ANNUAL REPORT FOR GN-CGS RANKIN INLET

YEAR BEING REPORTED: 2017

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence No. <u>3AM-GRA1624</u> issued to <u>Government of Nunavut, Department of Community and Government Services (GN-CGS)</u>.

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

Attached are results for Monitoring Station GRA-1 and GRA-3, as well as detailed chemical, physical and biological analysis required at GRA-2, GRA-6 and GRA-7.

Month Reported	Quantity of Water Obtained from all Sources (m³)	Quantity of Sewage Waste Discharged (Estimated, m ³)		
January	52,821.99	Same		
February	48,589.00	Same		
March	60,209.00	Same		
April	60,485.81	Same		
Мау	66,105.24	Same		
June	61,114.00	Same		
July	59,199.22	Same		
August	61,118.00	Same		
September	58,895.78	Same		
October	60,089.00	Same		
November	60,056.00	Same		
December	65,228.58	Same		
ANNUAL TOTAL	713911.62	Same		

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Below are the results for Monitoring Program Station GRA-6. There was a total water volume of 174,301 m³ transferred from Char River to Nipissar Lake between June 01 and October, 2017.

Month Reported	Water Transferred from Char River to Nipissar Lake (m³)
June	74,275
July	44,472.00
August	8,078
September	47,476
October	7,909
SEASONAL TOTAL	174,301

Below are the results for Monitoring Program Station GRA-1. The water level in Nipissar Lake increased by 20.65 cm from June 21, 2017 to September 25, 2017.

Date	Nipissar Lake Elevation (m)	Change in Nipissar Lake Elevation (m)
June 12, 2017	3.082925	-
June 21, 2017	3.038475	-0.04445
June 29, 2017	3.04165	0.003175
July 11, 2017	3.04165	0
July 21, 2017	3.13055	0.0889
August 16, 2017	3.1877	0.05715
September 25, 2017	3.24485	0.05715

Solid screenings separated from the sewage effluent at the Sewage Treatment Facility are contained in bags and transported to a designated area of the Rankin Inlet Solid Waste Site. Approximately 1 m³ of screenings are removed weekly. As per Part H, Item 5 of the Licence, below is a summary of solids remove from Sewage Treatment Facility at Monitoring Station Number GRA-4.

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Month Reported	Solids Removed from the Sewage Treatment Facility (m ³)
January	4
February	4
March	4
April	4
Мау	4
June	4
July	4
August	4
September	4
October	4
November	4
December	4
ANNUAL TOTAL	48

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

- N	A

v. a list of unauthorized discharges and summary of follow-up action taken;

Spills:

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Spill No.	Date	Site Description	Commodity	Quantity
2017179	2017-05-25	Rankin Inlet	Fuel Oil	236 L
2017185	2017-05-30	Rankin Inlet, 145-24 Inukshuk Avenue	Fuel Oil	5 L
2017326	2017-08-30	Rankin Inlet	Smoke	0 L
2017334	2017-09-05	Rankin Inlet Con Shed Fuel Tank	Heating Fuel P-50	50 L
2017370	2017-09-30	Rankin Inlet	Unknown	0 L
2017377	2017-10-05	Rankin Inlet Municipal Solide Waste Site, 62 48 06N 92 05 04W	De-icing Agent + Mixed Hydrocarbons	0 L
2017445	2017-12-11	Rankin Inlet - Residence #142 -24	Diesel Fuel	5 L

- vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
 - No abandonment and restoration work was completed in 2017.
 - Minor work to piping/valves and treated water storage tank to be undertaken in 2018.
- vii. a summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;
 - A Wastewater Effluent Characterization Study will be undertaken, beginning in 2018, as per Environment and Climate Change Canada Fisheries Act Direction. The Terms of Reference is currently being review by Environment and Climate Change Canada.
 - Water Pumping Adaptive Management Plan has been updated March 2018 and is submitted with this Annual Report.
- viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and
 - NIRB Screening Decision Report issued November 3, 2017 for the relocation of the resupply pipeline from Char River to Lower Landing Lake.

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ix. updates or revisions to the approved Operation and Maintenance Plans.

- none

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- Amendment application for the relocation of the resupply pipeline from Char River to Lower Landing Lake was submitted to the NWB February 14, 2018.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

- The INAC Inspection took place on June 05, 2017. A copy of the inspection report has not been received from INAC.

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Appendix J: Certificate of Analysis June 5, 2017 – 15 pages

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Appendix R: Certificate of Analysis December 18, 2017 – 18 pages



Char River Water Pumped to Nipissar Lake Water Licence No. 3AM-GRA1624 GRA-6

Date	Flow Meter Reading (m3)	Daily Volume Pumped (m3)	Nipissar Lake Elevations (m)	Change In Elevation (m)
12-Jun-17			3.082925	
21-Jun-17			3.038475	-0.04445
29-Jun-17	68855	68855	3.04165	0.003175
11-Jul-17	99177	2211	3.04165	0
12-Jul-17	101662	2485		
13-Jul-17	104234	2572		
14-Jul-17	106729	2495		
15-Jul-17	109107	2378		
16-Jul-17	111600	2493		
17-Jul-17	114498	2898		
18-Jul-17	116716	2218		
19-Jul-17	118747	2031		
21-Jul-17			3.13055	0.0889
16-Aug-17			3.1877	0.05715
15-Sep-17	126825			
16-Sep-17	128942	2117		
17-Sep-17	131502	2560		
18-Sep-17	134210	2708		
19-Sep-17	136934	2724		
20-Sep-17	139509	2575		
21-Sep-17	142193	2684		
22-Sep-17	144949	2756		
23-Sep-17	147452	2503		
24-Sep-17	150114	2662		
25-Sep-17	153390	3276	3.24485	0.05715
26-Sep-17	156285	2895		
27-Sep-17	158976	2691		
28-Sep-17	161103	2127		
29-Sep-17	163790	2687		
30-Sep-17	166392	2602		
01-Oct-17	168914	2522		
02-Oct-17	171676	2762		
03-Oct-17	174301	2625		



Hazardous Materials Spill Database

Environment Division of ENR Scotia 6, 5102-50th Avenue; Yellowknife, NT X1A 3S8 Phone: (867) 873-7654 Fax: (867) 873-0221

Sorted By: SpillNo for the year(s):

Spill No.	Date	Ter	Region	Location	Site Description	Commodity	Quantity	Source	Agency
2017179	2017-05-25	NU	KEE	Rankin Inlet	Rankin Inlet	Fuel Oil	236 L	ST<	GN
2017185	2017-05-30	NU	KEE	Rankin Inlet	Rankin Inlet, 145-24 Inukshuk Avenue	Fuel Oil	5 L	ST<	GN
2017326	2017-08-30	NU	KEE	Rankin Inlet	Rankin Inlet	Smoke	0 L	UK	GN
2017334	2017-09-05	NU	KEE	Rankin Inlet	Rankin Inlet Con Shed Fuel Tank	Heating Fuel P-50	50 L	ST<	GN
2017370	2017-09-30	NU	KEE	Rankin Inlet	Rankin Inlet	Unknown	0 L	MV	CCG
2017377	2017-10-05	NU	KEE	Rankin Inlet	Rankin Inlet Municipal Solide Waste Site, 62 48 06N 92 05 04W	De-icing Agent + Mixed Hydrocarbons	0 L	DRUM	INAC
2017445	2017-12-11	NU	KEE	Rankin Inlet	Rankin Inlet - Residence #142 -24	Diesel Fuel	5 L	PL	GN

Total Spills on this Report: 7

This report contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has not occurred at that location.

LEGEND

		LEGEND	
Region:	Source:		Agency:
BAF - Baffin DEH - Deh Cho INU - Inuvik KEE - Keewatin KIT - Kitikmeot NSL - North Slave SAH - Sahtu SSL - South Slave	AIR - Aircraft DRUM - Drum or Barrel MV - Marine Vessel NS - Natural Seepage OTH - Other Transportation	PL - Pipe or Line RT - Rail Train SL - Sewage Lagoon ST< - Storage Tank <4000 litres ST> - Storage Tank >4000 litres	CCG - Canadian Coast Guard EP - Environment Canada GN - Government of Nunavut GNWT - Government of Northwest Territories ILA - Inuvialiut Land Administration INAC - Indian and Northern Affairs Canada NEB - National Energy Board

			05-Jun-17		17	
			Nipissar Lake			
Parameters	Units	Detection Limit	GRA-1	GRA-6	GRA-7	Guidelines for Canadian Drinking Water Quality
Miscellaneous Parameters					l	
Ammonia Total (as N)	mg/L	0.010	0.052	0.01	0.01	None required
Phosphorus (P)	mg/L	0.010	0.012	0.011	0.011	·
Total Kjeldahl Nitrogen	mg/L	0.20				
Fecal Coliforms	MPN/100mL	3	10	10	10	
Total Suspended Solids	mg/L	5	5	5	5	
Alkalinity						
Alkalinity, Total (as CaCO3)	mg/L	20	46.8	23.1	20.4	
Bicarbonate (HCO3)	mg/L	24	57.1	28.2	24.9	
Carbonate (CO3)	mg/L	12	0.6	0.6	0.6	
Hydroxide (OH)	mg/L	6.8	0.34	0.34	0.34	
Chloride by Ion Chromatography					•	
Chloride (CI)	mg/L	0.50	36.9	13.8	12.6	AO: <u><</u> 250 mg/L
Conductivity						
Conductivity	umhos/cm	20	246	96.6	88.2	
Hardness Calculated						
Hardness (as CaCO3)	mg/L	0.30	72.5	27.7	25.6	None required
Nitrate as N by Ion Chromatography					1	·
Nitrate (as N)	mg/L	0.05	0.02	0.02	0.02	
Nitrate+Nitrite	J				<u>l</u>	
Nitrate and Nitrite as N	mg/L	0.071	0.07	0.07	0.07	10 mg/L as nitrate-nitrogen
Nitrite as N by Ion Chromatography					1	<u> </u>
Nitrite (as N)	mg/L	0.050	0.01	0.01	0.01	
Sulfate by Ion Chromatography						
Sulfate (SO4)	mg/L	0.50	20.8	4.32	3.94	AO: ≤ 500 mg/L
TDS Calculated					•	
TDS (Calculated)	mg/L	5.0				AO: < 500 mg/L
Total Metals by ICP-MS					•	
Aluminium (Al)	mg/L	0.02	0.0135	0.0289	0.0469	OG: <0.1 mg/L (conventional); <0.2 mg/L (other treatment types)
Antimony (Sb)	mg/L	0.001				MAC: 0.006 mg/L
Arsenic (As)	mg/L	0.001	0.00052	0.00033	0.00029	MAC: 0.010 mg/L
Barium (Ba)	mg/L	0.0005				MAC: 1.0 mg/L
Beryllium (Be)	mg/L	0.001				
Bismuth (Bi)	mg/L	0.0005				
Boron (B)	mg/L	0.03				MAC: 5 mg/L
Cadmium (Cd)	mg/L	0.0002	0.00001	0.00001	0.00001	MAC: 0.005 mg/L
Calcium (Ca)	mg/L	0.2	21	8.28		None required
Cesium (Cs)	mg/L	0.0005				·
Chromium (Cr)	mg/L	0.002	0.001	0.001	0.001	MAC: 0.05 mg/L
Cobalt (Co)	mg/L	0.0005	0.0002	0.0002		
Copper (Cu)	mg/L	0.002	0.00087	0.00081	0.00074	AO: ≤ 1.0 mg/L
Iron (Fe)	mg/L	0.1	0.029	0.176		 AO: ≤ 0.3 mg/L
Lead (Pb)	mg/L	0.001	0.00009	0.00009		MAC: 0.010 mg/L
Lithium (Li)	mg/L	0.002				.

Magnesium (Mg)	mg/L	0.05	4.9	1.72	1.58	None required
Manganese (Mn)	mg/L	0.001	0.0283	0.0106	0.0156	AO: <u><</u> 0.05 mg/L
Molybdenum (Mo)	mg/L	0.0005				
Nickel (Ni)	mg/L	0.002	0.002	0.002	0.002	
Phosphorus (P)	mg/L	0.5	0.012	0.011	0.011	
Potassium (K)	mg/L	0.1	2.61	1.4	1.33	
Rubidium (Rb)	mg/L	0.0005				
Selenium (Se)	mg/L	0.005				MAC: 0.01 mg/L
Silicon (Si)	mg/L	0.3				
Silver (Ag)	mg/L	0.001				None required
Sodium (Na)	mg/L	0.05	22.5	7.35	6.65	AO: <u><</u> 200 mg/L
Strontium (Sr)	mg/L	0.0005				
Tellurium (Te)	mg/L	0.001				
Thallium (Tl)	mg/L	0.005				
Thorium (Th)	mg/L	0.001				
Tin (Sn)	mg/L	0.0006				
Titanium (Ti)	mg/L	0.001				
Tungsten (W)	mg/L	0.002				
Uranium (U)	mg/L	0.0005				MAC: 0.02 mg/L
Vanadium (V)	mg/L	0.002				
Zinc (Zn)	mg/L	0.02	0.002	0.002	0.002	AO: <u><</u> 5.0 mg/L
Zirconium (Zr)	mg/L	0.001				
рН						
рН	pH Units	0.1	7.34	7.43	7.31	6.5-8.5

Summary of Hydrocarbon Contamination Analysis

			·17			
Parameters	Units	Detection Limit	Nipissar Lake	Char River	Lower Landing Lake	Guidelines for Canadian Drinking Water Quality
BTX plus F1 by GCMS						
Benzene	mg/L	0.00050	<0.00050	<0.00050	<0.00050	MAC: 0.005 mg/L
Toluene	mg/L	0.0010	<0.0010	<0.0010	<0.0010	AO: <u><</u> 0.024 mg/L ¹
Ethylbenzene	mg/L	0.00050	<0.00050	<0.00050	<0.00050	AO: < 0.0024 mg/L ²
o-Xylene	mg/L	0.00050	<0.00050	<0.00050	<0.00050	
m+p-Xylenes	mg/L	0.00040	<0.00040	<0.00040	<0.00040	
F1 (C6-C10)	mg/L	0.10	<0.10	<0.10	<0.10	
CCME Total Hydrocarbons				-		
F1-BTEX	mg/L	0.10	<0.10	<0.10	<0.10	
F2-Naphth	mg/L	0.1	<0.10	<0.10	<0.10	
F3-PAH	mg/L	0.25	<0.25	<0.25	<0.25	
Total Hydrocarbons (C6-C50)	mg/L	0.38	<0.38	<0.38	<0.38	
F2-F4 PHC Method						
F2 (C10-C16)	mg/L	0.1	<0.10	<0.10	<0.10	
F3 (C16-C34)	mg/L	0.25	<0.25	<0.25	<0.25	
F4 (C34-C50)	mg/L	0.25	<0.25	<0.25	<0.25	
Sum of Xylene Isomer Concentrations				-		
Kylenes (Total)	mg/L	0.00064	<0.00064	<0.00064	<0.00064	AO: ≤ 0.3 mg/L ³
Polyaromatic Hydrocarbons (PAHs)	•		•	•		
1-Methyl Napthalene	mg/L	0.000020	<0.000040 *	<0.000020	<0.000020	
2-Methyl Naphthalene	mg/L	0.000020	<0.000040 *	<0.000020	<0.000020	
Acenaphthene	mg/L	0.000020	<0.000040 *	<0.000020	<0.000020	
Acenaphthylene	mg/L	0.000020	<0.000040 *	<0.000020	<0.000020	
Anthracene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	
Acridine	mg/L	0.000020	<0.000020	<0.000020	<0.000020	
Benzo(a)anthracene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	
Benzo(a)pyrene	mg/L	0.0000050	<0.000050	<0.0000050	<0.000050	MAC: 0.00001 mg/L
Benzo(b&j)fluoranthene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	
Benzo(g,h,i)perylene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	
Benzo(k)fluoranthene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	
Chrysene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	
Dibenzo(a,h)anthracene	mg/L	0.0000050	<0.000050	<0.0000050	<0.000050	
Fluoranthene	mg/L	0.000020				
Fluorene	mg/L	0.000020	<0.000040 *	<0.000020	<0.000020	
ndeno(1,2,3-cd)pyrene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	
Naphthalene	mg/L	0.000050	0.0001 *	<0.000050	<0.000050	
Phenanthrene	mg/L	0.000050	<0.000050	<0.000050	<0.000050	
Pyrene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	
Quinoline	mg/L	0.000020	<0.000040 *	<0.000020	<0.000020	
B(a)P Total Potency Equivalent	mg/L	0.000030	<0.000030	<0.000030	<0.000030	

