mg/L	157	141	/	160	176	198	141	198	166.40
	Alkalinity - Carbonate (CO3)	mg/L	<0.60	<0.60	/	<0.60	<0.60	<0.60			
	Alkalinity - Hydroxide (OH)	mg/L	<0.34	<0.34	/	<0.34	<0.34	<0.34			
	Alkalinity - Total (as CaCO3)	mg/L	128	115	/	131	144	162	115	162	136.00
	Conductivity	uS/cm	569	598	/	708	737	574	569	737	637.20
	pH	pH Units	6.91	7.02	/	6.79	7.3	7.01	6.79	7.3	7.01
Bacteriological	Fecal Coliform	MPN/100 mL	>24200	>24200	/	>24200	/	>24200			
	Total Coliform	MPN/100 mL	/	/	/	>24200	>2420	>24200			
	E. Coli	MPN/100 mL	/	/	/	>24200	>2420	>24200			
Nutrients	Ammonia-N	mg/L	5.9	4.45	/	4	3.13	74	3.13	74	18.30
	Nitrate-N [NO3-N]	mg/L	<0.020	<0.020	/	<0.020	<0.020	<0.020			
	Nitrite-N [NO2-N]	mg/L	<0.010	0.016	/	<0.010	<0.010	<0.010	0.016	0.016	0.02
	Total Nitrogen	mg/L	/	/	/	/	/	/			
	Total Organic Carbon (TOC)	mg/L	106	61.2	/	68.6	53.1	210	53.1	210	99.78
	Total Phosphorous	mg/L	2.87	1.35	/	1.67	1.53	11.1	1.35	11.1	3.70
Major Ions	Calcium (Ca)	mg/L	35	39.7	/	46.1	60.1	29.1	29.1	60.1	42.00
	Chloride (Cl)	ug/L	80.9	88.4	/	97.9	115	52.6	52.6	115	86.96
	Fluoride (F)	mg/L	/	/	/	0.223	0.273	0.02	0.02	0.273	0.17
	Magnesium (Mg)	mg/L	9.04	8.95	/	12.3	11	7.25	7.25	12.3	9.71
	Potassium (K)	mg/L	9.76	8.82	/	10.8	9.98	28.2	8.82	28.2	13.51
	Sodium	mg/L	46.8	51.4	/	62.1	59.2	45.7	45.7	62.1	53.04
	Sulphate (SO4)	mg/L	34.8	40.9	/	50.2	51.6	21.8	21.8	51.6	39.86
Metals (Total)	Aluminum (Al)	ug/L	0.136	0.234	/	0.242	0.219	0.721	0.136	0.721	0.31
	Antimony (Sb)	ug/L	/	/	/	<0.00050	0.00014	0.00077	0.00014	0.00077	0.00
	Arsenic (As)	ug/L	0.00107	0.00218	/	0.00124	0.00125	0.0019	0.00107	0.00218	0.00
	Barium (Ba)	ug/L	/	/	/	0.0507	0.0498	0.037	0.037	0.0507	0.05
	Beryllium (Be)	ug/L	/	/	/	<0.00050	<0.00010	<0.00010			
	Cadmium (Cd)	ug/L	0.000057	0.0000428	/	0.000045	0.000039	0.000425	0.000039	0.00043	0.00
	Cesium (Cs)	ug/L	/	/	/	0.000058	0.000057	0.000152	0.000057	0.00015	0.00
	Chromium (Cr)	ug/L	0.00089	0.00094	/	0.00068	0.00063	0.00503	0.00063	0.00503	0.00
	Cobalt (Co)	ug/L	0.0002	0.00014	/	<0.00050	0.00014	0.0012	0.00014	0.0012	0.00
	Copper (Cu)	ug/L	0.184	0.182	/	0.163	0.158	0.283	0.158	0.283	0.19
	Iron (Fe)	ug/L	0.263	0.141	/	0.146	0.153	1.2	0.141	1.2	0.38
	Lead (Pb)	ug/L	0.00198	0.00113	/	0.00108	0.00145	0.00323	0.00108	0.00323	0.00
	Lithium (Li)	ug/L	/	/	/	0.0055	0.016	0.0045	0.0045	0.016	0.01
	Manganese (Mn)	ug/L	0.0402	0.034	/	0.0466	0.046	0.0792	0.034	0.0792	0.05
	Molybdenum (Mo)	ug/L	/	/	/	0.00103	0.00106	0.00317	0.00103	0.00317	0.00
	Nickel (Ni)	ug/L	0.00266	0.00247	/	0.003	0.00274	0.014	0.00247	0.014	0.00
	Rubidium (Rb)	ug/L	/	/	/	0.0101	0.00941	0.0274	0.00941	0.0274	0.02
	Selenium (Se)	ug/L	/	/	/	<0.00025	0.000205	0.000867	0.000205	0.00087	0.00
	Silver (Ag)	ug/L	/	/	/	<0.000050	0.000029	0.000081	0.000029	8.1E-05	0.00
	Strontium (Sr)	ug/L	/	/	/	0.215	0.441	0.105	0.105	0.441	0.25
	Thallium (Tl)	ug/L	/	/	/	<0.000050	<0.000010	0.000014	0.000014	1.4E-05	0.00
	Titanium (Ti)	ug/L	/	/	/	<0.0015	0.00823	0.0522	0.00823	0.0522	0.03
	Uranium (U)	ug/L	/	/	/	0.000265	0.000281	0.000399	0.000265	0.0004	0.00
	Vanadium (V)	ug/L	/	/	/	<0.0025	<0.00050	0.00162	0.00162	0.00162	0.00
	Zinc (Zn)	ug/L	0.077	0.0576	/	0.078	0.0581	0.25	0.0576	0.25	0.10
Other	Total phenols	mg/L	0.0095	0.0069	/	0.0058	0.0059	0.138	0.0058	0.138	0.03
	Oil and Grease	mg/L	30.5	22.5	/	18.1	23.1	79.3	18.1	79.3	34.70
	Total Potroleum Hydrocarbons	mg/L	14.4	10.6	/	10.3	7.94	53.4	7.94	53.4	19.33

¹Canadian 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 constraints. Please see attached email

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Appendix B: Certificate of Analysis, April 10, 2018 – 17 pages
Certificate of Analysis, May 9, 2018 – 20 pages
Certificate of Analysis, June 25, 2018 – 19 pages



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

Date: 24-APR-18
PO No.:
WO No.: L2079879
Project Ref: RANKIN INLET WWTP - MONTHLY EFFLUENT
Sample ID: RANKIN INLET WWTP - EFFLUENT
Sampled By: SIMON DOIRON
Date Collected: 10-APR-18
Lab Sample ID: L2079879-1
Matrix: WASTE

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
BTEX plus F1-F4						
Xylenes (Total)	<0.00064		mg/L	0.09	0.02	20-APR-18
CCME Total Hydrocarbons						
F1-BTEX	<0.10		mg/L			24-APR-18
F2-Naphth	0.45		mg/L			24-APR-18
F3-PAH	7.00		mg/L			24-APR-18
Total Hydrocarbons (C6-C50)	10.3		mg/L			24-APR-18
CCME PHC F2-F4 in Water						
F2 (C10-C16)	0.45		mg/L			18-APR-18
F3 (C16-C34)	7.00		mg/L			18-APR-18
F4 (C34-C50)	2.85		mg/L			18-APR-18
Surr: 2-Bromobenzotrifluoride	86.3		%			18-APR-18
BTX plus F1 by GCMS						
Benzene	<0.00050		mg/L	0.005		20-APR-18
Toluene	<0.0010		mg/L	0.06	0.024	20-APR-18
Ethyl benzene	<0.00050		mg/L	0.14	0.0016	20-APR-18
o-Xylene	<0.00050		mg/L			20-APR-18
m+p-Xylenes	<0.00040		mg/L			20-APR-18
F1 (C6-C10)	<0.10		mg/L			20-APR-18
Surr: 4-Bromofluorobenzene (SS)	97.8		%			20-APR-18
Nunavut WW Group 1						
Phosphorus, Total						
Phosphorus (P)-Total	1.67		mg/L			16-APR-18
Mercury Total						
Mercury (Hg)-Total	<0.000025		mg/L	0.001		16-APR-18
Bicarbonate (HCO3)	160		mg/L			19-APR-18
Carbonate (CO3)	<0.60		mg/L			19-APR-18
Hydroxide (OH)	<0.34		mg/L			19-APR-18
*Nitrate and Nitrite as N	<0.070		mg/L	10		18-APR-18
pH						
pH	6.79		pH units			19-APR-18
Total Suspended Solids						
Total Suspended Solids	62.7		mg/L			17-APR-18
Total Organic Carbon by Combustion						
Total Organic Carbon	68.6		mg/L			16-APR-18
Total Metals in Water by CRC ICPMS						
Aluminum (Al)-Total	0.242	DLM	mg/L		0.1	16-APR-18
Antimony (Sb)-Total	<0.00050	DLM	mg/L	0.006		16-APR-18
Arsenic (As)-Total	0.00124	DLM	mg/L	0.01		16-APR-18

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Total Metals in Water by CRC ICPMS						
Barium (Ba)-Total	0.0507	DLM	mg/L	1		16-APR-18
Beryllium (Be)-Total	<0.00050	DLM	mg/L			16-APR-18
Bismuth (Bi)-Total	0.00193	DLM	mg/L			16-APR-18
Boron (B)-Total	0.114	DLM	mg/L	5		16-APR-18
Cadmium (Cd)-Total	0.000045	DLM	mg/L	0.005		16-APR-18
Calcium (Ca)-Total	46.1	DLM	mg/L			16-APR-18
Cesium (Cs)-Total	0.000058	DLM	mg/L			16-APR-18
Chromium (Cr)-Total	0.00068	DLM	mg/L	0.05		16-APR-18
Cobalt (Co)-Total	<0.00050	DLM	mg/L			16-APR-18
Copper (Cu)-Total	0.163	DLM	mg/L		1.0	16-APR-18
Iron (Fe)-Total	0.146	DLM	mg/L		0.3	16-APR-18
Lead (Pb)-Total	0.00108	DLM	mg/L	0.01		16-APR-18
Lithium (Li)-Total	0.0055	DLM	mg/L			16-APR-18
Magnesium (Mg)-Total	12.3	DLM	mg/L			16-APR-18
Manganese (Mn)-Total	0.0466	DLM	mg/L		0.05	16-APR-18
Molybdenum (Mo)-Total	0.00103	DLM	mg/L			16-APR-18
Nickel (Ni)-Total	0.0030	DLM	mg/L			16-APR-18
Potassium (K)-Total	10.8	DLM	mg/L			16-APR-18
Phosphorus (P)-Total	1.73	DLM	mg/L			16-APR-18
Rubidium (Rb)-Total	0.0101	DLM	mg/L			16-APR-18
Selenium (Se)-Total	<0.00025	DLM	mg/L	0.05		16-APR-18
Silicon (Si)-Total	0.56	DLM	mg/L			16-APR-18
Silver (Ag)-Total	<0.000050	DLM	mg/L			16-APR-18
Sodium (Na)-Total	62.1	DLM	mg/L		200	16-APR-18
Strontium (Sr)-Total	0.215	DLM	mg/L			16-APR-18
Sulfur (S)-Total	21.7	DLM	mg/L			16-APR-18
Tellurium (Te)-Total	<0.0010	DLM	mg/L			16-APR-18
Thallium (Tl)-Total	<0.000050	DLM	mg/L			16-APR-18
Thorium (Th)-Total	<0.00050	DLM	mg/L			16-APR-18
Tin (Sn)-Total	0.00093	DLM	mg/L			16-APR-18
Titanium (Ti)-Total	<0.0015	DLM	mg/L			16-APR-18
Tungsten (W)-Total	<0.00050	DLM	mg/L			16-APR-18
Uranium (U)-Total	0.000265	DLM	mg/L	0.02		16-APR-18
Vanadium (V)-Total	<0.0025	DLM	mg/L			16-APR-18
Zinc (Zn)-Total	0.078	DLM	mg/L		5.0	16-APR-18
Zirconium (Zr)-Total	0.00096	DLM	mg/L			16-APR-18
Sulfate in Water by IC						
Sulfate (SO4)	50.2		mg/L		500	13-APR-18
Phenol (4AAP)						
Phenols (4AAP)	0.0058		mg/L			16-APR-18
Oil & Grease - Gravimetric						
Oil and Grease	18.1		mg/L			23-APR-18

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ATTN: SIMON DOIRON

Date: 24-APR-18
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Project Ref: RANKIN INLET WWTP - MONTHLY EFFLUENT
Sample ID: RANKIN INLET WWTP - EFFLUENT
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Date Collected: 10-APR-18
Lab Sample ID: L2079879-1
Matrix: WASTE

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Nitrite in Water by IC						
*Nitrite (as N)	<0.010		mg/L	1		13-APR-18
Nitrate in Water by IC						
*Nitrate (as N)	<0.020		mg/L	10		13-APR-18
Hardness Calculated						
Hardness (as CaCO ₃)	166	HTC	mg/L		500	17-APR-18
Fecal coliforms, 1:10 dilution by QT97						
Fecal Coliforms	>24200	PEHR	MPN/100mL			13-APR-18
Conductivity						
Conductivity	708		umhos/cm			19-APR-18
Chloride in Water by IC						
Chloride (Cl)	97.9		mg/L		250	13-APR-18
Carbonaceous BOD						
BOD Carbonaceous	68		mg/L			14-APR-18
Biochemical Oxygen Demand (BOD)						
Biochemical Oxygen Demand	73		mg/L			14-APR-18
Ammonia by colour						
Ammonia, Total (as N)	4.00		mg/L			17-APR-18
Alkalinity, Total (as CaCO₃)						
Alkalinity, Total (as CaCO ₃)	131		mg/L			19-APR-18
Fluoride (F)	0.223		mg/L	1.5		13-APR-18
Total and E. coli, 1:10 dilution by QT97						
Total Coliforms	>24200	PEHR	MPN/100mL	0		13-APR-18
Escherichia Coli	>24200	PEHR	MPN/100mL	0		13-APR-18
Polyaromatic Hydrocarbons (PAHs)						
1-Methyl Naphthalene	0.000036		mg/L			24-APR-18
2-Methyl Naphthalene	0.000042		mg/L			24-APR-18
Acenaphthene	<0.000020		mg/L			24-APR-18
Acenaphthylene	<0.000020		mg/L			24-APR-18
Anthracene	<0.000010		mg/L			24-APR-18
Acridine	<0.000020		mg/L			24-APR-18
Benzo(a)anthracene	<0.000020	DLCI	mg/L			24-APR-18
Benzo(a)pyrene	<0.000020	DLCI	mg/L	0.00001		24-APR-18
Benzo(b&j)fluoranthene	<0.000020	DLCI	mg/L			24-APR-18
Benzo(g,h,i)perylene	<0.000050	DLCI	mg/L			24-APR-18
Benzo(k)fluoranthene	<0.000010		mg/L			24-APR-18
Chrysene	<0.000020		mg/L			24-APR-18

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P.O. Box 490
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ATTN: SIMON DOIRON

Date: 24-APR-18
PO No.:
WO No.: L2079879
Project Ref: RANKIN INLET WWTP - MONTHLY EFFLUENT
Sample ID: RANKIN INLET WWTP - EFFLUENT
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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Polyaromatic Hydrocarbons (PAHs)						
Dibenzo(a,h)anthracene	<0.00050	DLCI	mg/L			24-APR-18
Fluoranthene	<0.000020		mg/L			24-APR-18
Fluorene	<0.000050	DLCI	mg/L			24-APR-18
Indeno(1,2,3-cd)pyrene	<0.00020	DLCI	mg/L			24-APR-18
Naphthalene	<0.000050		mg/L			24-APR-18
Phenanthrene	<0.000050		mg/L			24-APR-18
Pyrene	<0.000010		mg/L			24-APR-18
Quinoline	<0.00050	DLCI	mg/L			24-APR-18
B(a)P Total Potency Equivalent	<0.00028		mg/L			24-APR-18
Surr: Acenaphthene d10	104.3		%			24-APR-18
Surr: Acridine d9	86.3		%			24-APR-18
Surr: Chrysene d12	120.6		%			24-APR-18
Surr: Naphthalene d8	105.4		%			24-APR-18
Surr: Phenanthrene d10	99.9		%			24-APR-18
CDWQG = Health Canada Guideline Limits updated DECEMBER 2015 * CDWQG for Nitrate+Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/ or Aesthetic Objective.						
Approved by <u>Hua Wo</u> Hua Wo Account Manager						

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Guidelines & Objectives

Sample Parameter Qualifier key listed:

Qualifier	Description
DLCI	Detection Limit Raised: Chromatographic Interference due to co-elution.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Health Canada MAC Health Related Criteria Limits