^{*} Detection limit was modified by ALS Environmental

MAC - Maximum acceptable concentrations (health based)



AO - Aesthetic objectives (based on aesthetic considerations)

OG - Operational guidance values (based on operational considerations)

¹ AO based on odour

³ AO based on odour; levels above the AO would render drinking water unpalatable

³ AO based on taste and odour; levels above the AO would render water unpalatable

Summary of GRA-3 Wastewater Ef	fluent Analysis												
Parameters (From ALS)	Unit	28-Feb-17	29-Mar-17	26-Apr-17	29-May-17	29-Jun-17	20-Jul-17	05-Sep-17	26-Sep-17	25-Oct-17	30-Nov-17	18-Dec-17	
Total Suspended Solids	mg/L	76	575	140	90	88	160	98	140	56	85	90	
Biochemical Oxygen Demand	mg/L	112	392	182	58	94	164	98	128	59	153	146	
BOD Carbonaceous	mg/L	111	390	159	47	82	169	82	115	53	138	110	
Hardness (as CaCO3)	mg/L	121	134	129	127	75	87.2	83.3	199	86.6	96.8	100	
Bicarbonate (HCO3)	mg/L	139	232	179	135	118	127	121	147	99.4	143	127	
Carbonate (CO3)	mg/L	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Hydroxide (OH)	mg/L	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	
Total (as CaCO3)	mg/L	114	190	146	111	96.9	104	99	120	81.5	117	104	
Conductivity	uS/cm	574	753	682	549	392	417	410	507	379	537	491	
рН	pH Units	7.06	6.47	7.13	7.12	7.07	6.95	7.02	7.17	7.1	6.99	6.91	
Fecal Coliforms	MPN/100 mL	110000	110000	24200	24200	/	24200	/	24200	24200	24200	24200	
Total Coliforms	MPN/100 mL	/	/	/	/	/	/	/	24200	/	/	2420	
Escherichia Coli	MPN/100 mL	/	/	/	/	/	/	/	24200	/	/	2420	
Total Ammonia (as N)	mg/L	4.91	13.5	6.35	3.61	11.9	4.86	6.05	6.05	6.6	6.57	9.23	6.2
Nitrate (as N)	mg/L	0.02	0.058	0.02	0.02	0.02	0.02	0.02	0.02	0.047	0.02	0.02	
Nitrite (as N)	mg/L	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.013	0.01	0.01	
Total Nitrogen	mg/L	/	/	/	/	/	/	/	/	/	/	/	
Total Organic Carbon	mg/L	91.8	109	106	44.8	61.8	68.4	47.5	50.4	42	97	85.9	
Phosphorus (P)	mg/L	3.05	6.16	3.78	1.51	2.03	3.03	1.46	2.55	1.05	2.71	1.82	
Calcium (Ca)	mg/L	34.1	38.9	37	36.6	21.2	24.2	24.3	62.2	24	24.5	27.7	
Chloride (Cl)	ug/L	75100	75900	86400	74700	49000	52700	56200	62400	51100	64800	63000	
Fluoride (F)	mg/L	/	/	/	/	/	/	0.067	0.129	/	/	0.053	
Magnesium (Mg)	mg/L	8.84	8.97	8.86	8.59	5.36	6.48	5.48	10.6	6.47	8.62	7.53	
Potassium (K)	mg/L	12.1	14.7	11.9	8.19	8	10.7	6.53	13.4	8.53	12.5	9.53	
Sodium (Na)	mg/L	49.5	49.5	47	59.8	30.9	35.1	27.3	45.4	33.9	46.1	40.7	
Sulfate (SO4)	mg/L	34.7	37	40.5	35.7	16.3	19.5	28	30.3	26.5	30.8	29.4	
Aluminium (Al)	ug/L	203	224	156	134	240	290	113	233	194	258	161	
Antimony (Sb)	ug/L	/	/	/	/	/	/	/	0.23	/	/	/	
Arsenic (As)	ug/L	0.95	1.06	1.06	1.12	0.71	0.9	0.98	13.9	0.76	1.04	0.9	
Barium (Ba)	ug/L	/	/	/	/	/	/	/	66.9	/	/	/	
Beryllium (Be)	ug/L	/	/	/	/	/	/	. /	0.1	/	. /	/	
Cadmium (Cd)	ug/L	0.081	0.066	0.069	0.085	0.071	0.0881	0.0408	0.0946	0.0458	0.0816	0.054	
Cesium (Cs)	ug/L	/	/	/	/	/	/	/	0.099	/	/	/	
Chromium (Cr)	ug/L	1	1	1	1.2	1.1	1.45	0.54	0.65	0.65	1.02	0.84	
Cobalt (Co)	ug/L	0.2	0.27	0.2	0.34	0.43	0.3	0.26	1.84	0.2	0.27	0.19	
Copper (Cu)	ug/L	191	316	223	162	122	156	83.8	117	88.8	209	166	
Iron (Fe)	ug/L	1370	952	543	443	338	490	265	6020	195	243	167	
Lead (Pb)	ug/L	1.49	2.13	1.56	3.94	2.63	2.27	2.13	1.51	1.6	8.38	1.02	
Lithium (Li)	ug/L	/	/	/	/	/	/	/	6.4	/	/	/	
Manganese (Mn)	ug/L	40.8	47.3	52.2	77.1	33.7	44.4	39.9	468	24.5	47.1	36.3	

Molybdenum (Mo)	ug/L	/	/	/	/	/	/	/	0.387	/	/	/
Nickel (Ni)	ug/L	3.5	3.6	3.1	4.7	3	3.45	3.47	4.05	2.01	3.45	2.46
Rubidium (Rb)	ug/L	/	/	/	/	/	/	/	12.5	/	/	/
Selenium (Se)	ug/L	/	/	/	/	/	/	/	0.246	/	/	/
Silver (Ag)	ug/L	/	/	/	/	/	/	/	0.043	/	/	/
Strontium (Sr)	ug/L	/	/	/	/	/	/	/	346	/	/	/
Thallium (TI)	ug/L	/	/	/	/	/	/	/	0.011	/	/	/
Titanium (Ti)	ug/L	/	/	/	/	/	/	/	1.04	/	/	/
Uranium (U)	ug/L	/	/	/	/	/	/	/	0.376	/	/	/
Vanadium (V)	ug/L	/	/	/	/	/	/	/	1.6	/	/	/
Zinc (Zn)	ug/L	72	147	91.9	66	62.2	124	60.6	133	51.3	93.5	76.1
Phenols	mg/L	0.0249	0.0471	0.0102	0.0071	0.01	0.01	0.0102	0.0096	0.005	0.0118	0.0084
Oil and Grease	mg/L	40.1	44.3	33.3	22.6	29.9	93.6	22.1	34.3	9.9	25	28
Total Hydrocarbons (C6-C50)	mg/L	12.4	22.9	18.7	11.3	15.5	/	/	/	11.4	17.7	13.9



Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 03-MAR-17

Report Date: 20-MAR-17 14:02 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1897103

Project P.O. #: NOT SUBMITTED

Job Reference: RANKIN INLET WWTP - NUNAVUT

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



L1897103 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897103-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 28-FEB-17 @ 13:30							
Matrix: WASTEWATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene Benzene	<0.00050		0.00050	mg/L		09-MAR-17	R3672926
Toluene	0.0044		0.0010	mg/L		09-MAR-17	R3672926
Ethyl benzene	<0.00050		0.00050	mg/L		09-MAR-17	R3672926
o-Xylene	<0.00050		0.00050	mg/L		09-MAR-17	R3672926
m+p-Xylenes	<0.00050		0.00050	mg/L		09-MAR-17	R3672926
F1 (C6-C10)	<0.10		0.10	mg/L		09-MAR-17	R3672926
Surrogate: 4-Bromofluorobenzene (SS)	91.3		70-130	%		09-MAR-17	R3672926
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.42		0.10	mg/L	08-MAR-17	08-MAR-17	R3671663
F3 (C16-C34)	8.45		0.25	mg/L	08-MAR-17	08-MAR-17	R3671663
F4 (C34-C50)	3.54		0.25	mg/L	08-MAR-17	08-MAR-17	R3671663
Surrogate: 2-Bromobenzotrifluoride	95.6		60-140	%	08-MAR-17	08-MAR-17	R3671663
CCME Total Hydrocarbons F1-BTEX	-0.40		0.40	m ~ /I		14 MAD 47	
F1-BTEX F2-Naphth	<0.10 0.42		0.10 0.10	mg/L mg/L		14-MAR-17 14-MAR-17	
F3-PAH	8.45		0.10	mg/L		14-MAR-17	
Total Hydrocarbons (C6-C50)	12.4		0.23	mg/L		14-MAR-17	
Sum of Xylene Isomer Concentrations	12.4		0.50	mg/L		14-101/413-17	
Xylenes (Total)	<0.00071		0.00071	mg/L		10-MAR-17	
, , , , , , , , , , , , , , , , , , , ,				3			
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000029		0.000020	mg/L	08-MAR-17	13-MAR-17	R3674394
2-Methyl Naphthalene	0.000035		0.000020	mg/L	08-MAR-17	13-MAR-17	R3674394
Acenaphthene	<0.000020		0.000020	mg/L	08-MAR-17	13-MAR-17	R3674394
Acenaphthylene	<0.000020		0.000020	mg/L	08-MAR-17	13-MAR-17	R3674394
Anthracene	<0.000010		0.000010	mg/L	08-MAR-17	13-MAR-17	R3674394
Acridine	<0.000020		0.000020	mg/L	08-MAR-17	13-MAR-17	R3674394
Benzo(a)anthracene	<0.000010		0.000010	mg/L	08-MAR-17	13-MAR-17	R3674394
Benzo(a)pyrene	<0.000050		0.0000050	mg/L	08-MAR-17	13-MAR-17	R3674394
Benzo(b&j)fluoranthene	<0.000010	DIM	0.000010	mg/L	08-MAR-17	13-MAR-17	R3674394
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	08-MAR-17	13-MAR-17	R3674394
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	08-MAR-17 08-MAR-17	13-MAR-17	R3674394
Chrysene Dibenzo(a,h)anthracene	<0.000020 <0.00010	DLM	0.000020 0.00010	mg/L mg/L	08-MAR-17	13-MAR-17 13-MAR-17	R3674394
Fluoranthene	<0.00010	DEIVI	0.00010	mg/L	08-MAR-17	13-MAR-17	R3674394 R3674394
Fluorene	<0.000020		0.000020	mg/L	08-MAR-17	13-MAR-17	R3674394
Indeno(1,2,3-cd)pyrene	<0.00010	DLM	0.00010	mg/L	08-MAR-17	13-MAR-17	R3674394
Naphthalene	<0.00050		0.000050	mg/L	08-MAR-17	13-MAR-17	R3674394
Phenanthrene	<0.000050		0.000050	mg/L	08-MAR-17	13-MAR-17	R3674394
Pyrene	<0.00010		0.000010	mg/L	08-MAR-17	13-MAR-17	R3674394
Quinoline	<0.000050	DLM	0.000050	mg/L	08-MAR-17	13-MAR-17	R3674394
B(a)P Total Potency Equivalent	<0.000060		0.000060	mg/L	08-MAR-17	13-MAR-17	R3674394
Surrogate: Acenaphthene d10	67.5		40-130	%	08-MAR-17	13-MAR-17	R3674394
Surrogate: Acridine d9	96.1		40-130	%	08-MAR-17	13-MAR-17	R3674394
Surrogate: Chrysene d12	55.4		40-130	%	08-MAR-17	13-MAR-17	R3674394
Surrogate: Naphthalene d8	108.6		40-130	%	08-MAR-17	13-MAR-17	R3674394
Surrogate: Phenanthrene d10	83.0		40-130	%	08-MAR-17	13-MAR-17	R3674394
Nunavut WW Group 1							
Alkalinity, Bicarbonate	400		4.0	m ~/!		06 144 D 47	
Bicarbonate (HCO3)	139		1.2	mg/L		06-MAR-17	
Alkalinity, Carbonate							

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

L1897103 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897103-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT on 28-FEB-17 @ 13:30							
Matrix: WASTEWATER							
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		06-MAR-17	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		06-MAR-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	114		1.0	mg/L		03-MAR-17	R3668196
Ammonia by colour	114		1.0	9/ _		00 100 11	10000100
Ammonia, Total (as N)	4.91		0.10	mg/L		04-MAR-17	R3668928
Biochemical Oxygen Demand (BOD) Biochemical Oxygen Demand	440		20			03-MAR-17	D0070000
Carbonaceous BOD	112		20	mg/L		US-IVIAR-17	R3672063
BOD Carbonaceous	111		20	mg/L		03-MAR-17	R3672063
Chloride in Water by IC	75.4		0.50	m m/l		02 144 12 47	Daecoost
Chloride (CI) Conductivity	75.1		0.50	mg/L		03-MAR-17	R3669031
Conductivity	574		1.0	umhos/cm		03-MAR-17	R3668196
Fecal Coliform		DELLO	_	NADAUK SS.		00 1445 45	
Fecal Coliforms Hardness Calculated	>110000	PEHR	3	MPN/100mL		03-MAR-17	R3669004
Hardness (as CaCO3)	121	HTC	0.25	mg/L		08-MAR-17	
Mercury Total							
Mercury (Hg)-Total	0.0000130		0.0000050	mg/L	17-MAR-17	20-MAR-17	R3679923
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		03-MAR-17	R3669031
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		07-MAR-17	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		03-MAR-17	R3669031
Oil & Grease - Gravimetric							
Oil and Grease	40.1		5.0	mg/L		11-MAR-17	R3673490
Phenol (4AAP) Phenols (4AAP)	0.0249		0.0010	mg/L		09-MAR-17	R3672955
Phosphorus, Total	0.0249		0.0010	IIIg/L		US-IVIAIX-17	K3072933
Phosphorus (P)-Total	3.05		0.050	mg/L		08-MAR-17	R3669983
Sulfate in Water by IC	0.4.7		0.00			00 MAD 47	D0000004
Sulfate (SO4) Total Metals by ICP-MS	34.7		0.30	mg/L		03-MAR-17	R3669031
Aluminum (Al)-Total	0.203		0.0050	mg/L	07-MAR-17	07-MAR-17	R3669328
Arsenic (As)-Total	0.00095		0.00020	mg/L	07-MAR-17	07-MAR-17	R3669328
Cadmium (Cd)-Total	0.000081		0.000010	mg/L	07-MAR-17	07-MAR-17	R3669328
Calcium (Ca)-Total	34.1		0.10	mg/L	07-MAR-17	07-MAR-17	R3669328
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	07-MAR-17	07-MAR-17	R3669328
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	07-MAR-17	07-MAR-17	R3669328
Copper (Cu)-Total	0.191		0.00020	mg/L	07-MAR-17	07-MAR-17	R3669328
Iron (Fe)-Total	1.37		0.010	mg/L	07-MAR-17	07-MAR-17	R3669328
Lead (Pb)-Total	0.00149		0.000090	mg/L	07-MAR-17	07-MAR-17	R3669328
Magnesium (Mg)-Total	8.84		0.010	mg/L	07-MAR-17	07-MAR-17	R3669328
Manganese (Mn)-Total	0.0408		0.00030	mg/L	07-MAR-17	07-MAR-17	R3669328
Nickel (Ni)-Total	0.0035		0.0020	mg/L	07-MAR-17	07-MAR-17	R3669328
Potassium (K)-Total	12.1		0.020	mg/L	07-MAR-17	07-MAR-17	R3669328
Sodium (Na)-Total	49.5		0.030	mg/L	07-MAR-17	07-MAR-17	R3669328
Zinc (Zn)-Total	0.0720		0.0020	mg/L	07-MAR-17	07-MAR-17	R3669328
Total Organic Carbon by Combustion							
	L						

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

L1897103 CONTD.... PAGE 4 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897103-1 RANKIN INLET WWTP - EFFLUENT Sampled By: CLIENT on 28-FEB-17 @ 13:30 Matrix: WASTEWATER							
Total Organic Carbon by Combustion Total Organic Carbon Total Suspended Solids	91.8		2.5	mg/L		08-MAR-17	R3672916
Total Suspended Solids	76		10	mg/L		06-MAR-17	R3669850
pH pH	7.06		0.10	pH units		03-MAR-17	R3668196

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

L1897103 CONTD....

PAGE 5 of 7 Version: FINAL

Reference Information

Sample Parameter Qualifier Kev:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

Test Method References:

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

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

CALCULATION ALK-HCO3HCO3-CALC-Water Alkalinity, Bicarbonate

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 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.

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

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

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 Chloride in Water by IC EPA 300.1 (mod)

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

EC-WP Water Conductivity **APHA 2510B**

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

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

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.

L1897103 CONTD.... PAGE 6 of 7

Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
- 3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
- 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
- 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

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

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

FC-MPN-WP Water Fecal Coliform APHA 9221E

The Most Probable Number (MPN) method is based on the Multiple Tube Fermentation technique. Aliquots from three or more decimal dilutions of a sample are inoculated into tubes containing enrichment media and incubated at 35C for 48 – 3 hours. Sample aliquots exhibiting the characteristic positive response are transferred to various selective media for the coliform group(s) of interest and incubated at specific temperatures and times. The Most Probable Number for each target group is statistically derived from a standard MPN table based on the combinations of positive outcomes at each dilution.

The fecal (thermotolerant) coliform group may include organisms not originating in the intestines of warm-blooded animals.

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-L-MS-WP Water Total Metals by ICP-MS APHA 3030E/EPA 6020A-TL

This analysis involves preliminary sample treatment by hotblock acid digestion (APHA 3030E). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

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

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

NO2+NO3-CALC-WP Water Nitrate+Nitrite CALCULATION

NO2-IC-N-WP Water Nitrite in Water by IC EPA 300.1 (mod)

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

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

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

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

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

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

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

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

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

PH-WP Water pH APHA 4500H

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

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

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

L1897103 CONTD....

PAGE 7 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description** SO4-IC-N-WP Water Sulfate in Water by IC EPA 300.1 (mod) Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. SOLIDS-TOTSUS-WP Water Total Suspended Solids APHA 2540 D (modified) Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C. XYLENES-SUM-CALC-Sum of Xylene Isomer Concentrations CALCULATED RESULT WP

Total xylenes represents the sum of o-xylene and m&p-xylene.

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

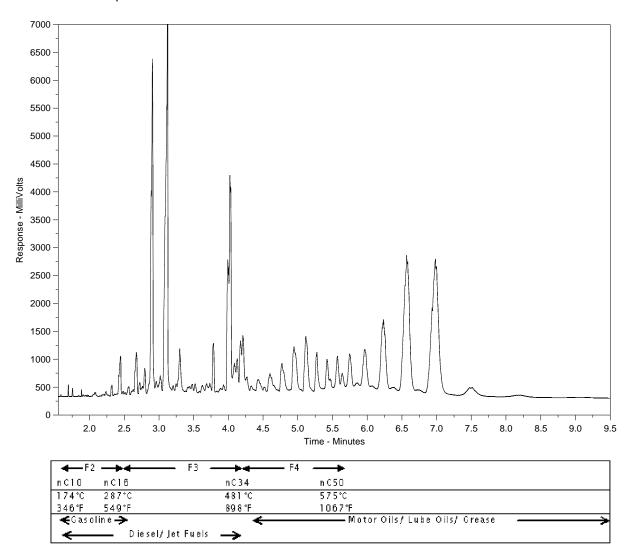
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L1897103-1

Client Sample ID: RANKIN INLET EFFLUENT



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

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

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

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



Chain of Custody (COC) / Analytical Request Form

L1897103-COFC

COC Number: 15 - 570905

[189710]

www.alsglobal.com Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the fire	al report		Report Format	Distribution	— —·	Select Se	rvice Lev	el Below -	Please co	onfine all	E&P TAI	rs with y	our AM -	surchar	ges will a	pply		
Company:	CGS RANKIN		Select Report For			EDD (DÍGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply												
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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.

8,



Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 31-MAR-17

Report Date: 12-APR-17 10:00 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1907517

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L1907517 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1907517-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Simon Doiron on 29-MAR-17 @ 10:00							
Matrix: WASTE WATER BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene Benzene	<0.00050		0.00050	mg/L		11-APR-17	R3696817
Toluene	0.0026		0.0010	mg/L		11-APR-17	R3696817
Ethyl benzene	<0.00050		0.00050	mg/L		11-APR-17	R3696817
o-Xylene	<0.00050		0.00050	mg/L		11-APR-17	R3696817
m+p-Xylenes	<0.00050		0.00050	mg/L		11-APR-17	R3696817
F1 (C6-C10)	<0.10		0.10	mg/L		11-APR-17	R3696817
Surrogate: 4-Bromofluorobenzene (SS)	84.0		70-130	%		11-APR-17	R3696817
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.97		0.10	mg/L	05-APR-17	05-APR-17	R3694227
F3 (C16-C34)	16.4		0.25	mg/L	05-APR-17	05-APR-17	R3694227
F4 (C34-C50)	5.52		0.25	mg/L	05-APR-17	05-APR-17	R3694227
Surrogate: 2-Bromobenzotrifluoride	84.1		60-140	%	05-APR-17	05-APR-17	R3694227
CCME Total Hydrocarbons						44 455 :=	
F1-BTEX	<0.10		0.10	mg/L		11-APR-17	
F2-Naphth	0.97		0.10	mg/L		11-APR-17	
F3-PAH Total Hydrocorbons (C6 C50)	16.4		0.25	mg/L		11-APR-17	
Total Hydrocarbons (C6-C50)	22.9		0.38	mg/L		11-APR-17	
Sum of Xylene Isomer Concentrations Xylenes (Total)	<0.00071		0.00071	mg/L		11-APR-17	
Ayleries (Total)	20.00071		0.00071	IIIg/L		11-A1 K-17	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000065		0.000020	mg/L	03-APR-17	03-APR-17	R3691722
2-Methyl Naphthalene	0.000083		0.000020	mg/L	03-APR-17	03-APR-17	R3691722
Acenaphthene	0.000022		0.000020	mg/L	03-APR-17	03-APR-17	R3691722
Acenaphthylene	<0.000020		0.000020	mg/L	03-APR-17	03-APR-17	R3691722
Anthracene	<0.00010		0.000010	mg/L	03-APR-17	03-APR-17	R3691722
Acridine	<0.000020		0.000020	mg/L	03-APR-17	03-APR-17	R3691722
Benzo(a)anthracene	<0.000010		0.000010	mg/L	03-APR-17	03-APR-17	R3691722
Benzo(a)pyrene	<0.000050	DLM	0.000050	mg/L	03-APR-17	03-APR-17	R3691722
Benzo(b&j)fluoranthene	<0.00010	DLM	0.00010	mg/L	03-APR-17	03-APR-17	R3691722
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	03-APR-17	03-APR-17	R3691722
Benzo(k)fluoranthene	<0.00010	DLM	0.00010	mg/L	03-APR-17	03-APR-17	R3691722
Chrysene	<0.000020		0.000020	mg/L	03-APR-17	03-APR-17	R3691722
Dibenzo(a,h)anthracene	<0.00010	DLM	0.00010	mg/L	03-APR-17	03-APR-17	R3691722
Fluoranthene	0.000036		0.000020	mg/L	03-APR-17	03-APR-17	R3691722
Fluorene	0.000025	DIM	0.000020	mg/L	03-APR-17	03-APR-17	R3691722
Indeno(1,2,3-cd)pyrene	<0.00020	DLM	0.00020	mg/L	03-APR-17	03-APR-17	R3691722
Naphthalene Phenanthrene	<0.000050		0.000050	mg/L	03-APR-17	03-APR-17	R3691722
Pyrene Pyrene	0.000087		0.000050	mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3691722
Quinoline	<0.000010 <0.000050	DLM	0.000010 0.000050	mg/L mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3691722 R3691722
B(a)P Total Potency Equivalent	<0.000030	DEIVI	0.000050	mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3691722
Surrogate: Acenaphthene d10	74.5		40-130	mg/L %	03-APR-17	03-AFR-17 03-APR-17	R3691722
Surrogate: Aceriaprillerie d 10 Surrogate: Acridine d9	89.5		40-130	%	03-APR-17	03-AFR-17	R3691722
Surrogate: Chrysene d12	52.9		40-130	%	03-APR-17	03-APR-17	R3691722
Surrogate: Naphthalene d8	106.8		40-130	%	03-APR-17	03-APR-17	R3691722
Surrogate: Phenanthrene d10	82.8		40-130	%	03-APR-17	03-APR-17	R3691722
Nunavut WW Group 1				• •			
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	232		1.2	mg/L		03-APR-17	
Alkalinity, Carbonate		<u> </u>					

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

L1907517 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
LACOZEAZ A DANIZINI INIJET MINITO EFFILIENT							
L1907517-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Simon Doiron on 29-MAR-17 @ 10:00							
Matrix: WASTE WATER							
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		03-APR-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		03-APR-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	190		1.0	mg/L		31-MAR-17	R3690848
Ammonia by colour Ammonia, Total (as N)	13.5		1.0	mg/L		04-APR-17	R3692851
Biochemical Oxygen Demand (BOD)	10.0		1.0	mg/L		04711111	10002001
Biochemical Oxygen Demand Carbonaceous BOD	392		50	mg/L		31-MAR-17	R3694537
BOD Carbonaceous	390		50	mg/L		31-MAR-17	R3694537
Chloride in Water by IC Chloride (CI)	75.9		1.0	mg/L		31-MAR-17	R3694397
Conductivity Conductivity	753		1.0	umhos/cm		31-MAR-17	R3690848
Fecal Coliform Fecal Coliforms	>110000		3	MPN/100mL		31-MAR-17	R3692140
Hardness Calculated Hardness (as CaCO3)	134	нтс	0.25	mg/L		05-APR-17	
Mercury Total Mercury (Hg)-Total	0.0000159		0.0000050	mg/L	03-APR-17	04-APR-17	R3692552
Nitrate in Water by IC					03-AFK-17		
Nitrate (as N)	0.058		0.040	mg/L		31-MAR-17	R3694397
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		06-APR-17	
Nitrite in Water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		31-MAR-17	R3694397
Oil & Grease - Gravimetric Oil and Grease	44.3		5.0	mg/L		05-APR-17	R3692778
Phenol (4AAP) Phenols (4AAP)	0.0471		0.0010	mg/L		06-APR-17	R3694880
Phosphorus, Total Phosphorus (P)-Total	6.16		0.10	mg/L		04-APR-17	R3692515
Sulfate in Water by IC	0.10		0.10	9, _		VI / WINCII	1.0002010
Sulfate (SO4)	37.0		0.60	mg/L		31-MAR-17	R3694397
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.224		0.0050	mg/L	03-APR-17	03-APR-17	R3692031
Arsenic (As)-Total	0.00106		0.00020	mg/L	03-APR-17	03-APR-17	R3692031
Calcium (Ca) Total	0.000066		0.000010	mg/L	03-APR-17	03-APR-17	R3692031
Calcium (Ca)-Total Chromium (Cr)-Total	38.9		0.10	mg/L	03-APR-17	03-APR-17	R3692031
Cobalt (Co)-Total	<0.0010		0.0010	mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3692031
Copper (Cu)-Total	0.00027 0.316		0.00020 0.00020	mg/L mg/l	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3692031
Iron (Fe)-Total	0.316		0.00020	mg/L mg/l	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3692031 R3692031
Lead (Pb)-Total	0.952		0.00090	mg/L mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	
Magnesium (Mg)-Total	0.00213 8.97		0.00090	mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3692031 R3692031
Manganese (Mn)-Total	8.97 0.0437		0.010	-	03-APR-17 03-APR-17	03-APR-17 03-APR-17	
Nickel (Ni)-Total	0.0437		0.00030	mg/L mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3692031 R3692031
Potassium (K)-Total	14.7		0.0020	mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	
Sodium (Na)-Total	49.5		0.020	mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3692031 R3692031
Zinc (Zn)-Total	49.5 0.147		0.030	mg/L	03-APR-17 03-APR-17	03-APR-17 03-APR-17	R3692031
Total Organic Carbon by Combustion	0.147		0.0020	IIIg/L	00-VI-U-II	00-VI- IV- II	173092031

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

L1907517 CONTD.... PAGE 4 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1907517-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Simon Doiron on 29-MAR-17 @ 10:00							
Matrix: WASTE WATER Total Organic Carbon by Combustion							
Total Organic Carbon by Combustion Total Organic Carbon	109		2.5	mg/L		04-APR-17	R3692537
Total Suspended Solids Total Suspended Solids	575		25	mg/L		06-APR-17	R3695083
pH						31-MAR-17	
pH	6.47		0.10	pH units		31-WAR-17	R3690848

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

L1907517 CONTD....

PAGE 5 of 7 Version: FINAL

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALC Test Code		Total December 2	Mothed Deference**
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- Water Alkalinity, Bicarbonate CALCULATION WP

The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water.

The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO3-/L

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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

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

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

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

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.

L1907517 CONTD....