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

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

Aesthetic Objective Concentration Levels

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

GLOSSARY OF REPORT TERMS

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

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

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

Quality Control Report

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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	R4017014							
WG2754157-5 DUP		L2079879-1						
Alkalinity, Total (as CaCO ₃)		131	131		mg/L	0.1	20	19-APR-18
WG2754157-4 LCS								
Alkalinity, Total (as CaCO ₃)			100.9		%		85-115	19-APR-18
WG2754157-1 MB								
Alkalinity, Total (as CaCO ₃)			<1.0		mg/L		1	19-APR-18
BOD-CBOD-WP								
Water								
Batch	R4018799							
WG2751337-2 LCS								
BOD Carbonaceous			102.1		%		85-115	14-APR-18
WG2751337-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	14-APR-18
BOD-WP								
Water								
Batch	R4018799							
WG2751337-2 LCS								
Biochemical Oxygen Demand			105.6		%		85-115	14-APR-18
WG2751337-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	14-APR-18
BTEXS+F1-HSMS-WP								
Water								
Batch	R4017780							
WG2754672-2 LCS								
Benzene			93.3		%		70-130	19-APR-18
Toluene			92.3		%		70-130	19-APR-18
Ethyl benzene			93.5		%		70-130	19-APR-18
o-Xylene			99.6		%		70-130	19-APR-18
m+p-Xylenes			101.2		%		70-130	19-APR-18
WG2754672-3 LCS								
F1 (C6-C10)			84.0		%		70-130	19-APR-18
WG2754672-1 MB								
Benzene			<0.00050		mg/L		0.0005	19-APR-18
Toluene			<0.0010		mg/L		0.001	19-APR-18
Ethyl benzene			<0.00050		mg/L		0.0005	19-APR-18
o-Xylene			<0.00030		mg/L		0.0003	19-APR-18
m+p-Xylenes			<0.00040		mg/L		0.0004	19-APR-18
F1 (C6-C10)			<0.10		mg/L		0.1	19-APR-18
Surrogate: 4-Bromofluorobenzene (SS)			97.1		%		70-130	19-APR-18
C-TOC-HTC-WP								
Water								

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP								
Batch R4015571								
WG2752492-3	DUP	L2079879-1						
Total Organic Carbon		68.6	66.1		mg/L	3.8	20	16-APR-18
WG2752492-2	LCS							
Total Organic Carbon			99.7		%		80-120	16-APR-18
WG2752492-1	MB							
Total Organic Carbon			<0.50		mg/L		0.5	16-APR-18
CL-IC-N-WP								
Batch R4015626								
WG2750684-6	LCS							
Chloride (Cl)			98.9		%		90-110	13-APR-18
WG2750684-5	MB							
Chloride (Cl)			<0.50		mg/L		0.5	13-APR-18
EC-WP								
Batch R4017014								
WG2754157-5	DUP	L2079879-1						
Conductivity		708	707		umhos/cm	0.1	10	19-APR-18
WG2754157-3	LCS							
Conductivity			97.1		%		90-110	19-APR-18
WG2754157-1	MB							
Conductivity			<1.0		umhos/cm		1	19-APR-18
F-IC-N-WP								
Batch R4015626								
WG2750684-6	LCS							
Fluoride (F)			100.1		%		90-110	13-APR-18
WG2750684-5	MB							
Fluoride (F)			<0.020		mg/L		0.02	13-APR-18
F2-F4-FID-WP								
Batch R4017053								
WG2754209-2	LCS							
F2 (C10-C16)			112.7		%		70-130	18-APR-18
F3 (C16-C34)			111.1		%		70-130	18-APR-18
F4 (C34-C50)			115.7		%		70-130	18-APR-18
WG2754209-1	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	18-APR-18
F3 (C16-C34)			<0.25		mg/L		0.25	18-APR-18
F4 (C34-C50)			<0.25		mg/L		0.25	18-APR-18
Surrogate: 2-Bromobenzotrifluoride			78.6		%		60-140	18-APR-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC10-QT97-WP								
Batch R4012554								
WG2750999-1 DUP		L2079879-1						
Fecal Coliforms		>24200	>24200		MPN/100mL	0.0	65	13-APR-18
WG2750999-2 MB								
Fecal Coliforms			<1		MPN/100mL		1	13-APR-18
HG-T-CVAF-WP								
Batch R4015627								
WG2752533-2 LCS								
Mercury (Hg)-Total			104.3		%		80-120	16-APR-18
WG2752533-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	16-APR-18
MET-T-CCMS-WP								
Batch R4015520								
WG2751944-2 LCS								
Aluminum (Al)-Total			101.3		%		80-120	16-APR-18
Antimony (Sb)-Total			105.1		%		80-120	16-APR-18
Arsenic (As)-Total			101.1		%		80-120	16-APR-18
Barium (Ba)-Total			100.3		%		80-120	16-APR-18
Beryllium (Be)-Total			101.4		%		80-120	16-APR-18
Bismuth (Bi)-Total			102.4		%		80-120	16-APR-18
Boron (B)-Total			97.7		%		80-120	16-APR-18
Cadmium (Cd)-Total			100.4		%		80-120	16-APR-18
Calcium (Ca)-Total			101.1		%		80-120	16-APR-18
Cesium (Cs)-Total			102.8		%		80-120	16-APR-18
Chromium (Cr)-Total			101.7		%		80-120	16-APR-18
Cobalt (Co)-Total			101.7		%		80-120	16-APR-18
Copper (Cu)-Total			101.9		%		80-120	16-APR-18
Iron (Fe)-Total			100.3		%		80-120	16-APR-18
Lead (Pb)-Total			101.0		%		80-120	16-APR-18
Lithium (Li)-Total			97.5		%		80-120	16-APR-18
Magnesium (Mg)-Total			107.3		%		80-120	16-APR-18
Manganese (Mn)-Total			101.4		%		80-120	16-APR-18
Molybdenum (Mo)-Total			102.2		%		80-120	16-APR-18
Nickel (Ni)-Total			100.4		%		80-120	16-APR-18
Potassium (K)-Total			101.1		%		80-120	16-APR-18
Phosphorus (P)-Total			106.2		%		80-120	16-APR-18
Rubidium (Rb)-Total			103.3		%		80-120	16-APR-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4015520							
WG2751944-2	LCS							
Selenium (Se)-Total			101.6		%		80-120	16-APR-18
Silicon (Si)-Total			103.2		%		80-120	16-APR-18
Silver (Ag)-Total			98.3		%		80-120	16-APR-18
Sodium (Na)-Total			102.0		%		80-120	16-APR-18
Strontium (Sr)-Total			101.9		%		80-120	16-APR-18
Sulfur (S)-Total			98.8		%		80-120	16-APR-18
Tellurium (Te)-Total			101.8		%		80-120	16-APR-18
Thallium (Tl)-Total			102.2		%		80-120	16-APR-18
Thorium (Th)-Total			97.3		%		80-120	16-APR-18
Tin (Sn)-Total			99.5		%		80-120	16-APR-18
Titanium (Ti)-Total			100.9		%		80-120	16-APR-18
Tungsten (W)-Total			102.3		%		80-120	16-APR-18
Uranium (U)-Total			102.4		%		80-120	16-APR-18
Vanadium (V)-Total			103.4		%		80-120	16-APR-18
Zinc (Zn)-Total			99.9		%		80-120	16-APR-18
Zirconium (Zr)-Total			99.7		%		80-120	16-APR-18
WG2751944-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	16-APR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	16-APR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	16-APR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	16-APR-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	16-APR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	16-APR-18
Boron (B)-Total			<0.010		mg/L		0.01	16-APR-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	16-APR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	16-APR-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	16-APR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	16-APR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	16-APR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	16-APR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	16-APR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	16-APR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	16-APR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	16-APR-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4015520							
WG2751944-1 MB								
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	16-APR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	16-APR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	16-APR-18
Potassium (K)-Total			<0.050		mg/L		0.05	16-APR-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	16-APR-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	16-APR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	16-APR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	16-APR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	16-APR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	16-APR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	16-APR-18
Sulfur (S)-Total			<0.50		mg/L		0.5	16-APR-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	16-APR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	16-APR-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	16-APR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	16-APR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	16-APR-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	16-APR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	16-APR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	16-APR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	16-APR-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	16-APR-18
NH3-COL-WP		Water						
Batch	R4016686							
WG2753160-38 LCS								
Ammonia, Total (as N)			92.0		%		85-115	17-APR-18
WG2753160-37 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	17-APR-18
NO2-IC-N-WP		Water						
Batch	R4015626							
WG2750684-6 LCS								
Nitrite (as N)			98.1		%		90-110	13-APR-18
WG2750684-5 MB								
Nitrite (as N)			<0.010		mg/L		0.01	13-APR-18
NO3-IC-N-WP		Water						

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP		Water						
Batch	R4015626							
WG2750684-6	LCS							
Nitrate (as N)			99.0		%		90-110	13-APR-18
WG2750684-5	MB							
Nitrate (as N)			<0.020		mg/L		0.02	13-APR-18
OG-GRAV-WP		Water						
Batch	R4021760							
WG2755441-2	LCS							
Oil and Grease			98.5		%		70-130	23-APR-18
WG2755441-1	MB							
Oil and Grease			<5.0		mg/L		5	23-APR-18
P-T-COL-WP		Water						
Batch	R4014452							
WG2750971-6	LCS							
Phosphorus (P)-Total			95.2		%		80-120	16-APR-18
WG2750971-5	MB							
Phosphorus (P)-Total			<0.010		mg/L		0.01	16-APR-18
PAH,PANH-WP		Water						
Batch	R4022201							
WG2754770-2	LCS							
1-Methyl Naphthalene			103.4		%		60-130	24-APR-18
2-Methyl Naphthalene			101.5		%		60-130	24-APR-18
Acenaphthene			99.3		%		60-130	24-APR-18
Acenaphthylene			95.3		%		60-130	24-APR-18
Anthracene			94.7		%		60-130	24-APR-18
Acridine			100.1		%		60-130	24-APR-18
Benzo(a)anthracene			101.4		%		60-130	24-APR-18
Benzo(a)pyrene			88.7		%		60-130	24-APR-18
Benzo(b&j)fluoranthene			94.2		%		60-130	24-APR-18
Benzo(g,h,i)perylene			93.0		%		60-130	24-APR-18
Benzo(k)fluoranthene			96.8		%		60-130	24-APR-18
Chrysene			115.6		%		60-130	24-APR-18
Dibenzo(a,h)anthracene			106.4		%		60-130	24-APR-18
Fluoranthene			105.1		%		60-130	24-APR-18
Fluorene			97.0		%		60-130	24-APR-18
Indeno(1,2,3-cd)pyrene			92.4		%		60-130	24-APR-18
Naphthalene			89.5		%		50-130	24-APR-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4022201							
WG2754770-2	LCS							
Phenanthrene			102.4		%		60-130	24-APR-18
Pyrene			108.1		%		60-130	24-APR-18
Quinoline			114.5		%		60-130	24-APR-18
WG2754770-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	24-APR-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	24-APR-18
Acenaphthene			<0.000020		mg/L		0.00002	24-APR-18
Acenaphthylene			<0.000020		mg/L		0.00002	24-APR-18
Anthracene			<0.000010		mg/L		0.00001	24-APR-18
Acridine			<0.000020		mg/L		0.00002	24-APR-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	24-APR-18
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	24-APR-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	24-APR-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	24-APR-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	24-APR-18
Chrysene			<0.000020		mg/L		0.00002	24-APR-18
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	24-APR-18
Fluoranthene			<0.000020		mg/L		0.00002	24-APR-18
Fluorene			<0.000020		mg/L		0.00002	24-APR-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	24-APR-18
Naphthalene			<0.000050		mg/L		0.00005	24-APR-18
Phenanthrene			<0.000050		mg/L		0.00005	24-APR-18
Pyrene			<0.000010		mg/L		0.00001	24-APR-18
Quinoline			<0.000020		mg/L		0.00002	24-APR-18
Surrogate: Acenaphthene d10			81.4		%		40-130	24-APR-18
Surrogate: Acridine d9			77.1		%		40-130	24-APR-18
Surrogate: Chrysene d12			89.7		%		40-130	24-APR-18
Surrogate: Naphthalene d8			74.5		%		40-130	24-APR-18
Surrogate: Phenanthrene d10			80.0		%		40-130	24-APR-18
PH-WP		Water						
Batch	R4017014							
WG2754157-5	DUP	L2079879-1						
pH		6.79	6.82	J	pH units	0.03	0.2	19-APR-18
WG2754157-2	LCS							
pH			7.41		pH units		7.3-7.5	19-APR-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-WT								
Batch R4015713								
WG2752055-11 DUP		L2079879-1						
Phenols (4AAP)		0.0058	0.0054		mg/L	7.8	20	16-APR-18
WG2752055-10 LCS								
Phenols (4AAP)			110.6		%		85-115	16-APR-18
WG2752055-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	16-APR-18
WG2752055-12 MS		L2079879-1						
Phenols (4AAP)			105.2		%		75-125	16-APR-18
SO4-IC-N-WP								
Batch R4015626								
WG2750684-6 LCS								
Sulfate (SO4)			100.3		%		90-110	13-APR-18
WG2750684-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-APR-18
SOLIDS-TOTSUS-WP								
Batch R4017212								
WG2752085-14 LCS								
Total Suspended Solids			96.7		%		85-115	17-APR-18
WG2752085-13 MB								
Total Suspended Solids			<2.0		mg/L		2	17-APR-18
TC,EC10-QT97-WP								
Batch R4012553								
WG2750994-1 DUP		L2079879-1						
Total Coliforms		>24200	>24200		MPN/100mL	0.0	65	13-APR-18
Escherichia Coli		>24200	>24200		MPN/100mL	0.0	65	13-APR-18
WG2750994-2 MB								
Total Coliforms			<1		MPN/100mL		1	13-APR-18
Escherichia Coli			<1		MPN/100mL		1	13-APR-18

Quality Control Report

Workorder: L2079879

Report Date: 24-APR-18

Page 9 of 10

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.

Quality Control Report

Workorder: L2079879

Report Date: 24-APR-18

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	10-APR-18 13:30	19-APR-18 12:00	0.25	215	hours	EHTR-FM
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97	1	10-APR-18 13:30	13-APR-18 15:30	30	74	hours	EHTR
Total and E. coli, 1:10 dilution by QT97	1	10-APR-18 13:30	13-APR-18 15:30	30	74	hours	EHTR
Aggregate Organics							
Biochemical Oxygen Demand (BOD)	1	10-APR-18 13:30	14-APR-18 07:00	48	90	hours	EHTR
Carbonaceous BOD	1	10-APR-18 13:30	14-APR-18 07:00	48	90	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 L2079879 were received on 13-APR-18 12:40.

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.

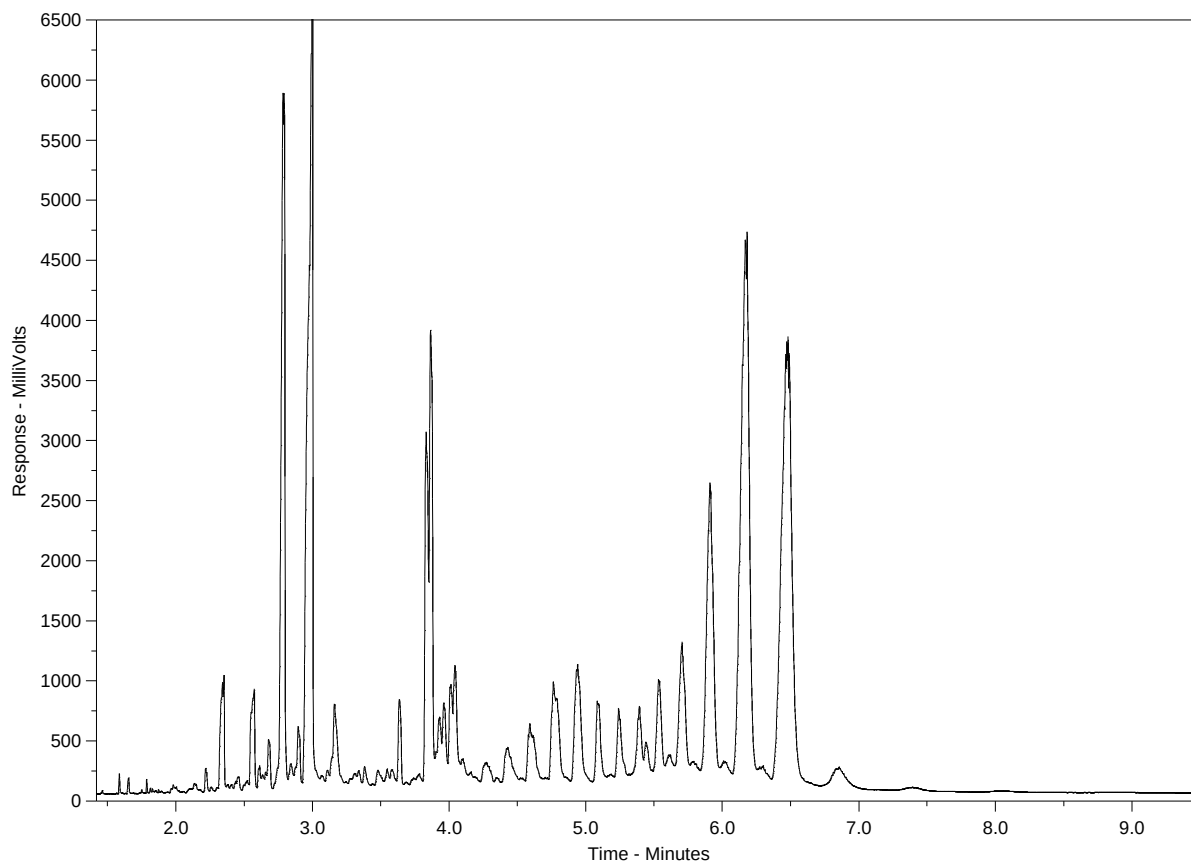
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2079879-1
Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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

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



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

Date Received: 10-MAY-18
Report Date: 25-MAY-18 12:11 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2092694

Project P.O. #: NOT SUBMITTED

Job Reference: RANKLIN INLET WWTP - MONTHLY EFFLUENT

C of C Numbers:

Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID				
		L2092694-1 WASTE 09-MAY-18 14:00 RANKIN INLET WWTP - EFFLUENT				
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (umhos/cm)	737				
	Hardness (as CaCO3) (mg/L)	195 ^{HTC}				
	pH (pH units)	7.30				
	Total Suspended Solids (mg/L)	84.1				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	144				
	Ammonia, Total (as N) (mg/L)	3.13				
	Bicarbonate (HCO3) (mg/L)	176				
	Carbonate (CO3) (mg/L)	<0.60				
	Chloride (Cl) (mg/L)	115				
	Fluoride (F) (mg/L)	0.273				
	Hydroxide (OH) (mg/L)	<0.34				
	Nitrate and Nitrite as N (mg/L)	<0.070				
	Nitrate (as N) (mg/L)	<0.020				
	Nitrite (as N) (mg/L)	<0.010				
	Phosphorus (P)-Total (mg/L)	1.53				
	Sulfate (SO4) (mg/L)	51.6				
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	53.1				
Bacteriological Tests	Escherichia Coli (MPN/100mL)	>2420				
	Total Coliforms (MPN/100mL)	>2420				
Total Metals	Aluminum (Al)-Total (mg/L)	0.219				
	Antimony (Sb)-Total (mg/L)	0.00014				
	Arsenic (As)-Total (mg/L)	0.00125				
	Barium (Ba)-Total (mg/L)	0.0498				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	0.000705				
	Boron (B)-Total (mg/L)	0.110				
	Cadmium (Cd)-Total (mg/L)	0.0000390				
	Calcium (Ca)-Total (mg/L)	60.1				
	Cesium (Cs)-Total (mg/L)	0.000057				
	Chromium (Cr)-Total (mg/L)	0.00063				
	Cobalt (Co)-Total (mg/L)	0.00014				
	Copper (Cu)-Total (mg/L)	0.158				
	Iron (Fe)-Total (mg/L)	0.153				
	Lead (Pb)-Total (mg/L)	0.00145				
	Lithium (Li)-Total (mg/L)	0.0160				
	Magnesium (Mg)-Total (mg/L)	11.0				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID				
		L2092694-1 WASTE 09-MAY-18 14:00 RANKIN INLET WWTP - EFFLUENT				
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)	0.0460				
	Mercury (Hg)-Total (mg/L)	<0.000025				
	Molybdenum (Mo)-Total (mg/L)	0.00106				
	Nickel (Ni)-Total (mg/L)	0.00274				
	Phosphorus (P)-Total (mg/L)	1.62				
	Potassium (K)-Total (mg/L)	9.98				
	Rubidium (Rb)-Total (mg/L)	0.00941				
	Selenium (Se)-Total (mg/L)	0.000205				
	Silicon (Si)-Total (mg/L)	0.44				
	Silver (Ag)-Total (mg/L)	0.000029				
	Sodium (Na)-Total (mg/L)	59.2				
	Strontium (Sr)-Total (mg/L)	0.441				
	Sulfur (S)-Total (mg/L)	18.5				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	0.00052				
	Titanium (Ti)-Total (mg/L)	0.00823				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	0.000281				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0581				
	Zirconium (Zr)-Total (mg/L)	0.000668				
Aggregate Organics	Biochemical Oxygen Demand (mg/L)	66				
	BOD Carbonaceous (mg/L)	66				
	Oil and Grease (mg/L)	23.1				
	Phenols (4AAP) (mg/L)	0.0059				
Volatile Organic Compounds	Benzene (mg/L)	<0.00050				
	Ethyl benzene (mg/L)	<0.00050				
	Toluene (mg/L)	<0.0010				
	o-Xylene (mg/L)	<0.00050				
	m+p-Xylenes (mg/L)	<0.00040				
	Xylenes (Total) (mg/L)	<0.00064				
	F1 (C6-C10) (mg/L)	<0.10				
	F1-BTEX (mg/L)	<0.10				
	F2-Naphth (mg/L)	0.22				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2092694-1 WASTE 09-MAY-18 14:00 RANKIN INLET WWTP - EFFLUENT				
Grouping	Analyte					
WATER						
Volatile Organic Compounds	F3-PAH (mg/L)	5.45				
	Total Hydrocarbons (C6-C50) (mg/L)	7.94				
	Surrogate: 4-Bromofluorobenzene (SS) (%)	94.0				
Hydrocarbons	F2 (C10-C16) (mg/L)	0.22				
	F3 (C16-C34) (mg/L)	5.45				
	F4 (C34-C50) (mg/L)	2.27				
	Surrogate: 2-Bromobenzotrifluoride (%)	101.5				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000020				
	Acenaphthylene (mg/L)	<0.000020				
	Acridine (mg/L)	<0.000020				
	Anthracene (mg/L)	<0.000010				
	Benzo(a)anthracene (mg/L)	<0.000010				
	Benzo(a)pyrene (mg/L)	<0.0000050				
	Benzo(b&j)fluoranthene (mg/L)	<0.000010				
	Benzo(g,h,i)perylene (mg/L)	<0.000020				
	Benzo(k)fluoranthene (mg/L)	<0.000010				
	Chrysene (mg/L)	<0.000020				
	Dibenzo(a,h)anthracene (mg/L)	<0.0000050				
	Fluoranthene (mg/L)	<0.000020				
	Fluorene (mg/L)	<0.000020				
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.00020 ^{DLCL}				
	1-Methyl Naphthalene (mg/L)	<0.000020				
	2-Methyl Naphthalene (mg/L)	<0.000020				
	Naphthalene (mg/L)	<0.000050				
	Phenanthrene (mg/L)	<0.000050				
	Pyrene (mg/L)	<0.000010				
	Quinoline (mg/L)	<0.000020				
	Surrogate: Acenaphthene d10 (%)	99.9				
	Surrogate: Acridine d9 (%)	97.4				
	Surrogate: Chrysene d12 (%)	108.3				
	Surrogate: Naphthalene d8 (%)	96.4				
	Surrogate: Phenanthrene d10 (%)	99.2				
	B(a)P Total Potency Equivalent (mg/L)	<0.000030				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Chloride (Cl)	MS-B	L2092694-1
Matrix Spike	Antimony (Sb)-Total	MS-B	L2092694-1
Matrix Spike	Arsenic (As)-Total	MS-B	L2092694-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2092694-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2092694-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2092694-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2092694-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2092694-1
Matrix Spike	Potassium (K)-Total	MS-B	L2092694-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2092694-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2092694-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2092694-1

Qualifiers for Individual Parameters Listed:

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).
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-OH-OH-CALC-WP	Water	Alkalinity, Hydroxide	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.			
ALK-TITR-WP	Water	Alkalinity, Total (as CaCO3)	APHA 2320B
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO3- and H2CO3 endpoints indicated electrometrically.			
BOD-CBOD-WP	Water	Carbonaceous BOD	APHA 5210 B
Samples are diluted and seeded, have TCMP added to inhibit nitrogenous demands, and then are incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.			
BOD-WP	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B
Samples are diluted and seeded and then incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.			
BTEXS+F1-HSMS-WP	Water	BTX plus F1 by GCMS	EPA 8260C / EPA 5021A
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			

Reference Information

F-IC-N-WP	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.			
In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.			
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.			
In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.			
Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:			
1. All extraction and analysis holding times were met.			
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.			
3. Linearity of gasoline response within 15% throughout the calibration range.			
Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:			
1. All extraction and analysis holding times were met.			
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.			
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.			
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.			
F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511
Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.			
HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-T-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-L-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorous is determined colourimetrically after persulphate digestion of the sample.			
PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA SW 846/8270-GC/MS
Water is spiked with a surrogate spike mix and extracted using solvent extraction techniques. Analysis is performed by GC/MS in the selected ion monitoring (SIM) mode.			

Reference Information

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

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

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

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

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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

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

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

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

Quality Control Report

Workorder: L2092694

Report Date: 25-MAY-18

Page 2 of 11

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP								
Water								
Batch	R4044752							
WG2773334-3	DUP	L2092694-1						
Total Organic Carbon		53.1	51.9		mg/L	2.2	20	15-MAY-18
WG2773334-2	LCS							
Total Organic Carbon			92.2		%		80-120	15-MAY-18
WG2773334-1	MB							
Total Organic Carbon			<0.50		mg/L		0.5	15-MAY-18
CL-IC-N-WP								
Water								
Batch	R4042612							
WG2770251-3	DUP	L2092694-1						
Chloride (Cl)		115	117		mg/L	1.0	20	11-MAY-18
WG2770251-2	LCS							
Chloride (Cl)			99.1		%		90-110	11-MAY-18
WG2770251-1	MB							
Chloride (Cl)			<0.50		mg/L		0.5	11-MAY-18
WG2770251-4	MS	L2092694-1						
Chloride (Cl)			N/A	MS-B	%		-	11-MAY-18
EC-WP								
Water								
Batch	R4041767							
WG2770387-18	LCS							
Conductivity			97.7		%		90-110	11-MAY-18
WG2770387-16	MB							
Conductivity			<1.0		umhos/cm		1	11-MAY-18
F-IC-N-WP								
Water								
Batch	R4042612							
WG2770251-3	DUP	L2092694-1						
Fluoride (F)		0.273	0.280		mg/L	2.8	20	11-MAY-18
WG2770251-2	LCS							
Fluoride (F)			98.3		%		90-110	11-MAY-18
WG2770251-1	MB							
Fluoride (F)			<0.020		mg/L		0.02	11-MAY-18
WG2770251-4	MS	L2092694-1						
Fluoride (F)			102.6		%		75-125	11-MAY-18
F2-F4-FID-WP								
Water								
Batch	R4039869							
WG2770224-2	LCS							
F2 (C10-C16)			97.2		%		70-130	11-MAY-18
F3 (C16-C34)			89.4		%		70-130	11-MAY-18

Quality Control Report

Workorder: L2092694

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-FID-WP								
Water								
Batch	R4039869							
WG2770224-2	LCS							
F4 (C34-C50)			101.3		%		70-130	11-MAY-18
WG2770224-1	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	11-MAY-18
F3 (C16-C34)			<0.25		mg/L		0.25	11-MAY-18
F4 (C34-C50)			<0.25		mg/L		0.25	11-MAY-18
Surrogate: 2-Bromobenzotrifluoride			93.6		%		60-140	11-MAY-18
HG-T-CVAF-WP								
Water								
Batch	R4043937							
WG2772404-2	LCS							
Mercury (Hg)-Total			110.0		%		80-120	14-MAY-18
WG2772404-1	MB							
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	14-MAY-18
MET-T-CCMS-WP								
Water								
Batch	R4043770							
WG2771522-2	LCS							
Aluminum (Al)-Total			99.2		%		80-120	14-MAY-18
Antimony (Sb)-Total			107.5		%		80-120	14-MAY-18
Arsenic (As)-Total			97.4		%		80-120	14-MAY-18
Barium (Ba)-Total			94.9		%		80-120	14-MAY-18
Beryllium (Be)-Total			107.4		%		80-120	14-MAY-18
Bismuth (Bi)-Total			110.3		%		80-120	14-MAY-18
Boron (B)-Total			103.6		%		80-120	14-MAY-18
Cadmium (Cd)-Total			96.8		%		80-120	14-MAY-18
Calcium (Ca)-Total			95.0		%		80-120	14-MAY-18
Cesium (Cs)-Total			100.6		%		80-120	14-MAY-18
Chromium (Cr)-Total			95.0		%		80-120	14-MAY-18
Cobalt (Co)-Total			94.2		%		80-120	14-MAY-18
Copper (Cu)-Total			97.0		%		80-120	14-MAY-18
Iron (Fe)-Total			94.3		%		80-120	14-MAY-18
Lead (Pb)-Total			111.1		%		80-120	14-MAY-18
Lithium (Li)-Total			102.5		%		80-120	14-MAY-18
Magnesium (Mg)-Total			99.8		%		80-120	14-MAY-18
Manganese (Mn)-Total			94.6		%		80-120	14-MAY-18
Molybdenum (Mo)-Total			99.7		%		80-120	14-MAY-18
Nickel (Ni)-Total			96.6		%		80-120	14-MAY-18

Quality Control Report

Workorder: L2092694

Report Date: 25-MAY-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4043770							
WG2771522-2	LCS							
Potassium (K)-Total			96.9		%		80-120	14-MAY-18
Phosphorus (P)-Total			96.3		%		80-120	14-MAY-18
Rubidium (Rb)-Total			94.6		%		80-120	14-MAY-18
Selenium (Se)-Total			98.7		%		80-120	14-MAY-18
Silicon (Si)-Total			92.0		%		80-120	14-MAY-18
Silver (Ag)-Total			103.7		%		80-120	14-MAY-18
Sodium (Na)-Total			99.2		%		80-120	14-MAY-18
Strontium (Sr)-Total			105.9		%		80-120	14-MAY-18
Sulfur (S)-Total			98.5		%		80-120	14-MAY-18
Tellurium (Te)-Total			106.0		%		80-120	14-MAY-18
Thallium (Tl)-Total			109.2		%		80-120	14-MAY-18
Thorium (Th)-Total			109.4		%		80-120	14-MAY-18
Tin (Sn)-Total			100.2		%		80-120	14-MAY-18
Titanium (Ti)-Total			98.1		%		80-120	14-MAY-18
Tungsten (W)-Total			111.5		%		80-120	14-MAY-18
Uranium (U)-Total			104.9		%		80-120	14-MAY-18
Vanadium (V)-Total			94.5		%		80-120	14-MAY-18
Zinc (Zn)-Total			94.4		%		80-120	14-MAY-18
Zirconium (Zr)-Total			106.9		%		80-120	14-MAY-18
WG2771522-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	14-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	14-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	14-MAY-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	14-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	14-MAY-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	14-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	14-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	14-MAY-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4043770							
WG2771522-1		MB						
Lead (Pb)-Total			<0.000050		mg/L		0.00005	14-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	14-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	14-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	14-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	14-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	14-MAY-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	14-MAY-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	14-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	14-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	14-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	14-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	14-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	14-MAY-18
Sulfur (S)-Total			<0.50		mg/L		0.5	14-MAY-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	14-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	14-MAY-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	14-MAY-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	14-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	14-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	14-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	14-MAY-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	14-MAY-18
NH3-COL-WP		Water						
Batch	R4041396							
WG2771065-6		LCS						
Ammonia, Total (as N)			102.1		%		85-115	11-MAY-18
WG2771065-5		MB						
Ammonia, Total (as N)			<0.010		mg/L		0.01	11-MAY-18
NO2-IC-N-WP		Water						

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-IC-N-WP								
Batch R4042612								
WG2770251-3	DUP	L2092694-1						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	11-MAY-18
WG2770251-2	LCS							
Nitrite (as N)			101.4		%		90-110	11-MAY-18
WG2770251-1	MB							
Nitrite (as N)			<0.010		mg/L		0.01	11-MAY-18
WG2770251-4	MS	L2092694-1						
Nitrite (as N)			120.4		%		75-125	11-MAY-18
NO3-IC-N-WP								
Batch R4042612								
WG2770251-3	DUP	L2092694-1						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	11-MAY-18
WG2770251-2	LCS							
Nitrate (as N)			99.6		%		90-110	11-MAY-18
WG2770251-1	MB							
Nitrate (as N)			<0.020		mg/L		0.02	11-MAY-18
WG2770251-4	MS	L2092694-1						
Nitrate (as N)			95.4		%		75-125	11-MAY-18
OG-GRAV-WP								
Batch R4046883								
WG2772997-2	LCS							
Oil and Grease			97.1		%		70-130	17-MAY-18
WG2772997-1	MB							
Oil and Grease			<5.0		mg/L		5	17-MAY-18
P-T-L-COL-WP								
Batch R4043822								
WG2771513-10	LCS							
Phosphorus (P)-Total			102.0		%		80-120	14-MAY-18
WG2771513-9	MB							
Phosphorus (P)-Total			<0.0010		mg/L		0.001	14-MAY-18
PAH,PANH-WP								
Batch R4055723								
WG2771990-2	LCS							
1-Methyl Naphthalene			91.4		%		60-130	14-MAY-18
2-Methyl Naphthalene			116.6		%		60-130	14-MAY-18
Acenaphthene			119.1		%		60-130	14-MAY-18
Acenaphthylene			118.8		%		60-130	14-MAY-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4055723							
WG2771990-2	LCS							
Anthracene			109.5		%		60-130	14-MAY-18
Acridine			114.1		%		60-130	14-MAY-18
Benzo(a)anthracene			116.7		%		60-130	14-MAY-18
Benzo(a)pyrene			107.3		%		60-130	14-MAY-18
Benzo(b&j)fluoranthene			109.7		%		60-130	14-MAY-18
Benzo(g,h,i)perylene			112.9		%		60-130	14-MAY-18
Benzo(k)fluoranthene			111.9		%		60-130	14-MAY-18
Chrysene			129.1		%		60-130	14-MAY-18
Dibenzo(a,h)anthracene			119.6		%		60-130	14-MAY-18
Fluoranthene			124.0		%		60-130	14-MAY-18
Fluorene			117.8		%		60-130	14-MAY-18
Indeno(1,2,3-cd)pyrene			111.6		%		60-130	14-MAY-18
Naphthalene			114.0		%		50-130	14-MAY-18
Phenanthrene			121.3		%		60-130	14-MAY-18
Pyrene			126.6		%		60-130	14-MAY-18
Quinoline			118.0		%		60-130	14-MAY-18
WG2771990-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	14-MAY-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	14-MAY-18
Acenaphthene			<0.000020		mg/L		0.00002	14-MAY-18
Acenaphthylene			<0.000020		mg/L		0.00002	14-MAY-18
Anthracene			<0.000010		mg/L		0.00001	14-MAY-18
Acridine			<0.000020		mg/L		0.00002	14-MAY-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	14-MAY-18
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	14-MAY-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	14-MAY-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	14-MAY-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	14-MAY-18
Chrysene			<0.000020		mg/L		0.00002	14-MAY-18
Dibenzo(a,h)anthracene			<0.0000050		mg/L		0.000005	14-MAY-18
Fluoranthene			<0.000020		mg/L		0.00002	14-MAY-18
Fluorene			<0.000020		mg/L		0.00002	14-MAY-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	14-MAY-18
Naphthalene			<0.000050		mg/L		0.00005	14-MAY-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TC,EC-QT97-WP	Water							
Batch	R4040769							
WG2769666-2	DUP	L2092694-1						
Total Coliforms		>2420	>2420		MPN/100mL	0.0	65	10-MAY-18
Escherichia Coli		>2420	>2420		MPN/100mL	0.0	65	10-MAY-18
WG2769666-1	MB							
Total Coliforms			<1		MPN/100mL		1	10-MAY-18
Escherichia Coli			<1		MPN/100mL		1	10-MAY-18

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Legend:

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

Sample Parameter Qualifier Definitions:

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

Quality Control Report

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	09-MAY-18 14:00	11-MAY-18 12:00	0.25	46	hours	EHTR-FM

Legend & Qualifier Definitions:

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

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2092694 were received on 10-MAY-18 15:30.