PAGE 6 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

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

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average
- 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
- 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F2-F4-FID-WP W

Water

CCME PHC F2-F4 in Water

EPA 3511

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

FC-MPN-WP

Water

Fecal Coliform

APHA 9221E

The Most Probable Number (MPN) method is based on the Multiple Tube Fermentation technique. Aliquots from three or more decimal dilutions of a sample are inoculated into tubes containing enrichment media and incubated at 35C for 48 – 3 hours. Sample aliquots exhibiting the characteristic positive response are transferred to various selective media for the coliform group(s) of interest and incubated at specific temperatures and times. The Most Probable Number for each target group is statistically derived from a standard MPN table based on the combinations of positive outcomes at each dilution.

The fecal (thermotolerant) coliform group may include organisms not originating in the intestines of warm-blooded animals.

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-L-MS-WP

Water

Total Metals by ICP-MS

APHA 3030E/EPA 6020A-TL

This analysis involves preliminary sample treatment by hotblock acid digestion (APHA 3030E). Instrumental analysis is by inductively coupled plasma mass spectrometry (EPA Method 6020A).

NH3-COL-WP

Water

Ammonia by colour

APHA 4500 NH3 F

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

NO2+NO3-CALC-WP

Water

Nitrate+Nitrite

CALCULATION

NO2-IC-N-WP

Water

Nitrite in Water by IC

EPA 300.1 (mod)

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

NO3-IC-N-WP

Water

Nitrate in Water by IC

EPA 300.1 (mod)

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

OG-GRAV-WP

Water

Oil & Grease - Gravimetric

EPA 1664 (modified)

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

P-T-COL-WP

Water

Phosphorus, Total

APHA 4500 P PHOSPHORUS

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

PAH, PANH-WP

Water

Polyaromatic Hydrocarbons (PAHs)

EPA SW 846/8270-GC/MS

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

PH-WP

Vater

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)

pΗ

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)

L1907517 CONTD....

PAGE 7 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

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

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

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

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

CALCULATED RESULT

Total xylenes represents the sum of o-xylene and m&p-xylene.

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

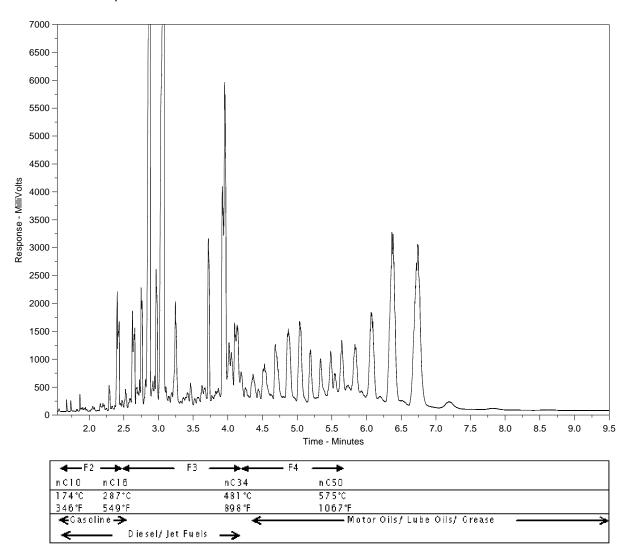
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L1907517-1

Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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

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	Rankin Inlet , NU, 2	X0C 0G0		Email 2:	mlusty@gov.nu	.ca		O™	me Da	y or W	eekend E	merge	ncy - Con	tact ALS	to Conf	irm TAT			
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Hardcopy of In	rvoice with Report?	Yes	☐ No	Job #:	Rankin Inlet W	VTP- Monthly Ef	ffluent											_	
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Sample #	(Th	Sample le	dentification	report)	Date Sampled	Time Sampled	Sample Type	XTX.F.	PAH,P.	UNAV								Number	
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Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 28-APR-17

Report Date: 09-MAY-17 12:15 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1918766

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L1918766 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1918766-1 RANKIN INLET WWTP - EFFLUENT							
L1918766-1 RANKIN INLET WWTP - EFFLUENT Sampled By: Kelly Adams on 26-APR-17 @ 11:30							
' '							
Matrix: WASTE BTEX plus F1-F4							
BTX plus F1 by GCMS Benzene	<0.00050		0.00050	mg/L		01-MAY-17	R3713689
Toluene	0.0015		0.0010	mg/L		01-MAY-17	R3713689
Ethyl benzene	<0.00050		0.00050	mg/L		01-MAY-17	R3713689
o-Xylene	<0.00050		0.00050	mg/L		01-MAY-17	R3713689
m+p-Xylenes	<0.00050		0.00050	mg/L		01-MAY-17	R3713689
F1 (C6-C10)	<0.10		0.10	mg/L		01-MAY-17	R3713689
Surrogate: 4-Bromofluorobenzene (SS)	86.9		70-130	%		01-MAY-17	R3713689
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.71		0.10	mg/L	29-APR-17	29-APR-17	R3711595
F3 (C16-C34)	13.1		0.25	mg/L	29-APR-17	29-APR-17	R3711595
F4 (C34-C50)	4.89		0.25	mg/L	29-APR-17	29-APR-17	R3711595
Surrogate: 2-Bromobenzotrifluoride	107.7		60-140	%	29-APR-17	29-APR-17	R3711595
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		08-MAY-17	
F2-Naphth	0.71		0.10	mg/L		08-MAY-17	
F3-PAH	13.1		0.25	mg/L		08-MAY-17	
Total Hydrocarbons (C6-C50)	18.7		0.38	mg/L		08-MAY-17	
Sum of Xylene Isomer Concentrations Xylenes (Total)	<0.00071		0.00071	mg/L		03-MAY-17	
Miscellaneous Parameters	<0.00071		0.00071	IIIg/L		03-WAT-17	
Fecal Coliforms	>24200		10	MPN/100mL		28-APR-17	R3710248
Polyaromatic Hydrocarbons (PAHs)	>24200		10	IVIE IN/ TOOTTIL		20-AFR-17	K3/ 10240
1-Methyl Naphthalene	0.000035		0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
2-Methyl Naphthalene	0.000049		0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
Acenaphthene	<0.000020		0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
Acenaphthylene	<0.00020		0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
Anthracene	<0.00010		0.000010	mg/L	05-MAY-17	05-MAY-17	R3716810
Acridine	<0.000020		0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
Benzo(a)anthracene	<0.000010		0.000010	mg/L	05-MAY-17	05-MAY-17	R3716810
Benzo(a)pyrene	<0.000050	DLM	0.000050	mg/L	05-MAY-17	05-MAY-17	R3716810
Benzo(b&j)fluoranthene	<0.00010	DLM	0.00010	mg/L	05-MAY-17	05-MAY-17	R3716810
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	05-MAY-17	05-MAY-17	R3716810
Benzo(k)fluoranthene	<0.00010	DLM	0.00010	mg/L	05-MAY-17	05-MAY-17	R3716810
Chrysene	<0.000020		0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
Dibenzo(a,h)anthracene	<0.00010	DLM	0.00010	mg/L	05-MAY-17	05-MAY-17	R3716810
Fluoranthene	<0.000020		0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
Fluorene	<0.000020	DIA	0.000020	mg/L	05-MAY-17	05-MAY-17	R3716810
Indeno(1,2,3-cd)pyrene	<0.00010	DLM	0.00010	mg/L	05-MAY-17	05-MAY-17	R3716810
Naphthalene Phenanthrene	<0.000050		0.000050	mg/L	05-MAY-17	05-MAY-17	R3716810
Pnenantnrene Pyrene	<0.000050	EMPC	0.000050	mg/L	05-MAY-17	05-MAY-17	R3716810
Pyrene Quinoline	0.000021	LIVIPO	0.000010	mg/L	05-MAY-17 05-MAY-17	05-MAY-17 05-MAY-17	R3716810
B(a)P Total Potency Equivalent	0.000048 0.000137		0.000020 0.000067	mg/L mg/L	05-MAY-17	05-MAY-17	R3716810 R3716810
Surrogate: Acenaphthene d10	87.5		40-130	mg/L %	05-MAY-17	05-MAY-17	R3716810
Surrogate: Aceriaprilierie d 10 Surrogate: Acridine d9	108.6		40-130	%	05-MAY-17	05-MAY-17	R3716810
Surrogate: Chrysene d12	62.5		40-130	%	05-MAY-17	05-MAY-17	R3716810
Surrogate: Naphthalene d8	115.2		40-130	%	05-MAY-17	05-MAY-17	R3716810
Surrogate: Phenanthrene d10	94.4		40-130	%	05-MAY-17	05-MAY-17	R3716810
Nunavut WW Group 1	J-77		13 130	"	JU 11	00	1.0. 10010
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	179		1.2	mg/L		01-MAY-17	

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

L1918766 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
LAGAGICCA DANIZINI INI ET MANTO EEST VENT							
L1918766-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Kelly Adams on 26-APR-17 @ 11:30							
Matrix: WASTE							
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		01-MAY-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		01-MAY-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	146		1.0	mg/L		28-APR-17	R3710615
Ammonia by colour Ammonia, Total (as N)	6.35		0.10	mg/L		28-APR-17	R3710257
Biochemical Oxygen Demand (BOD) Biochemical Oxygen Demand	182		50	mg/L		28-APR-17	R3714324
Carbonaceous BOD BOD Carbonaceous				-			
Chloride in Water by IC	159		50	mg/L		28-APR-17	R3714324
Chloride (CI)	86.4		0.50	mg/L		28-APR-17	R3710825
Conductivity Conductivity	682		1.0	umhos/cm		28-APR-17	R3710615
Hardness Calculated Hardness (as CaCO3)	129	нтс	0.25	mg/L		03-MAY-17	
Mercury Total Mercury (Hg)-Total	0.0000164		0.0000050	mg/L	04-MAY-17	04-MAY-17	R3716728
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		28-APR-17	R3710825
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		01-MAY-17	
Nitrite in Water by IC							
Nitrite (as N) Oil & Grease - Gravimetric	<0.010		0.010	mg/L		28-APR-17	R3710825
Oil and Grease	33.3		5.0	mg/L		04-MAY-17	R3714774
Phenol (4AAP) Phenols (4AAP)	0.0102		0.0010	mg/L		08-MAY-17	R3717207
Phosphorus, Total Phosphorus (P)-Total	3.78		0.10	mg/L		01-MAY-17	R3710693
Sulfate in Water by IC Sulfate (SO4)	40.5		0.30	mg/L		28-APR-17	R3710825
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.156		0.0050	mg/L	02-MAY-17	02-MAY-17	R3713525
Arsenic (As)-Total	0.00106		0.00020	mg/L	02-MAY-17	02-MAY-17	R3713525
Cadmium (Cd)-Total	0.000069		0.000010	mg/L	02-MAY-17	02-MAY-17	R3713525
Calcium (Ca)-Total	37.0		0.10	mg/L	02-MAY-17	02-MAY-17	R3713525
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	02-MAY-17	02-MAY-17	R3713525
Cobalt (Co)-Total	0.00020		0.00020	mg/L	02-MAY-17	02-MAY-17	R3713525
Copper (Cu)-Total	0.223		0.00020	mg/L	02-MAY-17	02-MAY-17	R3713525
Iron (Fe)-Total	0.543		0.010	mg/L	02-MAY-17	02-MAY-17	R3713525
Lead (Pb)-Total	0.00156		0.000090	mg/L	02-MAY-17	02-MAY-17	R3713525
Magnesium (Mg)-Total Manganese (Mn)-Total	8.86		0.010	mg/L	02-MAY-17 02-MAY-17	02-MAY-17	R3713525
Nickel (Ni)-Total	0.0522 0.0031		0.00030 0.0020	mg/L mg/L	02-MAY-17 02-MAY-17	02-MAY-17 02-MAY-17	R3713525 R3713525
Potassium (K)-Total	11.9		0.0020	mg/L	02-MAY-17	02-MAY-17	R3713525
Sodium (Na)-Total	47.0		0.020	mg/L	02-MAY-17	02-MAY-17	R3713525
Zinc (Zn)-Total	0.0919		0.030	mg/L	02-MAY-17	02-MAY-17	R3713525
Total Organic Carbon by Combustion				·	02 IVI/11-17		
Total Organic Carbon	106		2.5	mg/L		02-MAY-17	R3713672
Total Suspended Solids							

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

L1918766 CONTD.... PAGE 4 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1918766-1 RANKIN INLET WWTP - EFFLUENT Sampled By: Kelly Adams on 26-APR-17 @ 11:30 Matrix: WASTE							
Total Suspended Solids Total Suspended Solids pH	140		100	mg/L		01-MAY-17	R3711588
рН	7.13		0.10	pH units		28-APR-17	R3710615

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

L1918766 CONTD....

PAGE 5 of 7 Version: FINAL

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
EMPC	Estimated Maximum Possible Concentration. Parameter detected but didn't meet all criteria for positive identification.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

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- Water Alkalinity, Bicarbonate CALCULATION WP

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

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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

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

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

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

L1918766 CONTD....

PAGE 6 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
- 3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
- 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
- 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

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

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

FC10-QT97-WP Water Fecal coliforms, 1:10 dilution by QT97 APHA 9223B QT97

Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Fecal (thermotolerant) coliform bacteria are determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 44.5 – 0.2°C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.

HARDNESS-CALC-WP Water Hardness Calculated APHA 2340B

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

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

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

MET-T-L-MS-WP Water Total Metals by ICP-MS APHA 3030E/EPA 6020A-TL

This analysis involves preliminary sample treatment by hotblock acid digestion (APHA 3030E). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

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

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

NO2+NO3-CALC-WP Water Nitrate+Nitrite CALCULATION

NO2-IC-N-WP Water Nitrite in Water by IC EPA 300.1 (mod)

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

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

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

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

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

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

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

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

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

PH-WP Water pH APHA 4500H

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

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

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

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

L1918766 CONTD....

PAGE 7 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

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

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

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

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

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.

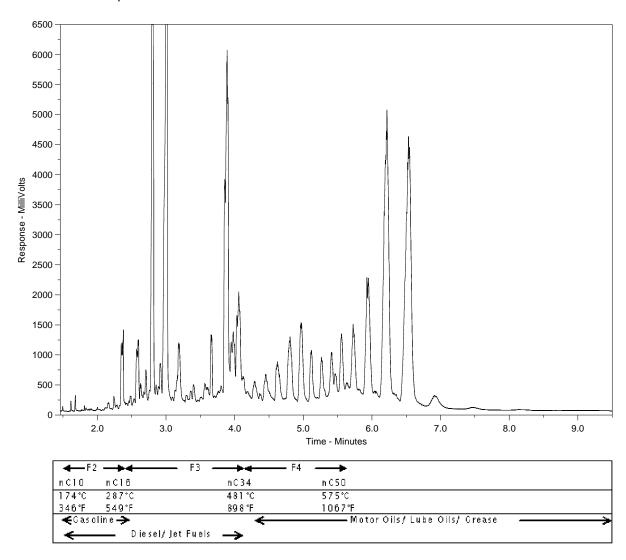
Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

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



ALS Sample ID: L1918766-1

Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

S) Environmental

Chain of Custody / Analytical Request Form Canada Toll Free: 1 800 668 9878

www.alsglobal.com

	COC#			
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Contact:	SIMON DOIRON	☑ PDF	☑PDF ☐Excel ☐Digital ☐Fax					2-4 Bus	- ####################################						1111	
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	Rankin Inlet , NU, X0C 0G0	Email 2:	mlusty@gov.nu	.ca		O\$a	me Day	or W		Ļ	.1918	3766-0	COFC		,,	
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	/-GRP1-WP pkg includes 1 L BOD/CBOD, 1 L Routine, 250 n fials for BTX,F1-F4 and 1 L Amber for PAH's = Total of 15 Bo			l, 250 ml Amber	Nutrient , 250 ml	Amb	er Phe	enols,	2 x 250	ml An	ber O	il & Gr	ease , 2	50 ml E	3acteria	(9
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Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 31-MAY-17

Report Date: 12-JUN-17 07:22 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1934317

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L1934317 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1934317-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Simon Doiron on 29-MAY-17 @ 13:00							
Matrix: Waste							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		01-JUN-17	R3737923
Toluene	0.0036		0.0010	mg/L		01-JUN-17	R3737923
Ethyl benzene	0.00164		0.00050	mg/L		01-JUN-17	R3737923
o-Xylene	0.00231		0.00050	mg/L		01-JUN-17	R3737923
m+p-Xylenes	0.00420		0.00050	mg/L		01-JUN-17	R3737923
F1 (C6-C10)	<0.10		0.10	mg/L		01-JUN-17	R3737923
Surrogate: 4-Bromofluorobenzene (SS)	93.8		70-130	%		01-JUN-17	R3737923
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.48		0.10	mg/L	01-JUN-17	01-JUN-17	R3737918
F3 (C16-C34)	7.47		0.25	mg/L	01-JUN-17	01-JUN-17	R3737918
F4 (C34-C50)	3.31		0.25	mg/L	01-JUN-17	01-JUN-17	R3737918
Surrogate: 2-Bromobenzotrifluoride	95.5		60-140	%	01-JUN-17	01-JUN-17	R3737918
CCME Total Hydrocarbons						00 "":	
F1-BTEX	<0.10		0.10	mg/L		09-JUN-17	
F2-Naphth F3-PAH	0.48		0.10	mg/L		09-JUN-17	
	7.47		0.25	mg/L		09-JUN-17	
Total Hydrocarbons (C6-C50)	11.3		0.38	mg/L		09-JUN-17	
Sum of Xylene Isomer Concentrations Xylenes (Total)	0.00651		0.00071	mg/L		02-JUN-17	
Ayleries (Total)	0.00031		0.00071	mg/L		02-3011-17	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000068		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
2-Methyl Naphthalene	0.000091		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthylene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Anthracene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Acridine	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(a)anthracene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(a)pyrene	0.0000060	EMPC	0.0000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Chrysene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Dibenzo(a,h)anthracene	<0.000050	DLM	0.000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Fluoranthene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Fluorene	<0.000020	DIM	0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Indeno(1,2,3-cd)pyrene	<0.00010	DLM	0.00010	mg/L	07-JUN-17	08-JUN-17	R3743483
Naphthalene	0.000139		0.000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Phenanthrene	<0.000050	EMPC	0.000050	mg/L	07-JUN-17 07-JUN-17	08-JUN-17	R3743483
Pyrene Quinoline	0.000015	EMPC	0.000010 0.000020	mg/L	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
B(a)P Total Potency Equivalent	0.000066 0.000039	LIVIFO	0.000020	mg/L mg/l	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Surrogate: Acenaphthene d10	98.4		40-130	mg/L %	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Surrogate: Aceriapritierie d 10 Surrogate: Acridine d9	96.4 106.5		40-130	%	07-JUN-17	08-JUN-17 08-JUN-17	R3743483
Surrogate: Achdine d9 Surrogate: Chrysene d12	63.1		40-130	% %	07-30N-17 07-JUN-17	08-JUN-17	R3743483
Surrogate: Naphthalene d8	131.7	SOL:MI	40-130	% %	07-30N-17 07-JUN-17	08-JUN-17	R3743483
Surrogate: Phenanthrene d10	88.6		40-130	%	07-30N-17 07-JUN-17	08-JUN-17	R3743483
Nunavut WW Group 1	55.0		10 100	, 0			1.07 10400
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	135		1.2	mg/L		02-JUN-17	
Alkalinity, Carbonate							

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

L1934317 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
14024247.4 DANIZINI INI ET WWTD. EEELIENT							
L1934317-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Simon Doiron on 29-MAY-17 @ 13:00							
Matrix: Waste							
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		02-JUN-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		02-JUN-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	111		1.0	mg/L		01-JUN-17	R3737831
Ammonia by colour							
Ammonia, Total (as N) Biochemical Oxygen Demand (BOD)	3.61		0.10	mg/L		01-JUN-17	R3737830
Biochemical Oxygen Demand	58		20	mg/L		01-JUN-17	R3740817
Carbonaceous BOD BOD Carbonaceous	47		20	mg/L		01-JUN-17	R3740817
Chloride in Water by IC Chloride (Cl)	74.7		0.50	mg/L		01-JUN-17	R3739668
Conductivity Conductivity	549		1.0	umhos/cm		01-JUN-17	R3737831
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms Hardness Calculated	>24200		10	MPN/100mL		31-MAY-17	R3737044
Hardness (as CaCO3)	127	HTC	0.25	mg/L		06-JUN-17	
Mercury Total Mercury (Hg)-Total	0.0000198		0.0000050	mg/L	01-JUN-17	06-JUN-17	R3740755
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		01-JUN-17	R3739668
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		05-JUN-17	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		01-JUN-17	R3739668
Oil & Grease - Gravimetric			0.010				K3/39000
Oil and Grease Phenol (4AAP)	22.6		5.0	mg/L		08-JUN-17	R3743055
Phenols (4AAP)	0.0071		0.0010	mg/L		09-JUN-17	R3743255
Phosphorus, Total Phosphorus (P)-Total	1.51		0.050	mg/L		02-JUN-17	R3738888
Sulfate in Water by IC Sulfate (SO4)	35.7		0.30	mg/L		01-JUN-17	R3739668
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.134		0.0050	mg/L	05-JUN-17	05-JUN-17	R3740322
Arsenic (As)-Total	0.00112		0.00020	mg/L	05-JUN-17	05-JUN-17	R3740322
Cadmium (Ca) Total	0.000085		0.000010	mg/L	05-JUN-17	05-JUN-17	R3740322
Calcium (Ca)-Total Chromium (Cr)-Total	36.6		0.10	mg/L	05-JUN-17	05-JUN-17	R3740322
Cobalt (Co)-Total	0.0012		0.0010	mg/L	05-JUN-17 05-JUN-17	05-JUN-17 05-JUN-17	R3740322 R3740322
Copper (Cu)-Total	0.00034		0.00020	mg/L mg/l	05-JUN-17 05-JUN-17	05-JUN-17 05-JUN-17	
Iron (Fe)-Total	0.162 0.443		0.00020	mg/L	05-JUN-17 05-JUN-17	05-JUN-17 05-JUN-17	R3740322
			0.010	mg/L	05-JUN-17 05-JUN-17		R3740322
Lead (Pb)-Total Magnesium (Mg)-Total	0.00394		0.000090	mg/L	05-JUN-17 05-JUN-17	05-JUN-17 05-JUN-17	R3740322 R3740322
	8.59		0.010	mg/L			
Manganese (Mn)-Total Nickel (Ni)-Total	0.0771		0.00030	mg/L	05-JUN-17	05-JUN-17	R3740322
	0.0047		0.0020	mg/L	05-JUN-17	05-JUN-17	R3740322
Potassium (K)-Total	8.19		0.020	mg/L	05-JUN-17	05-JUN-17	R3740322
Sodium (Na)-Total	59.8		0.030	mg/L	05-JUN-17	05-JUN-17	R3740322
Zinc (Zn)-Total	0.0660		0.0020	mg/L	05-JUN-17	05-JUN-17	R3740322
Total Organic Carbon by Combustion							

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

L1934317 CONTD.... PAGE 4 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1934317-1 RANKIN INLET WWTP - EFFLUENT Sampled By: Simon Doiron on 29-MAY-17 @ 13:00							
Matrix: Waste							
Total Organic Carbon by Combustion Total Organic Carbon	44.8		0.50	mg/L		02-JUN-17	R3739799
Total Suspended Solids Total Suspended Solids pH	90		17	mg/L		02-JUN-17	R3739964
pH	7.12		0.10	pH units		01-JUN-17	R3737831

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

L1934317 CONTD....

PAGE 5 of 7
Version: FINAL

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
EMPC	Estimated Maximum Possible Concentration. Parameter detected but didn't meet all criteria for positive identification.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

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- Water Alkalinity, Bicarbonate CALCULATION

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

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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

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

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

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

L1934317 CONTD....

PAGE 6 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
- 3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
- 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
- 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

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

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

FC10-QT97-WP Water Fecal coliforms, 1:10 dilution by QT97 APHA 9223B QT97

Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Fecal (thermotolerant) coliform bacteria are determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 44.5 – 0.2°C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.

HARDNESS-CALC-WP Water Hardness Calculated APHA 2340B

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

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

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

MET-T-L-MS-WP Water Total Metals by ICP-MS APHA 3030E/EPA 6020A-TL

This analysis involves preliminary sample treatment by hotblock acid digestion (APHA 3030E). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

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

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

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

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

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

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

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

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

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

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

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

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

PH-WP Water pH APHA 4500H

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

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

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

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

L1934317 CONTD....

PAGE 7 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

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

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

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

XYLENES-SUM-CALC-Water

Sum of Xylene Isomer Concentrations

CALCULATED RESULT

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.

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Chain of Custody / Analytical Request Form II Free: 1 800 668 9878

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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 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.

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Nunavut Community & Government

Services - Rankin Inlet ATTN: MEGAN LUSTY

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Rankin Inlet NU XOC 0G0

Date Received: 06-JUN-17

Report Date: 16-JUN-17 08:50 (MT)

Version: FINAL

Client Phone: 867-645-8176

Certificate of Analysis

Lab Work Order #: L1937418

Project P.O. #: NOT SUBMITTED

Job Reference: GN-CGS RANKIN INLET

C of C Numbers: Legal Site Desc:

Hua Wo

Chemistry Laboratory Manager

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

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L1937418 CONTD.... PAGE 2 of 11 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1937418-1 GRA-7							
Sampled By: CF on 05-JUN-17 @ 02:05							
Matrix: WASTE WATER BTEX plus F1-F4							
-							
BTX plus F1 by GCMS Benzene	<0.00050		0.00050	mg/L		09-JUN-17	R3744321
Toluene	<0.0010		0.0010	mg/L		09-JUN-17	R3744321
Ethyl benzene	<0.00050		0.00050	mg/L		09-JUN-17	R3744321
o-Xylene	<0.00050		0.00050	mg/L		09-JUN-17	R3744321
m+p-Xylenes	<0.00040		0.00040	mg/L		09-JUN-17	R3744321
F1 (C6-C10)	<0.10		0.10	mg/L		09-JUN-17	R3744321
Surrogate: 4-Bromofluorobenzene (SS)	96.3		70-130	%		09-JUN-17	R3744321
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.10		0.10	mg/L	07-JUN-17	08-JUN-17	R3743299
F3 (C16-C34)	<0.25		0.25	mg/L	07-JUN-17	08-JUN-17	R3743299
F4 (C34-C50)	<0.25		0.25	mg/L	07-JUN-17	08-JUN-17	R3743299
Surrogate: 2-Bromobenzotrifluoride	97.1		60-140	%	07-JUN-17	08-JUN-17	R3743299
CCME Total Hydrocarbons	0.15			n		40 11 11 4=	
F1-BTEX	<0.10		0.10	mg/L		12-JUN-17	
F2-Naphth	<0.10		0.10	mg/L		12-JUN-17	
F3-PAH Total Hydrocorbons (C6 C50)	<0.25 <0.38		0.25 0.38	mg/L		12-JUN-17 12-JUN-17	
Total Hydrocarbons (C6-C50)	<0.36		0.36	mg/L		12-JUN-17	
Sum of Xylene Isomer Concentrations Xylenes (Total)	<0.00064		0.00064	mg/L		12-JUN-17	
Aylenes (Total)	<0.00004		0.00004	1119/ =		12 0011 17	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthylene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Anthracene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Acridine	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(a)anthracene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(a)pyrene	<0.000050		0.0000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Chrysene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Dibenzo(a,h)anthracene Fluoranthene	<0.000050		0.0000050 0.000020	mg/L	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483
Fluorantnene	<0.000020 <0.000020		0.000020	mg/L mg/L	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Indeno(1,2,3-cd)pyrene	<0.000020		0.000020	mg/L	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Naphthalene	<0.000010		0.000010	mg/L	07-30N-17 07-JUN-17	08-JUN-17	R3743483
Phenanthrene	<0.000050		0.000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Pyrene	<0.000030		0.000030	mg/L	07-JUN-17	08-JUN-17	R3743483
Quinoline	<0.000020		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	07-JUN-17	08-JUN-17	R3743483
Surrogate: Acenaphthene d10	102.9		40-130	%	07-JUN-17	08-JUN-17	R3743483
Surrogate: Acridine d9	120.1		40-130	%	07-JUN-17	08-JUN-17	R3743483
Surrogate: Chrysene d12	104.5		40-130	%	07-JUN-17	08-JUN-17	R3743483
Surrogate: Naphthalene d8	95.6		40-130	%	07-JUN-17	08-JUN-17	R3743483
Surrogate: Phenanthrene d10	103.8		40-130	%	07-JUN-17	08-JUN-17	R3743483
Nunavut WW Group 1							
Alkalinity, Bicarbonate	0		4.5			00 11 11 4=	
Bicarbonate (HCO3)	24.9		1.2	mg/L		09-JUN-17	
Alkalinity, Carbonate							