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.

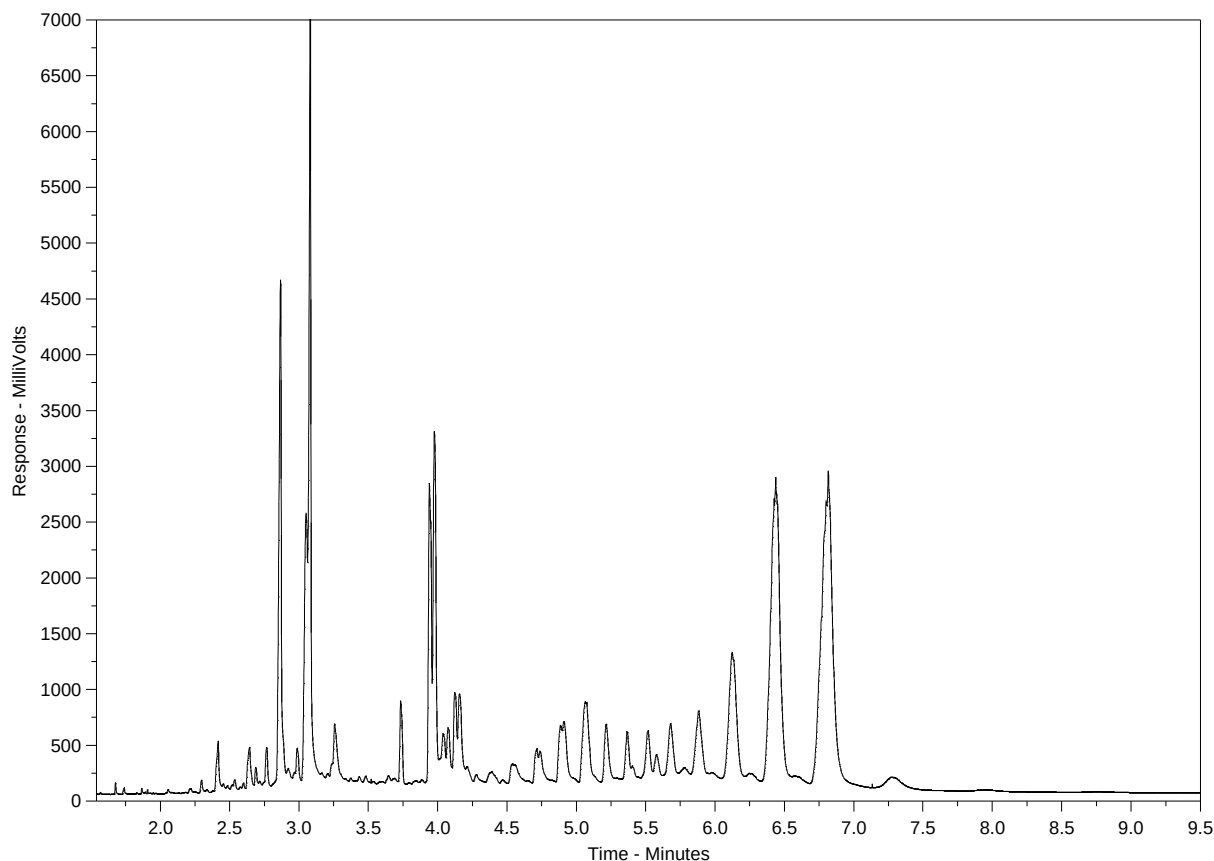
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2092694-1
 Client Sample ID: RANKIN INLET WWTP - EFFLUENT



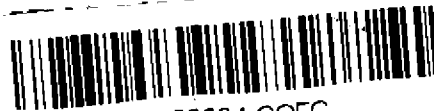
← F2 →		F3		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →					

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

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

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

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



Request Form
38 9878

COC #

Page of

L2092694-COFC

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) ☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT ☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT ☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT													
Contact:	SIMON DOIRON					☒ PDF ☐ Excel ☐ Digital ☐ Fax													
Address: Box 490		Email 1: sdoiron@gov.nu.ca																	
Rankin Inlet , NU, X0C 0G0		Email 2: mlusty@gov.nu.ca																	
Phone: 867-645-8155 Cell#: _____		Email 3: _____																	
Invoice To Same as Report? Yes ☒ No ☐ Hardcopy of Invoice with Report? Yes ☐ No ☐						Client / Project Information Job #: Rankin Inlet WWTP- Monthly Effluent PO / AFE: LSD: Quote #:						Please indicate below Filtered, Preserved or both (F, P, F/P)							
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	FIC-N-WP	TC.EC-QT97-WP						Number of Containers
#	(This description will appear on the report)																		
	Rankin Inlet WWTP - Effluent					May 9/18	14:00	Waste	x	x	x	x	x					15	
**NOTE TO LOGIN - remove metals Reporting Code WP-NUNAVUT-WWW-GRP1																			
So all ICP-MS metals report.																			
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details																			
Nunavut-WWW-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: Matt CGS Rankin - Hwywy	Date (dd-mm-yy): 09/05/18	Time (hh-mm): 14:00	Received by: hnl	Date: 10/05/18	Time: 3:30	Temperature: 8.8 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF									



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

Date Received: 27-JUN-18
Report Date: 20-JUL-18 11:16 (MT)
Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2119669

Project P.O. #: NOT SUBMITTED

Job Reference: RANKIN INLET WWTP - MONTHLY EFFLUENT

C of C Numbers:

Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

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

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

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2119669-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 25-JUN-18 @ 14:00							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		29-JUN-18	R4103966
Toluene	0.0026		0.0010	mg/L		29-JUN-18	R4103966
Ethyl benzene	<0.00050		0.00050	mg/L		29-JUN-18	R4103966
o-Xylene	<0.00050		0.00050	mg/L		29-JUN-18	R4103966
m+p-Xylenes	0.00058		0.00040	mg/L		29-JUN-18	R4103966
F1 (C6-C10)	0.14		0.10	mg/L		29-JUN-18	R4103966
Surrogate: 4-Bromofluorobenzene (SS)	91.0		70-130	%		29-JUN-18	R4103966
CCME PHC F2-F4 in Water							
F2 (C10-C16)	2.35		0.10	mg/L	28-JUN-18	30-JUN-18	R4106588
F3 (C16-C34)	42.5		0.25	mg/L	28-JUN-18	30-JUN-18	R4106588
F4 (C34-C50)	8.41		0.25	mg/L	28-JUN-18	30-JUN-18	R4106588
Surrogate: 2-Bromobenzotrifluoride	94.9		60-140	%	28-JUN-18	30-JUN-18	R4106588
CCME Total Hydrocarbons							
F1-BTEX	0.13		0.10	mg/L		04-JUL-18	
F2-Naphth	2.35		0.10	mg/L		04-JUL-18	
F3-PAH	42.5		0.25	mg/L		04-JUL-18	
Total Hydrocarbons (C6-C50)	53.4		0.38	mg/L		04-JUL-18	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		04-JUL-18	
Miscellaneous Parameters							
Fluoride (F)	0.020		0.020	mg/L		27-JUN-18	R4099848
Total and E. coli, 1:10 dilution by QT97							
Total Coliforms	>24200	PEHR	10	MPN/100mL		27-JUN-18	R4102997
Escherichia Coli	>24200	PEHR	10	MPN/100mL		27-JUN-18	R4102997
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000127		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
2-Methyl Naphthalene	0.000146		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
Acenaphthene	0.000048		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
Acenaphthylene	<0.000020		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
Anthracene	0.000064		0.000010	mg/L	27-JUN-18	29-JUN-18	R4111208
Acridine	<0.000020		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
Benzo(a)anthracene	0.000069		0.000010	mg/L	27-JUN-18	29-JUN-18	R4111208
Benzo(a)pyrene	0.000393		0.0000050	mg/L	27-JUN-18	29-JUN-18	R4111208
Benzo(b&j)fluoranthene	0.000031		0.000010	mg/L	27-JUN-18	29-JUN-18	R4111208
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	27-JUN-18	29-JUN-18	R4111208
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	27-JUN-18	29-JUN-18	R4111208
Chrysene	0.000076		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
Dibenzo(a,h)anthracene	<0.00010	DLM	0.00010	mg/L	27-JUN-18	29-JUN-18	R4111208
Fluoranthene	0.000211		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
Fluorene	0.000312	EMPC	0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
Indeno(1,2,3-cd)pyrene	<0.00010	DLM	0.00010	mg/L	27-JUN-18	29-JUN-18	R4111208
Naphthalene	0.000134		0.000050	mg/L	27-JUN-18	29-JUN-18	R4111208
Phenanthrene	0.000320		0.000050	mg/L	27-JUN-18	29-JUN-18	R4111208
Pyrene	0.000189		0.000010	mg/L	27-JUN-18	29-JUN-18	R4111208
Quinoline	0.000033		0.000020	mg/L	27-JUN-18	29-JUN-18	R4111208
B(a)P Total Potency Equivalent	0.000460		0.000060	mg/L	27-JUN-18	29-JUN-18	R4111208
Surrogate: Acenaphthene d10	98.2		40-130	%	27-JUN-18	29-JUN-18	R4111208
Surrogate: Acridine d9	126.2		40-130	%	27-JUN-18	29-JUN-18	R4111208
Surrogate: Chrysene d12	125.3		40-130	%	27-JUN-18	29-JUN-18	R4111208
Surrogate: Naphthalene d8	116.6		40-130	%	27-JUN-18	29-JUN-18	R4111208
Surrogate: Phenanthrene d10	121.1		40-130	%	27-JUN-18	29-JUN-18	R4111208

* 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
L2119669-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 25-JUN-18 @ 14:00							
Matrix: WASTE							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	198		1.2	mg/L		29-JUN-18	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		29-JUN-18	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		29-JUN-18	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	162		1.0	mg/L		28-JUN-18	R4102647
Ammonia by colour							
Ammonia, Total (as N)	74		10	mg/L		28-JUN-18	R4103227
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	211		50	mg/L		27-JUN-18	R4112404
Carbonaceous BOD							
BOD Carbonaceous	167		50	mg/L		27-JUN-18	R4112404
Chloride in Water by IC							
Chloride (Cl)	52.6		0.50	mg/L		27-JUN-18	R4099848
Conductivity							
Conductivity	574		1.0	umhos/cm		28-JUN-18	R4102647
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	>24200	PEHR	10	MPN/100mL		27-JUN-18	R4102990
Hardness Calculated							
Hardness (as CaCO3)	102	HTC	0.20	mg/L		04-JUL-18	
Mercury Total							
Mercury (Hg)-Total	0.000057		0.000050	mg/L	28-JUN-18	29-JUN-18	R4105452
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		27-JUN-18	R4099848
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		29-JUN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		27-JUN-18	R4099848
Oil & Grease - Gravimetric							
Oil and Grease	79.3		5.0	mg/L		06-JUL-18	R4113500
Phenol (4AAP)							
Phenols (4AAP)	0.138	DLM	0.010	mg/L		04-JUL-18	R4113493
Phosphorus, Total							
Phosphorus (P)-Total	11.1		0.020	mg/L		06-JUL-18	R4116554
Sulfate in Water by IC							
Sulfate (SO4)	21.8		0.30	mg/L		27-JUN-18	R4099848
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.721		0.0030	mg/L	03-JUL-18	03-JUL-18	R4110907
Antimony (Sb)-Total	0.00077		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Arsenic (As)-Total	0.00190		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Barium (Ba)-Total	0.0370		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Bismuth (Bi)-Total	0.00556		0.000050	mg/L	03-JUL-18	03-JUL-18	R4110907
Boron (B)-Total	0.114		0.010	mg/L	03-JUL-18	03-JUL-18	R4110907
Cadmium (Cd)-Total	0.000425		0.0000050	mg/L	03-JUL-18	03-JUL-18	R4110907
Calcium (Ca)-Total	29.1		0.050	mg/L	03-JUL-18	03-JUL-18	R4110907
Cesium (Cs)-Total	0.000152		0.000010	mg/L	03-JUL-18	03-JUL-18	R4110907
Chromium (Cr)-Total	0.00503		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Cobalt (Co)-Total	0.00120		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Copper (Cu)-Total	0.283		0.00050	mg/L	03-JUL-18	03-JUL-18	R4110907

* 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
L2119669-1 RANKIN INLET WWTP - EFFLUENT Sampled By: CLIENT on 25-JUN-18 @ 14:00 Matrix: WASTE							
Total Metals in Water by CRC ICPMS							
Iron (Fe)-Total	1.20		0.010	mg/L	03-JUL-18	03-JUL-18	R4110907
Lead (Pb)-Total	0.00323		0.000050	mg/L	03-JUL-18	03-JUL-18	R4110907
Lithium (Li)-Total	0.0045		0.0010	mg/L	03-JUL-18	03-JUL-18	R4110907
Magnesium (Mg)-Total	7.25		0.0050	mg/L	03-JUL-18	03-JUL-18	R4110907
Manganese (Mn)-Total	0.0792		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Molybdenum (Mo)-Total	0.00317		0.000050	mg/L	03-JUL-18	03-JUL-18	R4110907
Nickel (Ni)-Total	0.0140		0.00050	mg/L	03-JUL-18	03-JUL-18	R4110907
Potassium (K)-Total	28.2		0.050	mg/L	03-JUL-18	03-JUL-18	R4110907
Phosphorus (P)-Total	11.8		0.050	mg/L	03-JUL-18	03-JUL-18	R4110907
Rubidium (Rb)-Total	0.0274		0.00020	mg/L	03-JUL-18	03-JUL-18	R4110907
Selenium (Se)-Total	0.000867		0.000050	mg/L	03-JUL-18	03-JUL-18	R4110907
Silicon (Si)-Total	1.40		0.10	mg/L	03-JUL-18	03-JUL-18	R4110907
Silver (Ag)-Total	0.000081		0.000010	mg/L	03-JUL-18	03-JUL-18	R4110907
Sodium (Na)-Total	45.7		0.050	mg/L	03-JUL-18	03-JUL-18	R4110907
Strontium (Sr)-Total	0.105		0.00020	mg/L	03-JUL-18	03-JUL-18	R4110907
Sulfur (S)-Total	15.2		0.50	mg/L	03-JUL-18	03-JUL-18	R4110907
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	03-JUL-18	03-JUL-18	R4110907
Thallium (Tl)-Total	0.000014		0.000010	mg/L	03-JUL-18	03-JUL-18	R4110907
Thorium (Th)-Total	<0.00010		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Tin (Sn)-Total	0.00161		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Titanium (Ti)-Total	0.0522		0.00030	mg/L	03-JUL-18	03-JUL-18	R4110907
Tungsten (W)-Total	<0.00010		0.00010	mg/L	03-JUL-18	03-JUL-18	R4110907
Uranium (U)-Total	0.000399		0.000010	mg/L	03-JUL-18	03-JUL-18	R4110907
Vanadium (V)-Total	0.00162		0.00050	mg/L	03-JUL-18	03-JUL-18	R4110907
Zinc (Zn)-Total	0.250		0.0030	mg/L	03-JUL-18	03-JUL-18	R4110907
Zirconium (Zr)-Total	0.00121		0.000060	mg/L	03-JUL-18	03-JUL-18	R4110907
Total Organic Carbon by Combustion							
Total Organic Carbon	210		5.0	mg/L		19-JUL-18	R4133797
Total Suspended Solids							
Total Suspended Solids	416		6.0	mg/L		29-JUN-18	R4110554
pH							
pH	7.01		0.10	pH units		28-JUN-18	R4102647

* 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).
DUPM	MPN duplicate results were outside default ALS Data Quality Objective, but within 95% confidence interval for MPN reference method. Sample results are reliable.
EMPC	Estimated Maximum Possible Concentration. Parameter detected but didn't meet all criteria for positive identification.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

Test Method References:

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC. In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons. In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1. In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3. Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range: 1. All extraction and analysis holding times were met. 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene. 3. Linearity of gasoline response within 15% throughout the calibration range. Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges: 1. All extraction and analysis holding times were met. 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average. 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors. 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.			
F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511
Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.			
FC10-QT97-WP	Water	Fecal coliforms, 1:10 dilution by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Fecal (thermotolerant) coliform bacteria are determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 44.5 – 0.2°C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.			
HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-T-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-L-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorous is determined colourimetrically after persulphate digestion of the sample.			
PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA SW 846/8270-GC/MS

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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.			
SO4-IC-N-WP	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended solids in aqueous matrices is determined gravimetrically after drying the residue at 103 ± 105°C.			
TC,EC10-QT97-WP	Water	Total and E. coli, 1:10 dilution by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Total coliforms and Eschericia coli bacteria are simultaneously determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 35.0 ± 0.5°C for 18 or 24 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.			
XYLENES-SUM-CALC-WP	Water	Sum of Xylene Isomer Concentrations	CALCULATED RESULT
Total xylenes represents the sum of o-xylene and m&p-xylene.			