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

L1937418 CONTD.... PAGE 3 of 11 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1937418-1 GRA-7							
Sampled By: CF on 05-JUN-17 @ 02:05							
Matrix: WASTE WATER							
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		09-JUN-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		09-JUN-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	20.4		1.0	mg/L		07-JUN-17	R3742730
Ammonia by colour Ammonia, Total (as N)	<0.010		0.010	mg/L		08-JUN-17	R3743360
Biochemical Oxygen Demand (BOD) Biochemical Oxygen Demand	<2.0		2.0	mg/L		07-JUN-17	R3745691
Carbonaceous BOD BOD Carbonaceous	<2.0					07-JUN-17	
Chloride in Water by IC			2.0	mg/L			R3745691
Chloride (CI) Conductivity	12.6		0.50	mg/L		07-JUN-17	R3743972
Conductivity	88.2		1.0	umhos/cm		07-JUN-17	R3742730
Fecal coliforms, 1:10 dilution by QT97 Fecal Coliforms	<10	MBHT	10	MPN/100mL		06-JUN-17	R3742105
Hardness Calculated Hardness (as CaCO3)	25.6	HTC	0.25	mg/L		09-JUN-17	
Mercury Total Mercury (Hg)-Total	<0.000050		0.0000050	mg/L	08-JUN-17	09-JUN-17	R3743641
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		07-JUN-17	R3743972
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-JUN-17	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		07-JUN-17	R3743972
Oil & Grease - Gravimetric							
Oil and Grease Phenol (4AAP)	<5.0		5.0	mg/L		13-JUN-17	R3746217
Phenols (4AAP)	0.0021		0.0010	mg/L		15-JUN-17	R3747795
Phosphorus, Total Phosphorus (P)-Total	0.011		0.010	mg/L		09-JUN-17	R3743491
Sulfate in Water by IC Sulfate (SO4)	3.94		0.30	mg/L		07-JUN-17	R3743972
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0469		0.0050	mg/L	08-JUN-17	08-JUN-17	R3743269
Arsenic (As)-Total	0.00029		0.00020	mg/L	08-JUN-17	08-JUN-17	R3743269
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	08-JUN-17	08-JUN-17	R3743269
Calcium (Ca)-Total	7.64		0.10	mg/L	08-JUN-17	08-JUN-17	R3743269
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	08-JUN-17	08-JUN-17	R3743269
Copper (Cu)-Total	<0.00020		0.00020	mg/L	08-JUN-17	08-JUN-17	R3743269
Copper (Cu)-Total	0.00074		0.00020	mg/L	08-JUN-17	08-JUN-17	R3743269
Iron (Fe)-Total	0.190		0.010	mg/L	08-JUN-17	08-JUN-17	R3743269
Lead (Pb)-Total	<0.000090		0.000090	mg/L	08-JUN-17	08-JUN-17	R3743269
Magnesium (Mg)-Total	1.58		0.010	mg/L	08-JUN-17	08-JUN-17	R3743269
Manganese (Mn)-Total	0.0156		0.00030	mg/L	08-JUN-17	08-JUN-17	R3743269
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	08-JUN-17	08-JUN-17	R3743269
Potassium (K)-Total	1.33		0.020	mg/L	08-JUN-17	08-JUN-17	R3743269
Sodium (Na)-Total	6.65		0.030	mg/L	08-JUN-17	08-JUN-17	R3743269
Zinc (Zn)-Total	<0.0020		0.0020	mg/L	08-JUN-17	08-JUN-17	R3743269
Total Organic Carbon by Combustion							

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

L1937418 CONTD.... PAGE 4 of 11 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1937418-1 GRA-7							
Sampled By: CF on 05-JUN-17 @ 02:05							
' '							
Matrix: WASTE WATER							
Total Organic Carbon by Combustion Total Organic Carbon	4.76		0.50	mg/L		08-JUN-17	R3743705
Total Suspended Solids				,			
Total Suspended Solids	<5.0		5.0	mg/L		09-JUN-17	R3744998
pH pH	7.31		0.10	pH units		07-JUN-17	R3742730
<u>'</u>	7.31		0.10	pri units		07-30N-17	R3/42/30
L1937418-2 GRA-6							
Sampled By: CF on 05-JUN-17 @ 02:40							
Matrix: WASTE WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS	0.00050		0.00050			00 1111 17	D0744004
Benzene Toluene	<0.00050 <0.0010		0.00050 0.0010	mg/L		09-JUN-17 09-JUN-17	R3744321 R3744321
Ethyl benzene	<0.0010		0.0010	mg/L mg/L		09-JUN-17 09-JUN-17	R3744321 R3744321
o-Xylene	<0.00050		0.00050	mg/L		09-JUN-17 09-JUN-17	R3744321 R3744321
m+p-Xylenes	<0.00030		0.00030	mg/L		09-JUN-17	R3744321
F1 (C6-C10)	<0.10		0.00040	mg/L		09-JUN-17	R3744321
Surrogate: 4-Bromofluorobenzene (SS)	97.6		70-130	%		09-JUN-17	R3744321
CCME PHC F2-F4 in Water	07.0		70 100	70		00 0011 11	1107 44021
F2 (C10-C16)	<0.10		0.10	mg/L	07-JUN-17	08-JUN-17	R3743299
F3 (C16-C34)	<0.25		0.25	mg/L	07-JUN-17	08-JUN-17	R3743299
F4 (C34-C50)	<0.25		0.25	mg/L	07-JUN-17	08-JUN-17	R3743299
Surrogate: 2-Bromobenzotrifluoride	96.6		60-140	%	07-JUN-17	08-JUN-17	R3743299
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		12-JUN-17	
F2-Naphth	<0.10		0.10	mg/L		12-JUN-17	
F3-PAH	<0.25		0.25	mg/L		12-JUN-17	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		12-JUN-17	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		12-JUN-17	
Miscellaneous Parameters							
Biochemical Oxygen Demand	<2.0		2.0	mg/L	07-JUN-17	12-JUN-17	R3745246
BOD Carbonaceous	<2.0		2.0	mg/L	07-JUN-17	12-JUN-17	R3745251
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthulana	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthylene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Anthracene Acridine	<0.000010 <0.000020		0.000010 0.000020	mg/L	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Benzo(a)anthracene	<0.000020		0.000020	mg/L mg/L	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Benzo(a)pyrene	<0.000010		0.000010	mg/L	07-JUN-17 07-JUN-17	08-JUN-17	R3743483 R3743483
Benzo(b&j)fluoranthene	<0.000050		0.0000050	mg/L	07-JUN-17 07-JUN-17	08-JUN-17	R3743483
Benzo(g,h,i)perylene	<0.000010		0.000010	mg/L	07-30N-17 07-JUN-17	08-JUN-17	R3743483
Benzo(k)fluoranthene	<0.000020		0.000020	mg/L	07-30N-17 07-JUN-17	08-JUN-17	R3743483
Chrysene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Dibenzo(a,h)anthracene	<0.000050		0.0000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Fluoranthene	<0.000020		0.000000	mg/L	07-JUN-17	08-JUN-17	R3743483
Fluorene	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Naphthalene	<0.00050		0.000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Phenanthrene	<0.000050		0.000050	mg/L	07-JUN-17	08-JUN-17	R3743483

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

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1937418-2 GRA-6							
Sampled By: CF on 05-JUN-17 @ 02:40							
Matrix: WASTE WATER							
Polyaromatic Hydrocarbons (PAHs)							
Pyrene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Quinoline	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	07-JUN-17	08-JUN-17	R3743483
Surrogate: Acenaphthene d10	100.7		40-130	%	07-JUN-17	08-JUN-17	R3743483
Surrogate: Acridine d9 Surrogate: Chrysene d12	116.5		40-130	%	07-JUN-17 07-JUN-17	08-JUN-17	R3743483
Surrogate: Chrysene d12 Surrogate: Naphthalene d8	101.5 93.7		40-130 40-130	% %	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Surrogate: Phenanthrene d10	99.7		40-130	%	07-30N-17 07-JUN-17	08-JUN-17	R3743483
Nunavut WW Group 1	00.1		10 100	,,	0. 00	33 33.1	1107 10 100
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	28.2		1.2	mg/L		09-JUN-17	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		09-JUN-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		09-JUN-17	
Alkalinity, Total (as CaCO3)	<0.34		0.34	IIIg/L		09-3011-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	23.1		1.0	mg/L		07-JUN-17	R3742730
Ammonia by colour	20.1		1.0	9/ =		G. GG	1107 12700
Ammonia, Total (as N)	<0.010		0.010	mg/L		08-JUN-17	R3743360
Chloride in Water by IC							
Chloride (CI)	13.8		0.50	mg/L		07-JUN-17	R3743868
Conductivity							
Conductivity	96.6		1.0	umhos/cm		07-JUN-17	R3742730
Fecal coliforms, 1:10 dilution by QT97 Fecal Coliforms	<10	MBHT	10	MPN/100mL		06-JUN-17	R3742105
Hardness Calculated	Z 10	WIDITI	10	IVII IN/ IOOIIIL		00-3011-17	K3742103
Hardness (as CaCO3)	27.7	HTC	0.25	mg/L		09-JUN-17	
Mercury Total							
Mercury (Hg)-Total	<0.000050		0.0000050	mg/L	08-JUN-17	09-JUN-17	R3743641
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		07-JUN-17	R3743868
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		12-JUN-17	
Nitrite in Water by IC	<0.070		0.070	IIIg/L		12-00IN-17	
Nitrite (as N)	<0.010		0.010	mg/L		07-JUN-17	R3743868
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		14-JUN-17	R3747057
Phenol (4AAP)							
Phenols (4AAP)	0.0028		0.0010	mg/L		15-JUN-17	R3747795
Phosphorus, (P) Total	0.011		0.010	ma/l		00 111N 17	D2742404
Phosphorus (P)-Total Sulfate in Water by IC	0.011		0.010	mg/L		09-JUN-17	R3743491
Sulfate (SO4)	4.32		0.30	mg/L		07-JUN-17	R3743868
Total Metals by ICP-MS			0.00				1101 10000
Aluminum (Al)-Total	0.0289		0.0050	mg/L	08-JUN-17	08-JUN-17	R3743269
Arsenic (As)-Total	0.00033		0.00020	mg/L	08-JUN-17	08-JUN-17	R3743269
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	08-JUN-17	08-JUN-17	R3743269
Calcium (Ca)-Total	8.28		0.10	mg/L	08-JUN-17	08-JUN-17	R3743269
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	08-JUN-17	08-JUN-17	R3743269
Cobalt (Co)-Total Copper (Cu)-Total	<0.00020 0.00081		0.00020 0.00020	mg/L	08-JUN-17 08-JUN-17	08-JUN-17 08-JUN-17	R3743269
Iron (Fe)-Total	0.00081		0.00020	mg/L mg/L	08-JUN-17 08-JUN-17	08-JUN-17 08-JUN-17	R3743269 R3743269
11017 (1 0) 10tal	0.170		0.010	illy/L	00-00IN-1 <i>I</i>	00-0014-17	13743209

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

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1937418-2 GRA-6							
Sampled By: CF on 05-JUN-17 @ 02:40							
Matrix: WASTE WATER							
Total Metals by ICP-MS Lead (Pb)-Total	<0.000090		0.000090	mg/L	08-JUN-17	08-JUN-17	R3743269
Magnesium (Mg)-Total	<0.000090 1.72		0.00090	mg/L	08-JUN-17	08-JUN-17	R3743269
Manganese (Mn)-Total	0.0106		0.00030	mg/L	08-JUN-17	08-JUN-17	R3743269
Nickel (Ni)-Total	<0.0020		0.00030	mg/L	08-JUN-17	08-JUN-17	R3743269
Potassium (K)-Total	1.40		0.0020	mg/L	08-JUN-17	08-JUN-17	R3743269
Sodium (Na)-Total	7.35		0.020	mg/L	08-JUN-17	08-JUN-17	R3743269
Zinc (Zn)-Total	<0.0020		0.0020	mg/L	08-JUN-17	08-JUN-17	R3743269
Total Organic Carbon by Combustion	.5.5525			<u>-</u>			
Total Organic Carbon	5.04		0.50	mg/L		08-JUN-17	R3743705
Total Suspended Solids	-						
Total Suspended Solids	<5.0		5.0	mg/L		09-JUN-17	R3744998
pH							
pH	7.43		0.10	pH units		07-JUN-17	R3742730
L1937418-3 GRA-1							
Sampled By: CF on 05-JUN-17 @ 03:25							
Matrix: WASTE WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		09-JUN-17	R3744321
Toluene	<0.0010		0.0010	mg/L		09-JUN-17	R3744321
Ethyl benzene	<0.00050		0.00050	mg/L		09-JUN-17	R3744321
o-Xylene	<0.00050		0.00050	mg/L		09-JUN-17	R3744321
m+p-Xylenes	<0.00040		0.00040	mg/L		09-JUN-17	R3744321
F1 (C6-C10)	<0.10		0.10	mg/L		09-JUN-17	R3744321
Surrogate: 4-Bromofluorobenzene (SS)	87.1		70-130	%		09-JUN-17	R3744321
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.10		0.10	mg/L	07-JUN-17	08-JUN-17	R3743299
F3 (C16-C34)	<0.25		0.25	mg/L	07-JUN-17	08-JUN-17	R3743299
F4 (C34-C50)	<0.25		0.25	mg/L	07-JUN-17	08-JUN-17	R3743299
Surrogate: 2-Bromobenzotrifluoride	95.0		60-140	%	07-JUN-17	08-JUN-17	R3743299
CCME Total Hydrocarbons	0.40		0.40			40 11 151 47	
F1-BTEX	<0.10		0.10	mg/L		12-JUN-17	
F2-Naphth F3-PAH	<0.10		0.10	mg/L		12-JUN-17 12-JUN-17	
Total Hydrocarbons (C6-C50)	<0.25 <0.38		0.25 0.38	mg/L mg/L		12-JUN-17 12-JUN-17	
Sum of Xylene Isomer Concentrations	<u.30< td=""><td></td><td>0.36</td><td>mg/L</td><td></td><td>12-3014-17</td><td></td></u.30<>		0.36	mg/L		12-3014-17	
Xylenes (Total)	<0.00064		0.00064	mg/L		12-JUN-17	
Miscellaneous Parameters	-0.000 0		5.55554	9, =			
Biochemical Oxygen Demand	<2.0		2.0	mg/L	07-JUN-17	12-JUN-17	R3745246
BOD Carbonaceous	<2.0		2.0	mg/L	07-30N-17 07-JUN-17	12-JUN-17	R3745251
Polyaromatic Hydrocarbons (PAHs)	\2.0		2.0	ilig/L	0. 00IN-17	12 0014-17	110740201
1-Methyl Naphthalene	<0.000040	DLM	0.000040	mg/L	07-JUN-17	08-JUN-17	R3743483
2-Methyl Naphthalene	<0.000040	DLM	0.000040	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthene	<0.000040	DLM	0.000040	mg/L	07-JUN-17	08-JUN-17	R3743483
Acenaphthylene	<0.00040	DLM	0.000040	mg/L	07-JUN-17	08-JUN-17	R3743483
Anthracene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Acridine	<0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(a)anthracene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
			0.0000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Benzo(a)pyrene	< 0.0000050		0.0000000	9/ =			
Benzo(a)pyrene Benzo(b&j)fluoranthene	<0.0000050		0.0000030	mg/L	07-JUN-17	08-JUN-17	R3743483

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

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1937418-3 GRA-1							
Sampled By: CF on 05-JUN-17 @ 03:25							
Matrix: WASTE WATER							
Polyaromatic Hydrocarbons (PAHs)							
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Chrysene	<0.00000		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Dibenzo(a,h)anthracene	<0.000050		0.0000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Fluoranthene	< 0.000020		0.000020	mg/L	07-JUN-17	08-JUN-17	R3743483
Fluorene	< 0.000040	DLM	0.000040	mg/L	07-JUN-17	08-JUN-17	R3743483
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Naphthalene	<0.00010	DLM	0.00010	mg/L	07-JUN-17	08-JUN-17	R3743483
Phenanthrene	<0.000050		0.000050	mg/L	07-JUN-17	08-JUN-17	R3743483
Pyrene	<0.000010	DIM	0.000010	mg/L	07-JUN-17	08-JUN-17	R3743483
Quinoline B(o)D Total Patanay Equivalent	<0.000040	DLM	0.000040	mg/L	07-JUN-17	08-JUN-17	R3743483
B(a)P Total Potency Equivalent Surrogate: Acenaphthene d10	<0.000030 38.7	SOL:MI	0.000030 40-130	mg/L %	07-JUN-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483 R3743483
Surrogate: Accident d9	38.7 48.9	JOL.IVII	40-130	%	07-30N-17 07-JUN-17	08-JUN-17 08-JUN-17	R3743483
Surrogate: Chrysene d12	44.2		40-130	%	07-JUN-17	08-JUN-17	R3743483
Surrogate: Naphthalene d8	35.2	SOL:MI	40-130	%	07-JUN-17	08-JUN-17	R3743483
Surrogate: Phenanthrene d10	41.5		40-130	%	07-JUN-17	08-JUN-17	R3743483
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	57.1		1.2	mg/L		09-JUN-17	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		09-JUN-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		09-JUN-17	
Alkalinity, Total (as CaCO3)	νο.οτ		0.04	1119/2		00 0011 17	
Alkalinity, Total (as CaCO3)	46.8		1.0	mg/L		07-JUN-17	R3742730
Ammonia by colour							
Ammonia, Total (as N)	0.052		0.010	mg/L		08-JUN-17	R3743360
Chloride in Water by IC				, ,		07 11 11 17	Do-10000
Chloride (CI)	36.9		0.50	mg/L		07-JUN-17	R3743868
Conductivity Conductivity	246		1.0	umhos/cm		07-JUN-17	R3742730
Fecal coliforms, 1:10 dilution by QT97	240		1.0	4111110070111		07 0014 17	1137 427 30
Fecal Coliforms	<10	MBHT	10	MPN/100mL		06-JUN-17	R3742105
Hardness Calculated							
Hardness (as CaCO3)	72.5	HTC	0.25	mg/L		09-JUN-17	
Mercury Total							
Mercury (Hg)-Total	<0.000050		0.0000050	mg/L	08-JUN-17	09-JUN-17	R3743641
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		07-JUN-17	R3743868
Nitrate+Nitrite	<u> </u>		0.020	1119/1		01-00IN-11	11014000
Nitrate and Nitrite as N	<0.070		0.070	mg/L		12-JUN-17	
Nitrite in Water by IC	-						
Nitrite (as N)	<0.010		0.010	mg/L		07-JUN-17	R3743868
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		14-JUN-17	R3747057
Phenol (4AAP) Phenols (4AAP)	0.0027		0.0010	mg/L		15-JUN-17	D3747705
Phosphorus, Total	0.0027		0.0010	IIIg/L		10-00IN-17	R3747795
Phosphorus (P)-Total	0.012		0.010	mg/L		09-JUN-17	R3743491
	· -			J -			
Surface in water by IC		1					
Sulfate in Water by IC Sulfate (SO4)	20.8		0.30	mg/L		07-JUN-17	R3743868

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

L1937418 CONTD.... PAGE 8 of 11 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1937418-3 GRA-1							
Sampled By: CF on 05-JUN-17 @ 03:25							
Matrix: WASTE WATER							
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0135		0.0050	mg/L	08-JUN-17	08-JUN-17	R3743269
Arsenic (As)-Total	0.00052		0.00020	mg/L	08-JUN-17	08-JUN-17	R3743269
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	08-JUN-17	08-JUN-17	R3743269
Calcium (Ca)-Total	21.0		0.10	mg/L	08-JUN-17	08-JUN-17	R3743269
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	08-JUN-17	08-JUN-17	R3743269
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	08-JUN-17	08-JUN-17	R3743269
Copper (Cu)-Total	0.00087		0.00020	mg/L	08-JUN-17	08-JUN-17	R3743269
Iron (Fe)-Total	0.029		0.010	mg/L	08-JUN-17	08-JUN-17	R3743269
Lead (Pb)-Total Magnesium (Mg)-Total	<0.000090		0.000090	mg/L	08-JUN-17	08-JUN-17	R3743269
Manganese (Mn)-Total	4.90 0.0283		0.010 0.00030	mg/L mg/L	08-JUN-17 08-JUN-17	08-JUN-17 08-JUN-17	R3743269 R3743269
Nickel (Ni)-Total	<0.0283		0.00030	mg/L	08-JUN-17 08-JUN-17	08-JUN-17 08-JUN-17	R3743269 R3743269
Potassium (K)-Total	2.61		0.0020	mg/L	08-JUN-17	08-JUN-17	R3743269
Sodium (Na)-Total	22.5		0.020	mg/L	08-JUN-17	08-JUN-17	R3743269
Zinc (Zn)-Total	<0.0020		0.0020	mg/L	08-JUN-17	08-JUN-17	R3743269
Total Organic Carbon by Combustion							
Total Organic Carbon	4.18		0.50	mg/L		08-JUN-17	R3743705
Total Suspended Solids							
Total Suspended Solids	<5.0		5.0	mg/L		09-JUN-17	R3744998
pH							
pH	7.34		0.10	pH units		07-JUN-17	R3742730

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

L1937418 CONTD....

PAGE 9 of 11 Version: FINAL

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MBHT	The APHA 30 hour hold time was exceeded for microbiological testing. Samples processed within 48 hours from time of sampling may be valid in some cases (refer to Health Canada guidance).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

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.

CALCULATION ALK-HCO3HCO3-CALC-Water Alkalinity, Bicarbonate

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-MAN-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-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.

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.

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

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

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

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

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

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.

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

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

EC-WP Water Conductivity **APHA 2510B**

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

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

L1937418 CONTD.... PAGE 10 of 11 Version: FINAL

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.

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

MET-T-L-MS-WP Water Total Metals by ICP-MS APHA 3030E/EPA 6020A-TL

This analysis involves preliminary sample treatment by hotblock acid digestion (APHA 3030E). Instrumental analysis is by inductively coupled plasma mass spectrometry (EPA Method 6020A).

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

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

NO2+NO3-CALC-WP Water Nitrate+Nitrite CALCULATION

NO2-IC-N-WP Water Nitrite in Water by IC EPA 300.1 (mod)

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

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

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

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

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

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

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

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

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

GN-CGS RANKIN INLET

L1937418 CONTD.... PAGE 11 of 11 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description** PH-WP **APHA 4500H** Water

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 Phenol (4AAP) **EPA 9066** Water

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 Total Suspended Solids APHA 2540 D (modified) Water Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.

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

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.

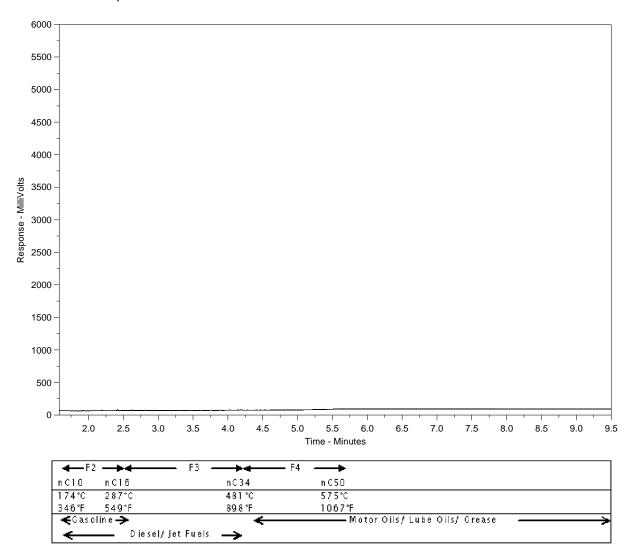
N/A - Result not available. Refer to qualifier code and definition for explanation.

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.



ALS Sample ID: L1937418-1 Client Sample ID: GRA-7



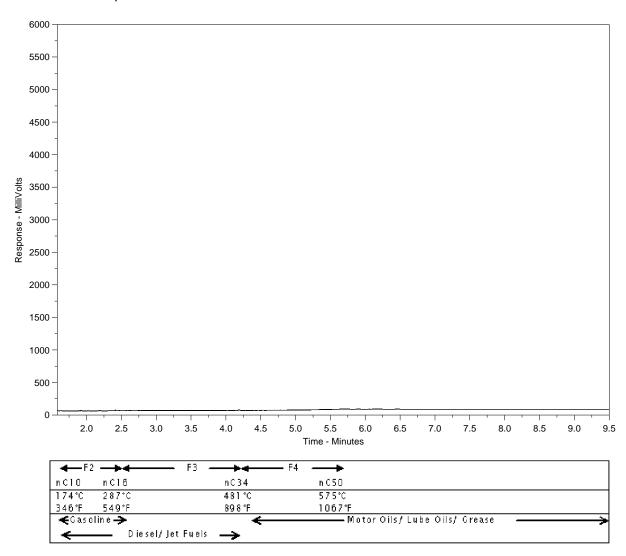
The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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.



ALS Sample ID: L1937418-2 Client Sample ID: GRA-6



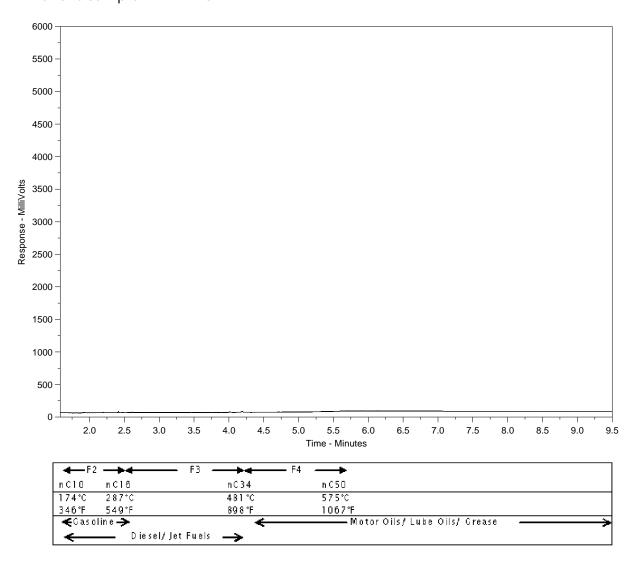
The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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.



ALS Sample ID: L1937418-3 Client Sample ID: GRA-1



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.

Environmental

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com Canada	foll Free: 1 800 66	88 9878		L193/2	116-C	JOPE	,				L	19.	37	419	3		-
Report To	T	Report Format	/ Distribunon		1	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)											
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Contact: Connor Fulkner/Megan Lusty	Quality Control (Quality Control (QC) Report with Report Yes No				P Priority (2-4 business days if received by 3pm)											
Address: Yo Box 490	Criteria on F	teport - provide details belo			E Emergency (1-2 business days if received by 3pm)												
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ALS Lab Work Order # (lab use only)	ALS Contact:	Riddell	Sampler:	aulkner	Rochi	801	Phenois	040	क्ष	0 + /	Backeri	X 18	F.2-	PA			-
ALS Sample # Sample Identification and/or Coordinates (lab use only) (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	اعد)		9	۲	6	'ර	سن						
GRA-7		05-Jun-17	02:05	water	1		P	P	P	P	P	8	P	ρ			15
GRA-6		05-Jun-17	07.40	water	V	/	P	6	9	P	ρ	P	<u>P</u>	ρ			15
68A-1		05-70-17		water	V	\	P	P	P	P.	ρ	P	9	P			15
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

SHIPMENT RELEASE (client use)

Date:

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Drinking Water (DW) Samples1 (client use)

No.

Are samples taken from a Regulated DW System?

Are samples for human drinking water use? 13 0

☐ Yes

厂 Yes

Released by:

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

Fime ()

Yes

ice packs

Cooling Initiated

Received by

INITIAL COOLER TEMPERATURES °C

NA-FM-0328e v99 Front/04 January 2014

Yes 🗌

FINAL COOLER TEMPERATURES °C

SAMPLE CONDITION AS RECEIVED (lab use only)

FINAL SHIPMENT RECEPTION (lab use only)

No Custody seal intact

SIF Observations

BTX IFI-FH

Received by:

Numarut - WW-GRP1-WP

Special Instructions / Specify Criteria to add on report (client Use)

INITIAL SHIPMENT RECEPTION (lab use only)



Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 01-JUL-17

Report Date: 14-JUL-17 06:53 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1952291

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L1952291 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1952291-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT							
Matrix: WASTE							
Nunavut WW Group 1 Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	118		1.2	mg/L		07-JUL-17	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		07-JUL-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		07-JUL-17	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	96.9		1.0	mg/L		05-JUL-17	R3766342
Ammonia by colour Ammonia, Total (as N)	11.9		2.0	mg/L		11-JUL-17	R3769974
Biochemical Oxygen Demand (BOD)	. 1.0		2.0	a, <u>-</u>			
Biochemical Oxygen Demand	94		20	mg/L		01-JUL-17	R3767196
Carbonaceous BOD BOD Carbonaceous	00		20	m c /1		04 11 11 47	D2767400
Chloride in Water by IC	82		20	mg/L		01-JUL-17	R3767196
Chloride (Cl)	49.0		0.50	mg/L		04-JUL-17	R3766502
Conductivity				. ,			
Conductivity	392		1.0	umhos/cm		05-JUL-17	R3766342
Hardness Calculated Hardness (as CaCO3)	75.0	нтс	0.25	mg/L		07-JUL-17	
Mercury Total							
Mercury (Hg)-Total	0.0000084		0.0000050	mg/L	05-JUL-17	07-JUL-17	R3769516
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		04-JUL-17	R3766502
Nitrate+Nitrite	10.020		0.020	9, =		0.002	110700002
Nitrate and Nitrite as N	<0.070		0.070	mg/L		06-JUL-17	
Nitrite in Water by IC Nitrite (as N)	-0.010		0.010	m a/I		04-JUL-17	D2766502
Oil & Grease - Gravimetric	<0.010		0.010	mg/L		04-JUL-17	R3766502
Oil and Grease	29.9		5.0	mg/L		10-JUL-17	R3768790
Phenol (4AAP)							
Phenols (4AAP)	0.0100		0.0010	mg/L		13-JUL-17	R3771332
Phosphorus, Total Phosphorus (P)-Total	2.03		0.050	mg/L		07-JUL-17	R3767086
Sulfate in Water by IC			-				
Sulfate (SO4)	16.3		0.30	mg/L		04-JUL-17	R3766502
Total Metals by ICP-MS Aluminum (Al)-Total	0.240		0.0050	mg/L	06-JUL-17	06-JUL-17	R3766914
Arsenic (As)-Total	0.00071		0.0000	mg/L	06-JUL-17	06-JUL-17	R3766914
Cadmium (Cd)-Total	0.000071		0.000010	mg/L	06-JUL-17	06-JUL-17	R3766914
Calcium (Ca)-Total	21.2		0.10	mg/L	06-JUL-17	06-JUL-17	R3766914
Chromium (Cr)-Total	0.0011		0.0010	mg/L	06-JUL-17	06-JUL-17	R3766914
Cobalt (Co)-Total	0.00043		0.00020	mg/L	06-JUL-17	06-JUL-17	R3766914
Copper (Cu)-Total	0.122		0.00020	mg/L	06-JUL-17	06-JUL-17	R3766914
Iron (Fe)-Total	0.338		0.010	mg/L	06-JUL-17	06-JUL-17	R3766914
Lead (Pb)-Total	0.00263		0.000090	mg/L	06-JUL-17	06-JUL-17	R3766914
Magnesium (Mg)-Total	5.36		0.010	mg/L	06-JUL-17	06-JUL-17	R3766914
Manganese (Mn)-Total	0.0337		0.00030	mg/L	06-JUL-17	06-JUL-17	R3766914
Nickel (Ni)-Total	0.0030		0.0020	mg/L	06-JUL-17	06-JUL-17	R3766914
Potassium (K)-Total	8.00		0.020	mg/L	06-JUL-17	06-JUL-17	R3766914
Sodium (Na)-Total	30.9		0.030	mg/L	06-JUL-17	06-JUL-17	R3766914

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

L1952291 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1952291-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CLIENT							
Matrix: WASTE Total Metals by ICP-MS							
Zinc (Zn)-Total	0.0622		0.0020	mg/L	06-JUL-17	06-JUL-17	R3766914
Total Organic Carbon by Combustion Total Organic Carbon	61.8		0.50	mg/L		11-JUL-17	R3769947
Total Suspended Solids Total Suspended Solids	88		20	mg/L		07-JUL-17	R3768512
pH pH	7.07		0.10	pH units		05-JUL-17	R3766342
				r			

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

L1952291 CONTD....