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

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

Quality Control Report

Workorder: L2119669

Report Date: 20-JUL-18

Page 1 of 10

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	R4102647							
WG2810326-5 DUP		L2119669-1						
Alkalinity, Total (as CaCO3)		162	160		mg/L	1.3	20	28-JUN-18
WG2810326-4 LCS								
Alkalinity, Total (as CaCO3)			102.8		%		85-115	28-JUN-18
WG2810326-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-JUN-18
BOD-CBOD-WP								
Water								
Batch	R4112404							
WG2807971-12 LCS								
BOD Carbonaceous			91.6		%		85-115	27-JUN-18
WG2807971-11 MB								
BOD Carbonaceous			<2.0		mg/L		2	27-JUN-18
BOD-WP								
Water								
Batch	R4112404							
WG2807971-12 LCS								
Biochemical Oxygen Demand			97.3		%		85-115	27-JUN-18
WG2807971-11 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	27-JUN-18
BTEXS+F1-HSMS-WP								
Water								
Batch	R4103966							
WG2810463-2 LCS								
Benzene			99.6		%		70-130	28-JUN-18
Toluene			104.5		%		70-130	28-JUN-18
Ethyl benzene			106.3		%		70-130	28-JUN-18
o-Xylene			108.0		%		70-130	28-JUN-18
m+p-Xylenes			109.0		%		70-130	28-JUN-18
WG2810463-3 LCS								
F1 (C6-C10)			97.4		%		70-130	28-JUN-18
WG2810463-1 MB								
Benzene			<0.00050		mg/L		0.0005	28-JUN-18
Toluene			<0.0010		mg/L		0.001	28-JUN-18
Ethyl benzene			<0.00050		mg/L		0.0005	28-JUN-18
o-Xylene			<0.00030		mg/L		0.0003	28-JUN-18
m+p-Xylenes			<0.00040		mg/L		0.0004	28-JUN-18
F1 (C6-C10)			<0.10		mg/L		0.1	28-JUN-18
Surrogate: 4-Bromofluorobenzene (SS)			90.0		%		70-130	28-JUN-18
C-TOC-HTC-WP								
Water								

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	Water							
Batch	R4133797							
WG2827884-2 LCS								
Total Organic Carbon			97.4		%		80-120	19-JUL-18
WG2827884-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	19-JUL-18
CL-IC-N-WP	Water							
Batch	R4099848							
WG2808196-14 LCS								
Chloride (Cl)			103.6		%		90-110	27-JUN-18
WG2808196-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	27-JUN-18
EC-WP	Water							
Batch	R4102647							
WG2810326-5 DUP		L2119669-1						
Conductivity		574	568		umhos/cm	1.1	10	28-JUN-18
WG2810326-3 LCS								
Conductivity			97.8		%		90-110	28-JUN-18
WG2810326-1 MB								
Conductivity			<1.0		umhos/cm		1	28-JUN-18
F-IC-N-WP	Water							
Batch	R4099848							
WG2808196-14 LCS								
Fluoride (F)			104.3		%		90-110	27-JUN-18
WG2808196-13 MB								
Fluoride (F)			<0.020		mg/L		0.02	27-JUN-18
F2-F4-FID-WP	Water							
Batch	R4106588							
WG2809679-2 LCS								
F2 (C10-C16)			103		%		70-130	30-JUN-18
F3 (C16-C34)			104		%		70-130	30-JUN-18
F4 (C34-C50)			109		%		70-130	30-JUN-18
WG2809679-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	30-JUN-18
F3 (C16-C34)			<0.25		mg/L		0.25	30-JUN-18
F4 (C34-C50)			<0.25		mg/L		0.25	30-JUN-18
Surrogate: 2-Bromobenzotrifluoride			82.7		%		60-140	30-JUN-18
FC10-QT97-WP	Water							

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC10-QT97-WP	Water							
Batch R4102990								
WG2808658-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	27-JUN-18
HG-T-CVAF-WP	Water							
Batch R4105452								
WG2811088-2 LCS								
Mercury (Hg)-Total			90.8		%		80-120	29-JUN-18
WG2811088-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	29-JUN-18
MET-T-CCMS-WP	Water							
Batch R4110907								
WG2812526-2 LCS								
Aluminum (Al)-Total			103.0		%		80-120	03-JUL-18
Antimony (Sb)-Total			105.1		%		80-120	03-JUL-18
Arsenic (As)-Total			99.7		%		80-120	03-JUL-18
Barium (Ba)-Total			101.1		%		80-120	03-JUL-18
Beryllium (Be)-Total			109.8		%		80-120	03-JUL-18
Bismuth (Bi)-Total			102.2		%		80-120	03-JUL-18
Boron (B)-Total			102.1		%		80-120	03-JUL-18
Cadmium (Cd)-Total			96.6		%		80-120	03-JUL-18
Calcium (Ca)-Total			102.4		%		80-120	03-JUL-18
Cesium (Cs)-Total			104.1		%		80-120	03-JUL-18
Chromium (Cr)-Total			99.4		%		80-120	03-JUL-18
Cobalt (Co)-Total			97.0		%		80-120	03-JUL-18
Copper (Cu)-Total			97.1		%		80-120	03-JUL-18
Iron (Fe)-Total			96.0		%		80-120	03-JUL-18
Lead (Pb)-Total			105.4		%		80-120	03-JUL-18
Lithium (Li)-Total			109.9		%		80-120	03-JUL-18
Magnesium (Mg)-Total			102.1		%		80-120	03-JUL-18
Manganese (Mn)-Total			99.2		%		80-120	03-JUL-18
Molybdenum (Mo)-Total			101.5		%		80-120	03-JUL-18
Nickel (Ni)-Total			98.6		%		80-120	03-JUL-18
Potassium (K)-Total			102.6		%		80-120	03-JUL-18
Phosphorus (P)-Total			114.2		%		80-120	03-JUL-18
Rubidium (Rb)-Total			103.6		%		80-120	03-JUL-18
Selenium (Se)-Total			96.7		%		80-120	03-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4110907							
WG2812526-2	LCS							
Silicon (Si)-Total			102.1		%		80-120	03-JUL-18
Silver (Ag)-Total			105.5		%		80-120	03-JUL-18
Sodium (Na)-Total			103.9		%		80-120	03-JUL-18
Strontium (Sr)-Total			97.1		%		80-120	03-JUL-18
Sulfur (S)-Total			100.9		%		80-120	03-JUL-18
Tellurium (Te)-Total			101.5		%		80-120	03-JUL-18
Thallium (Tl)-Total			102.9		%		80-120	03-JUL-18
Thorium (Th)-Total			96.7		%		80-120	03-JUL-18
Tin (Sn)-Total			98.0		%		80-120	03-JUL-18
Titanium (Ti)-Total			98.6		%		80-120	03-JUL-18
Tungsten (W)-Total			97.5		%		80-120	03-JUL-18
Uranium (U)-Total			108.6		%		80-120	03-JUL-18
Vanadium (V)-Total			101.1		%		80-120	03-JUL-18
Zinc (Zn)-Total			96.5		%		80-120	03-JUL-18
Zirconium (Zr)-Total			99.3		%		80-120	03-JUL-18
WG2812526-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	03-JUL-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-JUL-18
Boron (B)-Total			<0.010		mg/L		0.01	03-JUL-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	03-JUL-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-JUL-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-JUL-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	03-JUL-18
Iron (Fe)-Total			<0.010		mg/L		0.01	03-JUL-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-JUL-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-JUL-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-JUL-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	03-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP	Water							
Batch R4099848								
WG2808196-14 LCS								
Nitrate (as N)			103.1		%		90-110	27-JUN-18
WG2808196-13 MB								
Nitrate (as N)			<0.020		mg/L		0.02	27-JUN-18
OG-GRAV-WP	Water							
Batch R4113500								
WG2813946-2 LCS								
Oil and Grease			93.6		%		70-130	05-JUL-18
WG2813946-1 MB								
Oil and Grease			<5.0		mg/L		5	05-JUL-18
P-T-L-COL-WP	Water							
Batch R4116554								
WG2815494-6 LCS								
Phosphorus (P)-Total			92.9		%		80-120	06-JUL-18
WG2815494-5 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	06-JUL-18
PAH,PANH-WP	Water							
Batch R4111208								
WG2808505-2 LCS								
1-Methyl Naphthalene			91.4		%		60-130	29-JUN-18
2-Methyl Naphthalene			86.4		%		60-130	29-JUN-18
Acenaphthene			89.3		%		60-130	29-JUN-18
Acenaphthylene			85.4		%		60-130	29-JUN-18
Anthracene			92.1		%		60-130	29-JUN-18
Acridine			88.9		%		60-130	29-JUN-18
Benzo(a)anthracene			90.1		%		60-130	29-JUN-18
Benzo(a)pyrene			75.9		%		60-130	29-JUN-18
Benzo(b&j)fluoranthene			75.4		%		60-130	29-JUN-18
Benzo(g,h,i)perylene			83.7		%		60-130	29-JUN-18
Benzo(k)fluoranthene			79.9		%		60-130	29-JUN-18
Chrysene			86.0		%		60-130	29-JUN-18
Dibenzo(a,h)anthracene			93.5		%		60-130	29-JUN-18
Fluoranthene			87.8		%		60-130	29-JUN-18
Fluorene			90.6		%		60-130	29-JUN-18
Indeno(1,2,3-cd)pyrene			81.7		%		60-130	29-JUN-18
Naphthalene			93.9		%		50-130	29-JUN-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4111208							
WG2808505-2	LCS							
Phenanthrene			99.4		%		60-130	29-JUN-18
Pyrene			94.8		%		60-130	29-JUN-18
Quinoline			122.9		%		60-130	29-JUN-18
WG2808505-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	29-JUN-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	29-JUN-18
Acenaphthene			<0.000020		mg/L		0.00002	29-JUN-18
Acenaphthylene			<0.000020		mg/L		0.00002	29-JUN-18
Anthracene			<0.000010		mg/L		0.00001	29-JUN-18
Acridine			<0.000020		mg/L		0.00002	29-JUN-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	29-JUN-18
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	29-JUN-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	29-JUN-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	29-JUN-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	29-JUN-18
Chrysene			<0.000020		mg/L		0.00002	29-JUN-18
Dibenzo(a,h)anthracene			<0.000005C		mg/L		0.000005	29-JUN-18
Fluoranthene			<0.000020		mg/L		0.00002	29-JUN-18
Fluorene			<0.000020		mg/L		0.00002	29-JUN-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	29-JUN-18
Naphthalene			<0.000050		mg/L		0.00005	29-JUN-18
Phenanthrene			<0.000050		mg/L		0.00005	29-JUN-18
Pyrene			<0.000010		mg/L		0.00001	29-JUN-18
Quinoline			<0.000020		mg/L		0.00002	29-JUN-18
Surrogate: Acenaphthene d10			86.9		%		40-130	29-JUN-18
Surrogate: Acridine d9			90.2		%		40-130	29-JUN-18
Surrogate: Chrysene d12			91.4		%		40-130	29-JUN-18
Surrogate: Naphthalene d8			82.8		%		40-130	29-JUN-18
Surrogate: Phenanthrene d10			89.5		%		40-130	29-JUN-18
PH-WP		Water						
Batch	R4102647							
WG2810326-5	DUP	L2119669-1						
pH		7.01	7.01	J	pH units	0.00	0.2	28-JUN-18
WG2810326-2	LCS							
pH			7.41		pH units		7.3-7.5	28-JUN-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-WT								
Batch R4113493								
WG2813733-6	LCS							
Phenols (4AAP)			99.3		%		85-115	04-JUL-18
WG2813733-5	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	04-JUL-18
SO4-IC-N-WP								
Batch R4099848								
WG2808196-14	LCS							
Sulfate (SO4)			104.6		%		90-110	27-JUN-18
WG2808196-13	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	27-JUN-18
SOLIDS-TOTSUS-WP								
Batch R4110554								
WG2809640-22	LCS							
Total Suspended Solids			96.8		%		85-115	29-JUN-18
WG2809640-21	MB							
Total Suspended Solids			<2.0		mg/L		2	29-JUN-18
TC,EC10-QT97-WP								
Batch R4102997								
WG2808666-2	DUP	L2119669-1						
Total Coliforms		>24200	>24200		MPN/100mL	0.0	65	27-JUN-18
Escherichia Coli		>24200	>24200		MPN/100mL	0.0	65	27-JUN-18
WG2808666-1	MB							
Total Coliforms			<1		MPN/100mL		1	27-JUN-18
Escherichia Coli			<1		MPN/100mL		1	27-JUN-18

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Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.

Quality Control Report

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH	1	25-JUN-18 14:00	28-JUN-18 12:00	0.25	70	hours	EHTR-FM
Bacteriological Tests							
Fecal coliforms, 1:10 dilution by QT97	1	25-JUN-18 14:00	27-JUN-18 15:55	30	50	hours	EHTR
Total and E. coli, 1:10 dilution by QT97	1	25-JUN-18 14:00	27-JUN-18 15:55	30	50	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 L2119669 were received on 27-JUN-18 11:00.

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.

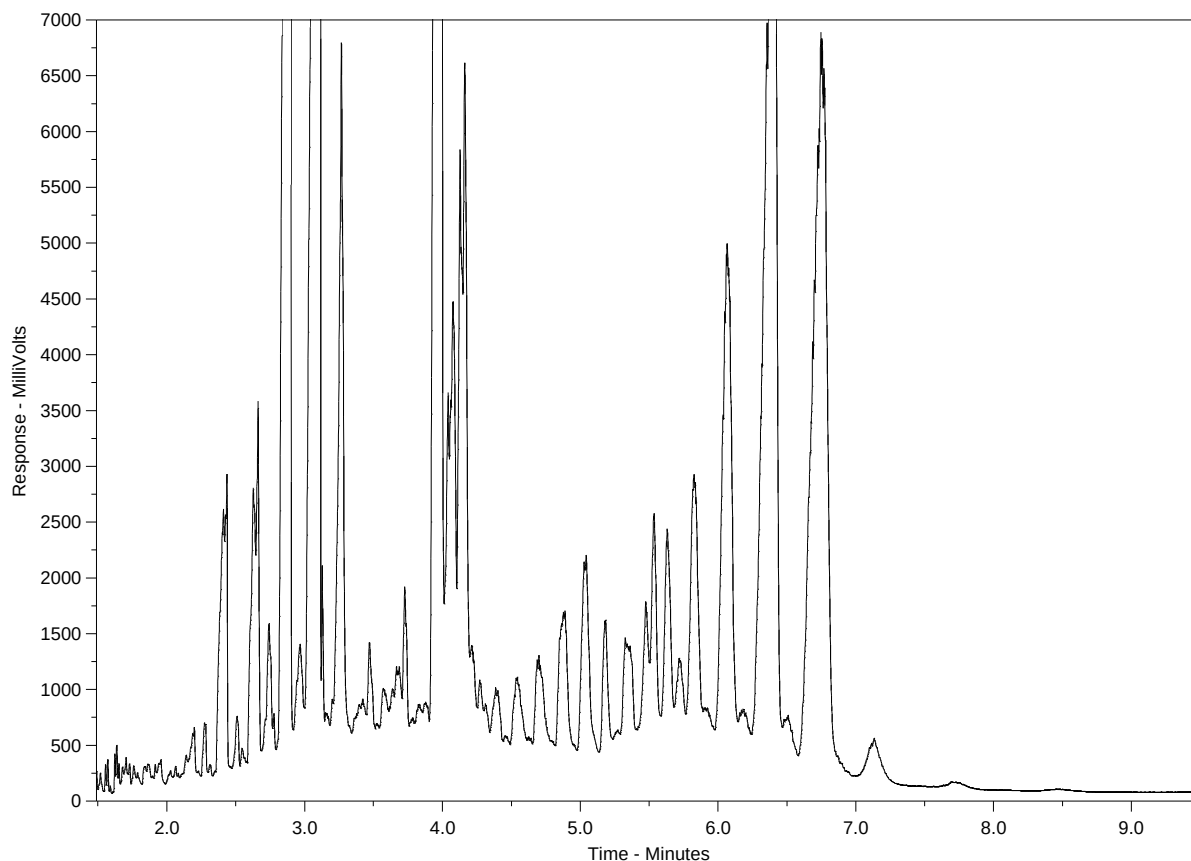
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2119669-1
 Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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

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

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

Appendix C: Daily Record of Nipissar Lake Volumes GRA-1 – 3 pages



Raw Water Supply From Nipissar Lake

Water Licence No. 3AM-GRA1624

GRA-1

Date	Volume (m ³)	Daily Volume (m ³)	Total Volume (m ³)	Total Monthly Volume (m ³)
31-Dec-17	3,022,680.95			
01-Jan-18	3,024,980.36	2,299.41	2,299.41	
02-Jan-18	3,027,204.78	2,224.42	4,523.83	
03-Jan-18	3,029,258.78	2,054.00	6,577.83	
31-Jan-18				4,278.42
16-Feb-18	3,128,843.78	99,585.00	106,162.83	
17-Feb-18	3,130,960.97	2,117.19	108,280.02	
18-Feb-18	3,133,313.73	2,352.76	110,632.78	
19-Feb-18	3,135,706.78	2,393.05	113,025.83	
20-Feb-18	3,138,069.78	2,363.00	115,388.83	
21-Feb-18				
22-Feb-18	3,145,189.78	7,120.00	122,508.83	
23-Feb-18	3,147,265.78	2,076.00	124,584.83	
24-Feb-18	3,147,410.01	144.23	124,729.06	
25-Feb-18	3,149,693.33	2,283.32	127,012.38	
26-Feb-18	3,152,103.78	2,410.45	129,422.83	
27-Feb-18	3,154,865.27	2,761.49	132,184.32	
28-Feb-18				26,021.49
01-Mar-18				
02-Mar-18	3,161,420.00	6,554.73	138,739.05	
03-Mar-18	3,163,760.00	2,340.00	141,079.05	
04-Mar-18	3,166,192.00	2,432.00	143,511.05	
05-Mar-18	3,168,788.78	2,596.78	146,107.83	
06-Mar-18	3,171,233.78	2,445.00	148,552.83	
07-Mar-18	3,173,570.78	2,337.00	150,889.83	
08-Mar-18	3,176,048.78	2,478.00	153,367.83	
09-Mar-18	3,178,465.78	2,417.00	155,784.83	
10-Mar-18	3,180,958.78	2,493.00	158,277.83	
11-Mar-18	3,183,845.78	2,887.00	161,164.83	
12-Mar-18	3,185,805.78	1,960.00	163,124.83	
13-Mar-18				
14-Mar-18	3,190,841.78	5,036.00	168,160.83	
15-Mar-18	3,193,296.51	2,454.73	170,615.56	
16-Mar-18	3,195,709.59	2,413.08	173,028.64	
17-Mar-18	3,198,190.39	2,480.80	175,509.44	
18-Mar-18	3,200,609.70	2,419.31	177,928.75	
19-Mar-18	3,203,016.12	2,406.42	180,335.17	
20-Mar-18				
21-Mar-18				
22-Mar-18	3,210,348.78	7,332.66	187,667.83	
23-Mar-18	3,212,838.78	2,490.00	190,157.83	
24-Mar-18				
25-Mar-18	3,217,758.70	4,919.92	195,077.75	
26-Mar-18				
27-Mar-18	3,222,952.78	5,194.08	200,271.83	
28-Mar-18				
29-Mar-18				
30-Mar-18				
31-Mar-18				61,532.78
01-Apr-18				
02-Apr-18				
03-Apr-18				
04-Apr-18	3,244,793.78	21,841.00	222,112.83	
05-Apr-18	3,247,218.78	2,425.00	224,537.83	
06-Apr-18				
07-Apr-18				
08-Apr-18				

09-Apr-18	3,254,264.78	7,046.00	231,583.83	
10-Apr-18	3,257,040.78	2,776.00	234,359.83	
11-Apr-18	3,259,544.78	2,504.00	236,863.83	
12-Apr-18				
13-Apr-18	3,264,899.78	5,355.00	242,218.83	
14-Apr-18	3,266,856.73	1,956.95	244,175.78	
15-Apr-18	3,269,271.80	2,415.07	246,590.85	
16-Apr-18	3,272,528.78	3,256.98	249,847.83	
17-Apr-18	3,274,235.78	1,707.00	251,554.83	
18-Apr-18	3,276,793.78	2,558.00	254,112.83	
19-Apr-18	3,279,225.78	2,432.00	256,544.83	
20-Apr-18	3,281,813.78	2,588.00	259,132.83	
21-Apr-18				
22-Apr-18				
23-Apr-18	3,289,211.78	7,398.00	266,530.83	
24-Apr-18	3,291,742.78	2,531.00	269,061.83	
25-Apr-18	3,294,297.78	2,555.00	271,616.83	
26-Apr-18	3,296,734.78	2,437.00	274,053.83	
27-Apr-18	3,299,258.78	2,524.00	276,577.83	
28-Apr-18				
29-Apr-18				
30-Apr-18	3,306,537.78	7,279.00	283,856.83	61,744.00
01-May-18	3,309,097.53	2,559.75	286,416.58	
02-May-18	3,311,670.78	2,573.25	288,989.83	
03-May-18	3,314,022.78	2,352.00	291,341.83	
04-May-18	3,316,531.78	2,509.00	293,850.83	
05-May-18				
06-May-18				
07-May-18				
08-May-18				
09-May-18	3,328,696.78	12,165.00	306,015.83	
10-May-18	3,331,145.78	2,449.00	308,464.83	
22-May-18	3,360,362.78	29,217.00	337,681.83	
23-May-18	3,362,580.78	2,218.00	339,899.83	
24-May-18	3,365,097.78	2,517.00	342,416.83	
25-May-18	3,367,543.78	2,446.00	344,862.83	
26-May-18				
27-May-18				
28-May-18				
29-May-18	3,377,118.15	9,574.37	354,437.20	
30-May-18	3,380,033.21	2,915.06	357,352.26	
31-May-18	3,381,981.78	1,948.57	359,300.83	72,884.25
01-Jun-18	3,384,384.78	2,403.00	361,703.83	
02-Jun-18				
03-Jun-18				
04-Jun-18	3,391,915.00	7,530.22	369,234.05	
05-Jun-18	3,394,362.00	2,447.00	371,681.05	
06-Jun-18	3,396,217.00	1,855.00	373,536.05	
07-Jun-18	3,398,666.00	2,449.00	375,985.05	
08-Jun-18	3,400,926.00	2,260.00	378,245.05	
09-Jun-18	3,403,252.00	2,326.00	380,571.05	
10-Jun-18	3,405,628.00	2,376.00	382,947.05	
11-Jun-18	3,408,211.00	2,583.00	385,530.05	
12-Jun-18	3,410,695.00	2,484.00	388,014.05	
13-Jun-18	3,413,289.00	2,594.00	390,608.05	
14-Jun-18	3,415,680.00	2,391.00	392,999.05	
15-Jun-18	3,418,073.00	2,393.00	395,392.05	
16-Jun-18				
17-Jun-18				
18-Jun-18	3,425,323.00	7,250.00	402,642.05	
19-Jun-18	3,427,822.00	2,499.00	405,141.05	
20-Jun-18	3,430,116.00	2,294.00	407,435.05	
21-Jun-18	3,432,336.00	2,220.00	409,655.05	
22-Jun-18	3,434,519.00	2,183.00	411,838.05	
23-Jun-18	3,436,767.00	2,248.00	414,086.05	
24-Jun-18	3,438,762.00	1,995.00	416,081.05	
25-Jun-18	3,440,936.00	2,174.00	418,255.05	
26-Jun-18	3,443,747.00	2,811.00	421,066.05	

27-Jun-18	3,445,394.00	1,647.00	422,713.05	
28-Jun-18	3,447,329.00	1,935.00	424,648.05	
29-Jun-18	3,449,511.00	2,182.00	426,830.05	
30-Jun-18	3,451,823.00	2,312.00	429,142.05	67,438.22

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

Appendix D: Char River Pumping Volumes GRA-6 – 1 page



Char River Water Pumped to Nipissar Lake

Water Licence No. 3AM-GRA1624

GRA-6

Date	Time	Flow Meter Reading (m ³)	Daily Volume Pumped (m ³)	Total Volume Pumped (m ³)	Nipissar Lake Elevations		Change in Elevation*		Notes
					(inches)	(m)	(inches)	(m)	
18-Jun-18	/	0	-	0	132.375	3.362325	-5.1875	-0.1317625	
19-Jun-18	/	0	-	0	/	/	/	/	
20-Jun-18	/	0	-	0	/	/	/	/	
21-Jun-18	/	0	-	0	/	/	/	/	
22-Jun-18	2:00 PM	5260	5,260.00	5,260.00	/	/	/	/	
23-Jun-18	11:45 AM	10,080.00	4,820.00	10,080.00	/	/	/	/	
24-Jun-18	11:00 AM	15,210.00	5,130.00	15,210.00	/	/	/	/	
25-Jun-18	11:00 AM	20,370.00	5,160.00	20,370.00	/	/	/	/	
26-Jun-18	10:45 AM	25,520.00	5,150.00	25,520.00	/	/	/	/	
27-Jun-18	2:00 PM	31,400.00	5,880.00	31,400.00	/	/	/	/	
28-Jun-18	2:00 PM	36,640.00	5,240.00	36,640.00	/	/	/	/	
29-Jun-18	2:00 PM	41,940.00	5,300.00	41,940.00	/	/	/	/	
30-Jun-18	1:30 PM	46,850.00	4,910.00	46,850.00	/	/	/	/	
			-						
Last day of pumping			5,205.56						

46,850.00

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

Appendix E: Certificate of Analysis GRA-6/GRA-7, June 25, 2018 – 26 pages



Nunavut Community & Government Services - Rankin Inlet
Bag 002
Rankin Inlet NU X0C 0G0
ATTN: CONNOR FAULKNER

Date: 16-JUL-18
PO No.:
WO No.: L2118836
Project Ref:
Sample ID: GRA-7
Sampled By:
Date Collected: 25-JUN-18
Lab Sample ID: L2118836-1
Matrix: WATER

PAGE 1 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
BTEX plus F1-F4						
Xylenes (Total)	<0.00064		mg/L	0.09	0.02	04-JUL-18
CCME Total Hydrocarbons						
F1-BTEX	<0.10		mg/L			04-JUL-18
F2-Naphth	<0.10		mg/L			04-JUL-18
F3-PAH	<0.25		mg/L			04-JUL-18
Total Hydrocarbons (C6-C50)	<0.38		mg/L			04-JUL-18
CCME PHC F2-F4 in Water						
F2 (C10-C16)	<0.10		mg/L			30-JUN-18
F3 (C16-C34)	<0.25		mg/L			30-JUN-18
F4 (C34-C50)	<0.25		mg/L			30-JUN-18
Surr: 2-Bromobenzotrifluoride	96.3		%			30-JUN-18
BTX plus F1 by GCMS						
Benzene	<0.00050		mg/L	0.005		29-JUN-18
Toluene	<0.0010		mg/L	0.06	0.024	29-JUN-18
Ethyl benzene	<0.00050		mg/L	0.14	0.0016	29-JUN-18
o-Xylene	<0.00050		mg/L			29-JUN-18
m+p-Xylenes	<0.00040		mg/L			29-JUN-18
F1 (C6-C10)	<0.10		mg/L			29-JUN-18
Surr: 4-Bromofluorobenzene (SS)	92.0		%			29-JUN-18
Nunavut WW Group 1						
Phosphorus, Total						
Phosphorus (P)-Total	0.0040		mg/L			05-JUL-18
Mercury Total						
Mercury (Hg)-Total	<0.0000050		mg/L	0.001		29-JUN-18
Bicarbonate (HCO3)	17.9		mg/L			28-JUN-18
Carbonate (CO3)	<0.60		mg/L			28-JUN-18
Hydroxide (OH)	<0.34		mg/L			28-JUN-18
*Nitrate and Nitrite as N	<0.070		mg/L	10		27-JUN-18
pH						
pH	7.08		pH units			27-JUN-18
Total Suspended Solids						
Total Suspended Solids	<2.0		mg/L			29-JUN-18
Total Organic Carbon by Combustion						
Total Organic Carbon	3.65		mg/L			13-JUL-18
Total Metals in Water by CRC ICPMS						
Aluminum (Al)-Total	0.0396		mg/L		0.1	03-JUL-18
Arsenic (As)-Total	0.00028		mg/L	0.01		03-JUL-18
Cadmium (Cd)-Total	<0.0000050		mg/L	0.005		03-JUL-18

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Nunavut Community & Government Services - Rankin Inlet
Bag 002
Rankin Inlet NU X0C 0G0
ATTN: CONNOR FAULKNER

Date: 16-JUL-18
PO No.:
WO No.: L2118836
Project Ref:
Sample ID: GRA-7
Sampled By:
Date Collected: 25-JUN-18
Lab Sample ID: L2118836-1
Matrix: WATER

PAGE 2 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Total Metals in Water by CRC ICPMS						
Calcium (Ca)-Total	6.02		mg/L			03-JUL-18
Chromium (Cr)-Total	0.00017		mg/L	0.05		03-JUL-18
Cobalt (Co)-Total	<0.00010		mg/L			03-JUL-18
Copper (Cu)-Total	0.00087		mg/L	2.0	1.0	03-JUL-18
Iron (Fe)-Total	0.116		mg/L		0.3	03-JUL-18
Lead (Pb)-Total	0.000058		mg/L	0.01		03-JUL-18
Magnesium (Mg)-Total	1.34		mg/L			03-JUL-18
Manganese (Mn)-Total	0.00754		mg/L		0.05	03-JUL-18
Nickel (Ni)-Total	0.00064		mg/L			03-JUL-18
Potassium (K)-Total	1.08		mg/L			03-JUL-18
Sodium (Na)-Total	6.00		mg/L		200	03-JUL-18
Zinc (Zn)-Total	<0.0030		mg/L		5.0	03-JUL-18
Sulfate in Water by IC						
Sulfate (SO4)	3.91		mg/L		500	26-JUN-18
Phenol (4AAP)						
Phenols (4AAP)	<0.0010		mg/L			29-JUN-18
Oil & Grease - Gravimetric						
Oil and Grease	5.6		mg/L			05-JUL-18
Nitrite in Water by IC						
*Nitrite (as N)	<0.010		mg/L	1		26-JUN-18
Nitrate in Water by IC						
*Nitrate (as N)	<0.020		mg/L	10		26-JUN-18
Hardness Calculated						
Hardness (as CaCO3)	20.5	HTC	mg/L		500	04-JUL-18
Fecal coliforms, 1:10 dilution by QT97						
Fecal Coliforms	<10		MPN/100mL			26-JUN-18
Conductivity						
Conductivity	83.4		umhos/cm			27-JUN-18
Chloride in Water by IC						
Chloride (Cl)	12.2		mg/L		250	26-JUN-18
Carbonaceous BOD						
BOD Carbonaceous	<2.0		mg/L			27-JUN-18
Biochemical Oxygen Demand (BOD)						
Biochemical Oxygen Demand	<2.0		mg/L			27-JUN-18
Ammonia by colour						
Ammonia, Total (as N)	<0.10		mg/L			28-JUN-18

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Date: 16-JUL-18

PO No.:

WO No.: L2118836

Project Ref:

Sample ID: GRA-7

Sampled By:

Date Collected: 25-JUN-18

Lab Sample ID: L2118836-1

Matrix: WATER

Nunavut Community & Government Services - Rankin Inlet
Bag 002

Rankin Inlet NU X0C 0G0

ATTN: CONNOR FAULKNER

PAGE 3 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Alkalinity, Total (as CaCO₃)						
Alkalinity, Total (as CaCO ₃)	14.7		mg/L			27-JUN-18
Polyaromatic Hydrocarbons (PAHs)						
1-Methyl Naphthalene	<0.000020		mg/L			29-JUN-18
2-Methyl Naphthalene	<0.000020		mg/L			29-JUN-18
Acenaphthene	<0.000020		mg/L			29-JUN-18
Acenaphthylene	<0.000020		mg/L			29-JUN-18
Anthracene	<0.000010		mg/L			29-JUN-18
Acridine	<0.000020		mg/L			29-JUN-18
Benzo(a)anthracene	<0.000020	DLM	mg/L			29-JUN-18
Benzo(a)pyrene	<0.000015	DLM	mg/L	0.00004		29-JUN-18
Benzo(b&j)fluoranthene	<0.000020	DLM	mg/L			29-JUN-18
Benzo(g,h,i)perylene	<0.000020		mg/L			29-JUN-18
Benzo(k)fluoranthene	<0.000010		mg/L			29-JUN-18
Chrysene	<0.000020		mg/L			29-JUN-18
Dibenzo(a,h)anthracene	<0.000015	DLM	mg/L			29-JUN-18
Fluoranthene	<0.000020		mg/L			29-JUN-18
Fluorene	<0.000020		mg/L			29-JUN-18
Indeno(1,2,3-cd)pyrene	<0.000015	DLM	mg/L			29-JUN-18
Naphthalene	<0.000050		mg/L			29-JUN-18
Phenanthrene	<0.000050		mg/L			29-JUN-18
Pyrene	<0.000010		mg/L			29-JUN-18
Quinoline	<0.000020		mg/L			29-JUN-18
B(a)P Total Potency Equivalent	<0.000030		mg/L			29-JUN-18
Surr: Acenaphthene d10	98.1		%			29-JUN-18
Surr: Acridine d9	114.4		%			29-JUN-18
Surr: Chrysene d12	107.6		%			29-JUN-18
Surr: Naphthalene d8	91.5		%			29-JUN-18
Surr: Phenanthrene d10	112.1		%			29-JUN-18

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Date: 16-JUL-18

PO No.:

WO No.: L2118836

Project Ref:

Sample ID: GRA-7

Sampled By:

Date Collected: 25-JUN-18

Lab Sample ID: L2118836-1

Matrix: WATER

Nunavut Community & Government Services - Rankin Inlet

Bag 002

Rankin Inlet NU X0C 0G0

ATTN: CONNOR FAULKNER

PAGE 4 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
CDWQG = Health Canada Guideline Limits updated	MAY 2018					
* CDWQG for Nitrate+Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/ or Aesthetic Objective.						
Approved by 						
Hua Wo Account Manager						

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ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



Nunavut Community & Government Services - Rankin Inlet
 Bag 002
 Rankin Inlet NU X0C 0G0
 ATTN: CONNOR FAULKNER

Date: 16-JUL-18
 PO No.:
 WO No.: L2118836
 Project Ref:
 Sample ID: GRA-6
 Sampled By:
 Date Collected: 25-JUN-18
 Lab Sample ID: L2118836-2
 Matrix: WATER

PAGE 5 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
BTEX plus F1-F4						
Xylenes (Total)	<0.00064		mg/L	0.09	0.02	04-JUL-18
CCME Total Hydrocarbons						
F1-BTEX	<0.10		mg/L			04-JUL-18
F2-Naphth	<0.10		mg/L			04-JUL-18
F3-PAH	<0.25		mg/L			04-JUL-18
Total Hydrocarbons (C6-C50)	<0.38		mg/L			04-JUL-18
CCME PHC F2-F4 in Water						
F2 (C10-C16)	<0.10		mg/L			30-JUN-18
F3 (C16-C34)	<0.25		mg/L			30-JUN-18
F4 (C34-C50)	<0.25		mg/L			30-JUN-18
Surr: 2-Bromobenzotrifluoride	91.1		%			30-JUN-18
BTX plus F1 by GCMS						
Benzene	<0.00050		mg/L	0.005		29-JUN-18
Toluene	<0.0010		mg/L	0.06	0.024	29-JUN-18
Ethyl benzene	<0.00050		mg/L	0.14	0.0016	29-JUN-18
o-Xylene	<0.00050		mg/L			29-JUN-18
m+p-Xylenes	<0.00040		mg/L			29-JUN-18
F1 (C6-C10)	<0.10		mg/L			29-JUN-18
Surr: 4-Bromofluorobenzene (SS)	93.0		%			29-JUN-18
Nunavut WW Group 1						
Phosphorus, Total						
Phosphorus (P)-Total	0.0032		mg/L			05-JUL-18
Mercury Total						
Mercury (Hg)-Total	<0.0000050		mg/L	0.001		29-JUN-18
Bicarbonate (HCO3)	18.1		mg/L			28-JUN-18
Carbonate (CO3)	<0.60		mg/L			28-JUN-18
Hydroxide (OH)	<0.34		mg/L			28-JUN-18
*Nitrate and Nitrite as N	<0.070		mg/L	10		27-JUN-18
pH						
pH	7.18		pH units			27-JUN-18
Total Suspended Solids						
Total Suspended Solids	<2.0		mg/L			29-JUN-18
Total Organic Carbon by Combustion						
Total Organic Carbon	3.58		mg/L			13-JUL-18
Total Metals in Water by CRC ICPMS						
Aluminum (Al)-Total	0.0459		mg/L		0.1	03-JUL-18
Arsenic (As)-Total	0.00029		mg/L	0.01		03-JUL-18
Cadmium (Cd)-Total	<0.0000050		mg/L	0.005		03-JUL-18

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 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



Date: 16-JUL-18

PO No.:

WO No.: L2118836

Project Ref:

Sample ID: GRA-6

Sampled By:

Date Collected: 25-JUN-18

Lab Sample ID: L2118836-2

Matrix: WATER

Nunavut Community & Government Services - Rankin Inlet
Bag 002

Rankin Inlet NU X0C 0G0

ATTN: CONNOR FAULKNER

PAGE 6 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Total Metals in Water by CRC ICPMS						
Calcium (Ca)-Total	6.67		mg/L			03-JUL-18
Chromium (Cr)-Total	0.00038		mg/L	0.05		03-JUL-18
Cobalt (Co)-Total	<0.00010		mg/L			03-JUL-18
Copper (Cu)-Total	0.00100		mg/L	2.0	1.0	03-JUL-18
Iron (Fe)-Total	0.115		mg/L		0.3	03-JUL-18
Lead (Pb)-Total	0.000054		mg/L	0.01		03-JUL-18
Magnesium (Mg)-Total	1.35		mg/L			03-JUL-18
Manganese (Mn)-Total	0.00747		mg/L		0.05	03-JUL-18
Nickel (Ni)-Total	0.00144		mg/L			03-JUL-18
Potassium (K)-Total	1.12		mg/L			03-JUL-18
Sodium (Na)-Total	6.16		mg/L		200	03-JUL-18
Zinc (Zn)-Total	<0.0030		mg/L		5.0	03-JUL-18
Sulfate in Water by IC						
Sulfate (SO4)	3.92		mg/L		500	26-JUN-18
Phenol (4AAP)						
Phenols (4AAP)	<0.0010		mg/L			29-JUN-18
Oil & Grease - Gravimetric						
Oil and Grease	<5.0		mg/L			05-JUL-18
Nitrite in Water by IC						
*Nitrite (as N)	<0.010		mg/L	1		26-JUN-18
Nitrate in Water by IC						
*Nitrate (as N)	<0.020		mg/L	10		26-JUN-18
Hardness Calculated						
Hardness (as CaCO3)	22.2	HTC	mg/L		500	04-JUL-18
Fecal coliforms, 1:10 dilution by QT97						
Fecal Coliforms	<10		MPN/100mL			26-JUN-18
Conductivity						
Conductivity	78.7		umhos/cm			27-JUN-18
Chloride in Water by IC						
Chloride (Cl)	11.5		mg/L		250	26-JUN-18
Carbonaceous BOD						
BOD Carbonaceous	<2.0		mg/L			27-JUN-18
Biochemical Oxygen Demand (BOD)						
Biochemical Oxygen Demand	<2.0		mg/L			27-JUN-18
Ammonia by colour						
Ammonia, Total (as N)	<0.010		mg/L			28-JUN-18

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Date: 16-JUL-18

PO No.:

WO No.: L2118836

Project Ref:

Sample ID: GRA-6

Sampled By:

Date Collected: 25-JUN-18

Lab Sample ID: L2118836-2

Matrix: WATER

Nunavut Community & Government Services - Rankin Inlet
Bag 002

Rankin Inlet NU X0C 0G0

ATTN: CONNOR FAULKNER

PAGE 7 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Alkalinity, Total (as CaCO₃)						
Alkalinity, Total (as CaCO ₃)	14.8		mg/L			27-JUN-18
Polyaromatic Hydrocarbons (PAHs)						
1-Methyl Naphthalene	<0.000020		mg/L			29-JUN-18
2-Methyl Naphthalene	<0.000020		mg/L			29-JUN-18
Acenaphthene	<0.000020		mg/L			29-JUN-18
Acenaphthylene	<0.000020		mg/L			29-JUN-18
Anthracene	<0.000010		mg/L			29-JUN-18
Acridine	<0.000020		mg/L			29-JUN-18
Benzo(a)anthracene	<0.000020	DLM	mg/L			29-JUN-18
Benzo(a)pyrene	<0.000015	DLM	mg/L	0.00004		29-JUN-18
Benzo(b&j)fluoranthene	<0.000020	DLM	mg/L			29-JUN-18
Benzo(g,h,i)perylene	<0.000020		mg/L			29-JUN-18
Benzo(k)fluoranthene	<0.000010		mg/L			29-JUN-18
Chrysene	<0.000020		mg/L			29-JUN-18
Dibenzo(a,h)anthracene	<0.000015	DLM	mg/L			29-JUN-18
Fluoranthene	<0.000020		mg/L			29-JUN-18
Fluorene	<0.000020		mg/L			29-JUN-18
Indeno(1,2,3-cd)pyrene	<0.000015	DLM	mg/L			29-JUN-18
Naphthalene	<0.000050		mg/L			29-JUN-18
Phenanthrene	<0.000050		mg/L			29-JUN-18
Pyrene	<0.000010		mg/L			29-JUN-18
Quinoline	<0.000020		mg/L			29-JUN-18
B(a)P Total Potency Equivalent	<0.000030		mg/L			29-JUN-18
Surr: Acenaphthene d10	90.6		%			29-JUN-18
Surr: Acridine d9	96.8		%			29-JUN-18
Surr: Chrysene d12	114.3		%			29-JUN-18
Surr: Naphthalene d8	92.5		%			29-JUN-18
Surr: Phenanthrene d10	99.3		%			29-JUN-18

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Date: 16-JUL-18

PO No.:

WO No.: L2118836

Project Ref:

Sample ID: GRA-6

Sampled By:

Date Collected: 25-JUN-18

Lab Sample ID: L2118836-2

Matrix: WATER

Nunavut Community & Government Services - Rankin Inlet

Bag 002

Rankin Inlet NU X0C 0G0

ATTN: CONNOR FAULKNER

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
CDWQG = Health Canada Guideline Limits updated	MAY 2018					
* CDWQG for Nitrate+Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/ or Aesthetic Objective.						
Approved by 						
Hua Wo Account Manager						

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Nunavut Community & Government Services - Rankin Inlet
Bag 002
Rankin Inlet NU X0C 0G0
ATTN: CONNOR FAULKNER

Date: 16-JUL-18
PO No.:
WO No.: L2118836
Project Ref:
Sample ID: GRA-1
Sampled By:
Date Collected: 25-JUN-18
Lab Sample ID: L2118836-3
Matrix: WATER

PAGE 9 of 13

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
BTEX plus F1-F4						
Xylenes (Total)	<0.00064		mg/L	0.09	0.02	04-JUL-18
CCME Total Hydrocarbons						
F1-BTEX	<0.10		mg/L			04-JUL-18
F2-Naphth	<0.10		mg/L			04-JUL-18
F3-PAH	<0.25		mg/L			04-JUL-18
Total Hydrocarbons (C6-C50)	<0.38		mg/L			04-JUL-18
CCME PHC F2-F4 in Water						
F2 (C10-C16)	<0.10		mg/L			30-JUN-18
F3 (C16-C34)	<0.25		mg/L			30-JUN-18
F4 (C34-C50)	<0.25		mg/L			30-JUN-18
Surr: 2-Bromobenzotrifluoride	90.2		%			30-JUN-18
BTX plus F1 by GCMS						
Benzene	<0.00050		mg/L	0.005		29-JUN-18
Toluene	<0.0010		mg/L	0.06	0.024	29-JUN-18
Ethyl benzene	<0.00050		mg/L	0.14	0.0016	29-JUN-18
o-Xylene	<0.00050		mg/L			29-JUN-18
m+p-Xylenes	<0.00040		mg/L			29-JUN-18
F1 (C6-C10)	<0.10		mg/L			29-JUN-18
Surr: 4-Bromofluorobenzene (SS)	91.0		%			29-JUN-18
Nunavut WW Group 1						
Phosphorus, Total						
Phosphorus (P)-Total	0.0074		mg/L			05-JUL-18
Mercury Total						
Mercury (Hg)-Total	<0.0000050		mg/L	0.001		29-JUN-18
Bicarbonate (HCO3)	32.6		mg/L			28-JUN-18
Carbonate (CO3)	<0.60		mg/L			28-JUN-18
Hydroxide (OH)	<0.34		mg/L			28-JUN-18
*Nitrate and Nitrite as N	<0.070		mg/L	10		27-JUN-18
pH						
pH	7.40		pH units			27-JUN-18
Total Suspended Solids						
Total Suspended Solids	13.2		mg/L			29-JUN-18
Total Organic Carbon by Combustion						
Total Organic Carbon	3.64		mg/L			13-JUL-18
Total Metals in Water by CRC ICPMS						
Aluminum (Al)-Total	0.0606		mg/L		0.1	03-JUL-18
Arsenic (As)-Total	0.00062		mg/L	0.01		03-JUL-18
Cadmium (Cd)-Total	0.0000053		mg/L	0.005		03-JUL-18

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Nunavut Community & Government Services - Rankin Inlet
 Bag 002
 Rankin Inlet NU X0C 0G0
 ATTN: CONNOR FAULKNER

Date: 16-JUL-18
 PO No.:
 WO No.: L2118836
 Project Ref:
 Sample ID: GRA-1
 Sampled By:
 Date Collected: 25-JUN-18
 Lab Sample ID: L2118836-3
 Matrix: WATER

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Nunavut WW Group 1						
Total Metals in Water by CRC ICPMS						
Calcium (Ca)-Total	14.1		mg/L			03-JUL-18
Chromium (Cr)-Total	0.00064		mg/L	0.05		03-JUL-18
Cobalt (Co)-Total	0.00021		mg/L			03-JUL-18
Copper (Cu)-Total	0.00148		mg/L	2.0	1.0	03-JUL-18
Iron (Fe)-Total	0.118		mg/L		0.3	03-JUL-18
Lead (Pb)-Total	0.000062		mg/L	0.01		03-JUL-18
Magnesium (Mg)-Total	3.53		mg/L			03-JUL-18
Manganese (Mn)-Total	0.0388		mg/L		0.05	03-JUL-18
Nickel (Ni)-Total	0.00208		mg/L			03-JUL-18
Potassium (K)-Total	1.88		mg/L			03-JUL-18
Sodium (Na)-Total	16.0		mg/L		200	03-JUL-18
Zinc (Zn)-Total	<0.0030		mg/L		5.0	03-JUL-18
Sulfate in Water by IC						
Sulfate (SO4)	16.8		mg/L		500	26-JUN-18
Phenol (4AAP)						
Phenols (4AAP)	<0.0010		mg/L			29-JUN-18
Oil & Grease - Gravimetric						
Oil and Grease	<5.0		mg/L			05-JUL-18
Nitrite in Water by IC						
*Nitrite (as N)	<0.010		mg/L	1		26-JUN-18
Nitrate in Water by IC						
*Nitrate (as N)	<0.020		mg/L	10		26-JUN-18
Hardness Calculated						
Hardness (as CaCO3)	49.7	HTC	mg/L		500	04-JUL-18
Fecal coliforms, 1:10 dilution by QT97						
Fecal Coliforms	30		MPN/100mL			26-JUN-18
Conductivity						
Conductivity	167		umhos/cm			27-JUN-18
Chloride in Water by IC						
Chloride (Cl)	24.0		mg/L		250	26-JUN-18
Carbonaceous BOD						
BOD Carbonaceous	<2.0		mg/L			27-JUN-18
Biochemical Oxygen Demand (BOD)						
Biochemical Oxygen Demand	<2.0		mg/L			27-JUN-18
Ammonia by colour						
Ammonia, Total (as N)	0.024		mg/L			28-JUN-18

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Date: 16-JUL-18

PO No.:

WO No.: L2118836

Project Ref:

Sample ID: GRA-1

Sampled By:

Date Collected: 25-JUN-18

Lab Sample ID: L2118836-3

Matrix: WATER

Nunavut Community & Government Services - Rankin Inlet

Bag 002

Rankin Inlet NU X0C 0G0

ATTN: CONNOR FAULKNER

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Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
CDWQG = Health Canada Guideline Limits updated	MAY 2018					
* CDWQG for Nitrate+Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/ or Aesthetic Objective.						
Approved by 						
Hua Wo Account Manager						

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Guidelines & Objectives

Sample Parameter Qualifier key listed:

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

Health Canada MAC Health Related Criteria Limits

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

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

Aesthetic Objective Concentration Levels

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

GLOSSARY OF REPORT TERMS

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

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

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

Quality Control Report

Workorder: L2118836

Report Date: 16-JUL-18

Page 2 of 9

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	Water							
Batch	R4126236							
WG2823305-14 LCS								
Total Organic Carbon			97.8		%		80-120	13-JUL-18
WG2823305-13 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-JUL-18
CL-IC-N-WP	Water							
Batch	R4098315							
WG2807013-11 DUP		L2118836-1						
Chloride (Cl)		12.2	12.2		mg/L	0.1	20	26-JUN-18
WG2807013-10 LCS								
Chloride (Cl)			103.4		%		90-110	26-JUN-18
WG2807013-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-JUN-18
WG2807013-12 MS		L2118836-1						
Chloride (Cl)			102.9		%		75-125	26-JUN-18
EC-WP	Water							
Batch	R4099029							
WG2809105-3 LCS								
Conductivity			98.0		%		90-110	27-JUN-18
WG2809105-1 MB								
Conductivity			<1.0		umhos/cm		1	27-JUN-18
F2-F4-FID-WP	Water							
Batch	R4106588							
WG2809659-2 LCS								
F2 (C10-C16)			96		%		70-130	30-JUN-18
F3 (C16-C34)			94		%		70-130	30-JUN-18
F4 (C34-C50)			101		%		70-130	30-JUN-18
WG2809659-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	30-JUN-18
F3 (C16-C34)			<0.25		mg/L		0.25	30-JUN-18
F4 (C34-C50)			<0.25		mg/L		0.25	30-JUN-18
Surrogate: 2-Bromobenzotrifluoride			81.2		%		60-140	30-JUN-18
FC10-QT97-WP	Water							
Batch	R4098645							
WG2807318-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	26-JUN-18
HG-T-CVAF-WP	Water							

Quality Control Report

Workorder: L2118836

Report Date: 16-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAF-WP		Water						
Batch	R4105452							
WG2811088-2	LCS							
Mercury (Hg)-Total			90.8		%		80-120	29-JUN-18
WG2811088-1	MB							
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	29-JUN-18
MET-T-CCMS-WP		Water						
Batch	R4110907							
WG2812523-2	LCS							
Aluminum (Al)-Total			101.5		%		80-120	03-JUL-18
Arsenic (As)-Total			98.8		%		80-120	03-JUL-18
Cadmium (Cd)-Total			98.8		%		80-120	03-JUL-18
Calcium (Ca)-Total			100.3		%		80-120	03-JUL-18
Chromium (Cr)-Total			98.5		%		80-120	03-JUL-18
Cobalt (Co)-Total			96.3		%		80-120	03-JUL-18
Copper (Cu)-Total			96.6		%		80-120	03-JUL-18
Iron (Fe)-Total			98.9		%		80-120	03-JUL-18
Lead (Pb)-Total			103.3		%		80-120	03-JUL-18
Magnesium (Mg)-Total			101.6		%		80-120	03-JUL-18
Manganese (Mn)-Total			98.2		%		80-120	03-JUL-18
Nickel (Ni)-Total			99.9		%		80-120	03-JUL-18
Potassium (K)-Total			100.3		%		80-120	03-JUL-18
Sodium (Na)-Total			103.8		%		80-120	03-JUL-18
Zinc (Zn)-Total			94.9		%		80-120	03-JUL-18
WG2812523-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	03-JUL-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	03-JUL-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-JUL-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	03-JUL-18
Iron (Fe)-Total			<0.010		mg/L		0.01	03-JUL-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-JUL-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-JUL-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	03-JUL-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-JUL-18
Potassium (K)-Total			<0.050		mg/L		0.05	03-JUL-18

Quality Control Report

Workorder: L2118836

Report Date: 16-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	Water							
Batch	R4110907							
WG2812523-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	03-JUL-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-JUL-18
NH3-COL-WP	Water							
Batch	R4103227							
WG2810368-6 LCS								
Ammonia, Total (as N)			100.2		%		85-115	28-JUN-18
WG2810368-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	28-JUN-18
NO2-IC-N-WP	Water							
Batch	R4098315							
WG2807013-11 DUP		L2118836-1						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-JUN-18
WG2807013-10 LCS								
Nitrite (as N)			104.4		%		90-110	26-JUN-18
WG2807013-9 MB								
Nitrite (as N)			<0.010		mg/L		0.01	26-JUN-18
WG2807013-12 MS		L2118836-1						
Nitrite (as N)			102.1		%		75-125	26-JUN-18
NO3-IC-N-WP	Water							
Batch	R4098315							
WG2807013-11 DUP		L2118836-1						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	26-JUN-18
WG2807013-10 LCS								
Nitrate (as N)			104.3		%		90-110	26-JUN-18
WG2807013-9 MB								
Nitrate (as N)			<0.020		mg/L		0.02	26-JUN-18
WG2807013-12 MS		L2118836-1						
Nitrate (as N)			103.0		%		75-125	26-JUN-18
OG-GRAV-WP	Water							
Batch	R4113500							
WG2813946-2 LCS								
Oil and Grease			93.6		%		70-130	05-JUL-18
WG2813946-1 MB								
Oil and Grease			<5.0		mg/L		5	05-JUL-18
P-T-L-COL-WP	Water							

Quality Control Report

Workorder: L2118836

Report Date: 16-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-WP		Water						
Batch	R4113692							
WG2814355-10 LCS			93.6		%		80-120	05-JUL-18
Phosphorus (P)-Total								
WG2814355-9 MB			<0.0010		mg/L		0.001	05-JUL-18
Phosphorus (P)-Total								
PAH,PANH-WP		Water						
Batch	R4111208							
WG2808505-2 LCS			91.4		%		60-130	29-JUN-18
1-Methyl Naphthalene								
2-Methyl Naphthalene			86.4		%		60-130	29-JUN-18
Acenaphthene			89.3		%		60-130	29-JUN-18
Acenaphthylene			85.4		%		60-130	29-JUN-18
Anthracene			92.1		%		60-130	29-JUN-18
Acridine			88.9		%		60-130	29-JUN-18
Benzo(a)anthracene			90.1		%		60-130	29-JUN-18
Benzo(a)pyrene			75.9		%		60-130	29-JUN-18
Benzo(b&j)fluoranthene			75.4		%		60-130	29-JUN-18
Benzo(g,h,i)perylene			83.7		%		60-130	29-JUN-18
Benzo(k)fluoranthene			79.9		%		60-130	29-JUN-18
Chrysene			86.0		%		60-130	29-JUN-18
Dibenzo(a,h)anthracene			93.5		%		60-130	29-JUN-18
Fluoranthene			87.8		%		60-130	29-JUN-18
Fluorene			90.6		%		60-130	29-JUN-18
Indeno(1,2,3-cd)pyrene			81.7		%		60-130	29-JUN-18
Naphthalene			93.9		%		50-130	29-JUN-18
Phenanthrene			99.4		%		60-130	29-JUN-18
Pyrene			94.8		%		60-130	29-JUN-18
Quinoline			122.9		%		60-130	29-JUN-18
WG2808505-1 MB			<0.000020		mg/L		0.00002	29-JUN-18
1-Methyl Naphthalene								
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	29-JUN-18
Acenaphthene			<0.000020		mg/L		0.00002	29-JUN-18
Acenaphthylene			<0.000020		mg/L		0.00002	29-JUN-18
Anthracene			<0.000010		mg/L		0.00001	29-JUN-18
Acridine			<0.000020		mg/L		0.00002	29-JUN-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	29-JUN-18
Benzo(a)pyrene			<0.000005C		mg/L		0.000005	29-JUN-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch	R4111208							
WG2808505-1	MB							
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	29-JUN-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	29-JUN-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	29-JUN-18
Chrysene			<0.000020		mg/L		0.00002	29-JUN-18
Dibenzo(a,h)anthracene			<0.0000050		mg/L		0.000005	29-JUN-18
Fluoranthene			<0.000020		mg/L		0.00002	29-JUN-18
Fluorene			<0.000020		mg/L		0.00002	29-JUN-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	29-JUN-18
Naphthalene			<0.000050		mg/L		0.00005	29-JUN-18
Phenanthrene			<0.000050		mg/L		0.00005	29-JUN-18
Pyrene			<0.000010		mg/L		0.00001	29-JUN-18
Quinoline			<0.000020		mg/L		0.00002	29-JUN-18
Surrogate: Acenaphthene d10			86.9		%		40-130	29-JUN-18
Surrogate: Acridine d9			90.2		%		40-130	29-JUN-18
Surrogate: Chrysene d12			91.4		%		40-130	29-JUN-18
Surrogate: Naphthalene d8			82.8		%		40-130	29-JUN-18
Surrogate: Phenanthrene d10			89.5		%		40-130	29-JUN-18
PH-WP		Water						
Batch	R4099029							
WG2809105-2	LCS							
pH			7.41		pH units		7.3-7.5	27-JUN-18
PHENOLS-4AAP-WT		Water						
Batch	R4110409							
WG2811065-2	LCS							
Phenols (4AAP)			96.1		%		85-115	29-JUN-18
WG2811065-1	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	29-JUN-18
SO4-IC-N-WP		Water						
Batch	R4098315							
WG2807013-11	DUP	L2118836-1						
Sulfate (SO4)		3.91	3.89		mg/L	0.4	20	26-JUN-18
WG2807013-10	LCS							
Sulfate (SO4)			104.4		%		90-110	26-JUN-18
WG2807013-9	MB							

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WP								
Batch R4098315								
WG2807013-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	26-JUN-18
WG2807013-12 MS		L2118836-1						
Sulfate (SO4)			103.0		%		75-125	26-JUN-18
SOLIDS-TOTSUS-WP								
Batch R4110554								
WG2809640-14 LCS								
Total Suspended Solids			100.8		%		85-115	29-JUN-18
WG2809640-13 MB								
Total Suspended Solids			<2.0		mg/L		2	29-JUN-18

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Legend:

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

Sample Parameter Qualifier Definitions:

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

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	25-JUN-18 13:30	27-JUN-18 12:00	0.25	47	hours	EHTR-FM
	2	25-JUN-18 14:00	27-JUN-18 12:00	0.25	46	hours	EHTR-FM
	3	25-JUN-18 14:45	27-JUN-18 12:00	0.25	45	hours	EHTR-FM

Legend & Qualifier Definitions:

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

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2118836 were received on 26-JUN-18 11:00.

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.

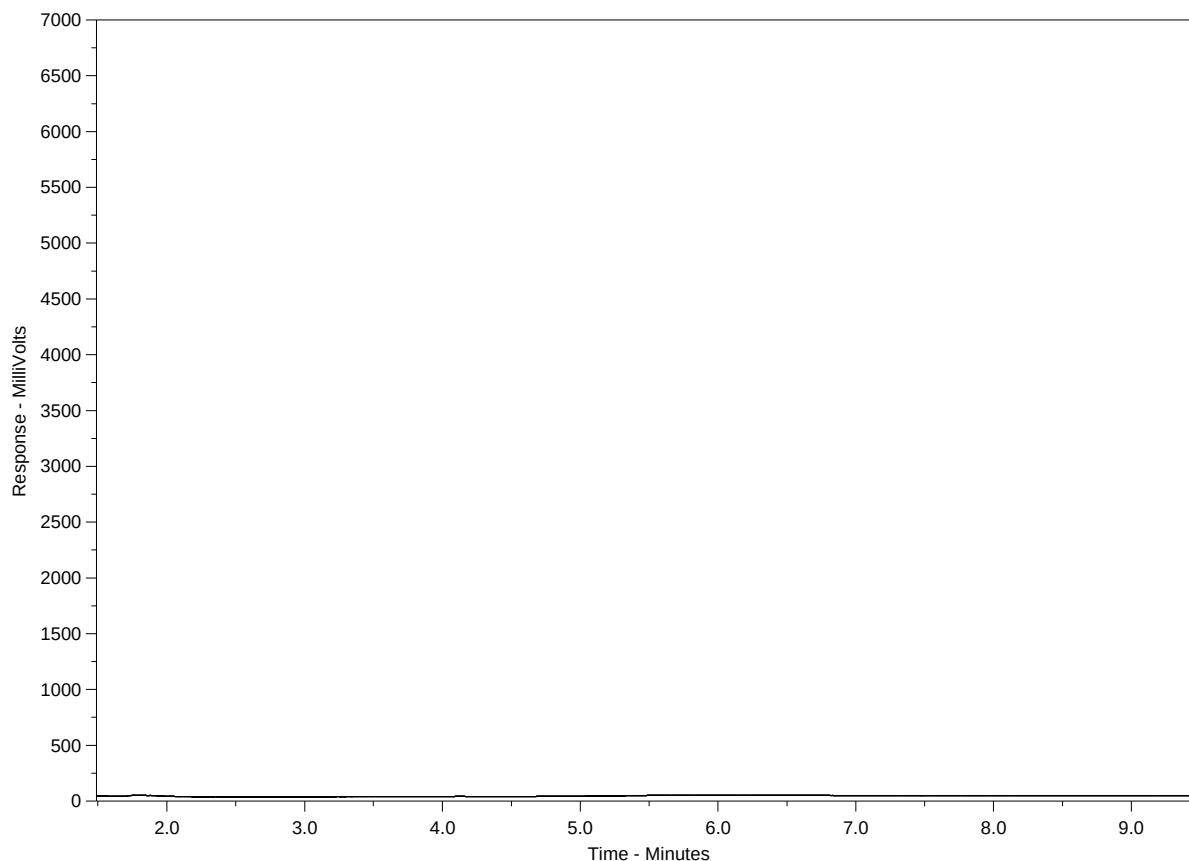
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide 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: L2118836-1
Client Sample ID: GRA-7



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

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

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

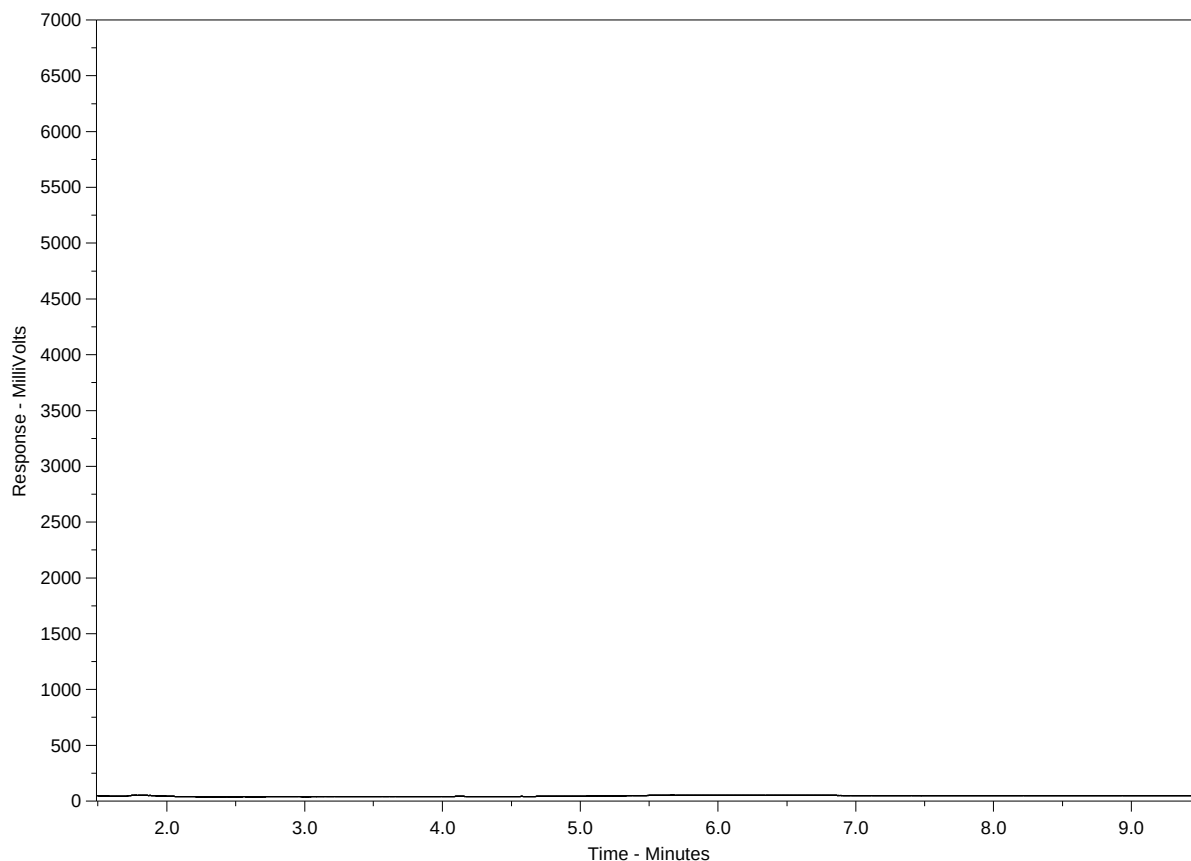
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2118836-2
Client Sample ID: GRA-6



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

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

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

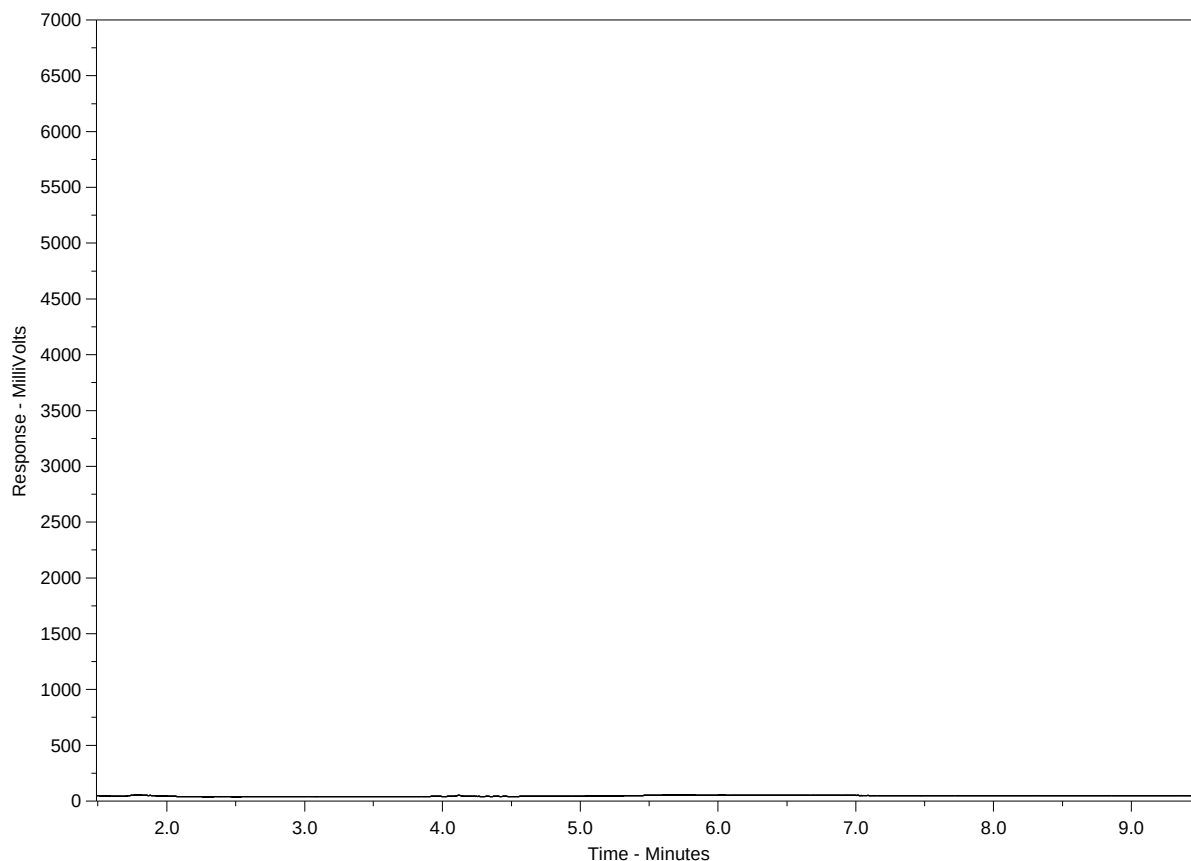
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2118836-3
Client Sample ID: GRA-1



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

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

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

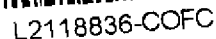
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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



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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 specified on the back page of the white - report copy.

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

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