PAGE 4 of 5 Version: FINAL

Reference Information

Sample Parameter Qualifier Key:

Qualifier Description HTC Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable). MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

C-TOC-HTC-WP

HG-T-CVAF-WP

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-Water WP

Alkalinity, Bicarbonate

CALCULATION

APHA 5310 B-WP

EPA245.7 V2.0

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.

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.

Water

Total Organic Carbon by Combustion

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.

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

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

EC-WP **APHA 2510B** Conductivity

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.

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.

Mercury Total

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

MFT-T-I -MS-WP Total Metals by ICP-MS APHA 3030E/EPA 6020A-TL Water

This analysis involves preliminary sample treatment by hotblock acid digestion (APHA 3030E). Instrumental analysis is by inductively coupled plasma mass spectrometry (EPA Method 6020A).

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)

L1952291 CONTD....

Reference Information

PAGE 5 of 5 Version: FINAL

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

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

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

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

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

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

Grease is determined from the weight of the residue in the vial.

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

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

persulphate digestion of the sample.

PH-WP Water pH APHA 4500H

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

reference electrode.
PHENOLS-4AAP-WT

Water Phenol (4AAP) EPA 9066

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

red complex which is measured colorimetrically.

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

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

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

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

** 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.

Page	of	

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Company:	Nunavut CGS - Rankin	Inlet (W8133)		Standar	Standard Other					Regular (Standard Turnaround Times - Business Days)									
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Address:	Box 490			Email 1:	Email 1: sdoiron@gov.nu.ca					DEmergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT									
	Rankin Inlet , NU, X0C 0G0				mlusty@gov.nu	ı.ca			Same Day or Weekend Emergency - Contact ALS to Confirm TAT										
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Nunavut Community & Government

Services - Rankin Inlet

ATTN: SIMON DOIRON P.O. Box 490

Rankin Inlet NU XOC OGO

Date Received: 05-JUL-17

Report Date: 19-JUL-17 15:23 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1953319

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L1953319 CONTD.... PAGE 2 of 4 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1953319-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: CF on 04-JUL-17 @ 16:00							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		07-JUL-17	R3767225
Toluene	0.0018		0.0010	mg/L		07-JUL-17	R3767225
Ethyl benzene	<0.00050		0.00050	mg/L		07-JUL-17	R3767225
o-Xylene	0.00052		0.00050	mg/L		07-JUL-17	R3767225
m+p-Xylenes	<0.0010	DLB	0.0010	mg/L		07-JUL-17	R3767225
F1 (C6-C10)	<0.10		0.10	mg/L		07-JUL-17	R3767225
Surrogate: 4-Bromofluorobenzene (SS)	97.2		70-130	%		07-JUL-17	R3767225
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.51		0.10	mg/L	06-JUL-17	06-JUL-17	R3767089
F3 (C16-C34)	9.96		0.25	mg/L	06-JUL-17	06-JUL-17	R3767089
F4 (C34-C50)	5.07		0.25	mg/L	06-JUL-17	06-JUL-17	R3767089
Surrogate: 2-Bromobenzotrifluoride	79.4		60-140	%	06-JUL-17	06-JUL-17	R3767089
CCME Total Hydrocarbons F1-BTEX	-0.10		0.10	ma/l		19-JUL-17	
F2-Naphth	<0.10 0.51		0.10 0.10	mg/L mg/L		19-JUL-17 19-JUL-17	
F3-PAH	9.96		0.10	mg/L		19-30L-17 19-JUL-17	
Total Hydrocarbons (C6-C50)	15.5		0.23	mg/L		19-30L-17 19-JUL-17	
Sum of Xylene Isomer Concentrations			5.55	∌, =			
Xylenes (Total)	<0.0011		0.0011	mg/L		07-JUL-17	
Polyaromatic Hydrocarbons (PAHs)				,.		47 :=	
1-Methyl Naphthalene	0.000061		0.000020	mg/L	14-JUL-17	17-JUL-17	R3774263
2-Methyl Naphthalene	0.000069		0.000020	mg/L	14-JUL-17	17-JUL-17	R3774263
Acenaphthene Acenaphthylene	<0.000020		0.000020 0.000020	mg/L	14-JUL-17 14-JUL-17	17-JUL-17 17-JUL-17	R3774263
Anthracene	<0.000020 <0.000010		0.000020	mg/L mg/L	14-JUL-17 14-JUL-17	17-JUL-17 17-JUL-17	R3774263 R3774263
Acridine	<0.000010		0.000010	mg/L	14-30L-17 14-JUL-17	17-30L-17 17-JUL-17	R3774263
Benzo(a)anthracene	<0.000020		0.000020	mg/L	14-JUL-17	17-JUL-17	R3774263
Benzo(a)pyrene	<0.000050	DLM	0.000010	mg/L	14-JUL-17	17-JUL-17	R3774263
Benzo(b&j)fluoranthene	<0.00010	DLM	0.00010	mg/L	14-JUL-17	17-JUL-17	R3774263
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	14-JUL-17	17-JUL-17	R3774263
Benzo(k)fluoranthene	<0.00010	DLM	0.00010	mg/L	14-JUL-17	17-JUL-17	R3774263
Chrysene	<0.000020		0.000020	mg/L	14-JUL-17	17-JUL-17	R3774263
Dibenzo(a,h)anthracene	<0.000050	DLM	0.000050	mg/L	14-JUL-17	17-JUL-17	R3774263
Fluoranthene	<0.000020		0.000020	mg/L	14-JUL-17	17-JUL-17	R3774263
Fluorene	<0.000020		0.000020	mg/L	14-JUL-17	17-JUL-17	R3774263
Indeno(1,2,3-cd)pyrene	<0.00010	DLM	0.00010	mg/L	14-JUL-17	17-JUL-17	R3774263
Naphthalene	0.000059		0.000050	mg/L	14-JUL-17	17-JUL-17	R3774263
Phenanthrene	<0.000050	DIM	0.000050	mg/L	14-JUL-17	17-JUL-17	R3774263
Pyrene	<0.000020	DLM	0.000020	mg/L	14-JUL-17	17-JUL-17 17-JUL-17	R3774263
Quinoline B(a)P Total Potency Equivalent	<0.000020 <0.000067		0.000020 0.000067	mg/L mg/l	14-JUL-17 14-JUL-17	17-JUL-17 17-JUL-17	R3774263
Surrogate: Acenaphthene d10	<0.000067 86.4		40-130	mg/L %	14-JUL-17 14-JUL-17	17-JUL-17 17-JUL-17	R3774263 R3774263
Surrogate: Aceriaprilierie d 10 Surrogate: Acridine d9	92.2		40-130	%	14-JUL-17	17-30L-17 17-JUL-17	R3774263
Surrogate: Chrysene d12	62.0		40-130	%	14-JUL-17	17-JUL-17	R3774263
Surrogate: Naphthalene d8	135.3	SOL:MI	40-130	%	14-JUL-17	17-JUL-17	R3774263
Surrogate: Phenanthrene d10	79.0		40-130	%	14-JUL-17	17-JUL-17	R3774263
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^{*} Refer to Referenced Information for Qualifiers (if any) and Methodology.

L1953319 CONTD....

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Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Test Method References:							
ALS Test Code	Matrix	Test Description	Method Reference**				
BTEXS+F1-HSMS-WP	Water	BTX plus F1 by GCMS	EPA 8260C / EPA 5021A				
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph.							

Target compound concentrations are measured using mass spectrometry detection.

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

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.

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.

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.

XYLENES-SUM-CALC-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
Chain of Custody Numbers	

Chain of Custody Numbers:

L1953319 CONTD....

PAGE 4 of 4 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

GLOSSARY OF REPORT TERMS

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

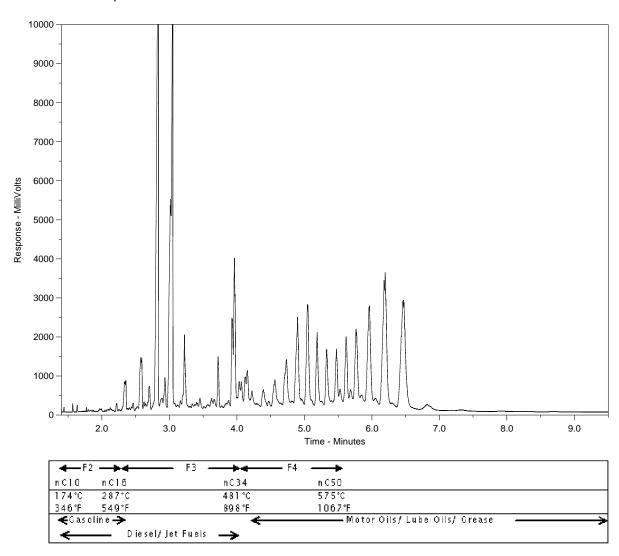
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L1953319-1

Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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



Chain of Custody / Analytical Request Form Canada Toll Free: 1 800 668 9878 www.alsglobal.com

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Report To	Report Fo	rmat / Distribut	ion		Serv	ice R	eque	sted (Rus	h for ro	outine an	alysis sul	ject to	availabil	ity)
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Contact: SIMON DOIRON	 JPD⊧	Excel	Digital	Fax		ority (2		# 11 ##/# #			18 18 18	11 11 5 11 1	11 2 1 1 21	,
Address: Box 490	Email 1:	sdoiron@gov.nu	ı.ca			ergeno		11 16 6						
Rankin Inlet , NU, X0C 0G0	Email 2:	mlusty@gov.nu.	ca		()Sai	ne Day	or!		L1:	95331	9-COF		(† 6) († 6) (†	ı 📗
Phone: 867-645-8155 Cell#:	Email 3:									- 000	U-UUF	C		-
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Lab Work Order# (lab use only)	ALS Contact:	Craig Riddell	Sampled By:	Dimon Doiron	BTX,F1-F4-WP	PAH,PANH-WP								Number of Containers
Sample Sample Identification (This description will appear on the report)	, e	Date Sampled	Time Sampled	Sample Type	ВТХ,Е	PAH,P								Numb
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Nunavut-WW-GRP1-WP pkg includes 1 L BOD/CBOD, 1 L Routine, 250 ml bottles) + 5 Vials for BTX,F1-F4 and 1 L Amber for PAH's = Total of 15 Bot	l Metals , 40 tles per san	oml Mercury Via nple.	, 250 ml Amber	Nutrient , 250 ml	Amb	er Pho	enols	2 x 250) ml Ba	ıcteria (9
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Hamlet of Rankin Inlet ATTN: SIMON DOIRON

PO Box 310

Rankin Inlet NU XOC OGO

Date Received: 21-JUL-17

Report Date: 01-AUG-17 14:42 (MT)

Version: FINAL

Client Phone: 867-645-2895

Certificate of Analysis

Lab Work Order #: L1962661
Project P.O. #: NOT SUBMITTED

Job Reference: RANKIN INLET WWTP - MONTHLY EFFLUENT

C of C Numbers: Legal Site Desc:

While

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



L1962661 CONTD.... PAGE 2 of 6 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1962661-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 20-JUL-17							
Matrix: WASTE BTEX plus F1-F4							
•							
BTX plus F1 by GCMS Benzene	<0.00050		0.00050	mg/L		28-JUL-17	R3783613
Toluene	0.0034		0.0010	mg/L		28-JUL-17	R3783613
Ethyl benzene	<0.00050		0.00050	mg/L		28-JUL-17	R3783613
o-Xylene	<0.00050		0.00050	mg/L		28-JUL-17	R3783613
m+p-Xylenes	<0.00040		0.00040	mg/L		28-JUL-17	R3783613
F1 (C6-C10)	<0.10		0.10	mg/L		28-JUL-17	R3783613
Surrogate: 4-Bromofluorobenzene (SS)	104.1		70-130	%		28-JUL-17	R3783613
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		01-AUG-17	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		31-JUL-17	
Debugger of the land of the la							
Polyaromatic Hydrocarbons (PAHs) 1-Methyl Naphthalene	0.000033		0.000020	mg/L	27-JUL-17	29-JUL-17	R3786488
2-Methyl Naphthalene	0.000033		0.000020	mg/L	27-JUL-17 27-JUL-17	29-JUL-17 29-JUL-17	R3786488
Acenaphthene	<0.000043		0.000020	mg/L	27-30L-17 27-JUL-17	29-JUL-17	R3786488
Acenaphthylene	<0.000020		0.000020	mg/L	27-JUL-17	29-JUL-17	R3786488
Anthracene	<0.000010		0.000010	mg/L	27-JUL-17	29-JUL-17	R3786488
Acridine	<0.000020		0.000020	mg/L	27-JUL-17	29-JUL-17	R3786488
Benzo(a)anthracene	<0.000010		0.000010	mg/L	27-JUL-17	29-JUL-17	R3786488
Benzo(a)pyrene	<0.000050	DLM	0.000050	mg/L	27-JUL-17	29-JUL-17	R3786488
Benzo(b&j)fluoranthene	<0.00010	DLM	0.00010	mg/L	27-JUL-17	29-JUL-17	R3786488
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	27-JUL-17	29-JUL-17	R3786488
Benzo(k)fluoranthene	<0.00010	DLM	0.00010	mg/L	27-JUL-17	29-JUL-17	R3786488
Chrysene	<0.000020		0.000020	mg/L	27-JUL-17	29-JUL-17	R3786488
Dibenzo(a,h)anthracene	<0.00010	DLM	0.00010	mg/L	27-JUL-17	29-JUL-17	R3786488
Fluoranthene	<0.000020		0.000020	mg/L	27-JUL-17	29-JUL-17	R3786488
Fluorene	<0.000020		0.000020	mg/L	27-JUL-17	29-JUL-17	R3786488
Indeno(1,2,3-cd)pyrene	<0.00010	DLM	0.00010	mg/L	27-JUL-17	29-JUL-17	R3786488
Naphthalene	<0.000050		0.000050	mg/L	27-JUL-17	29-JUL-17	R3786488
Phenanthrene	<0.000050		0.000050	mg/L	27-JUL-17	29-JUL-17	R3786488
Pyrene Quinoline	<0.000010		0.000010 0.000020	mg/L	27-JUL-17 27-JUL-17	29-JUL-17	R3786488
B(a)P Total Potency Equivalent	0.000032 0.000098		0.000020	mg/L mg/L	27-JUL-17 27-JUL-17	29-JUL-17 29-JUL-17	R3786488 R3786488
Surrogate: Acenaphthene d10	97.8		40-130	mg/L %	27-30L-17 27-JUL-17	29-JUL-17 29-JUL-17	R3786488
Surrogate: Aceriaphitierie d 10 Surrogate: Acridine d9	93.8		40-130	%	27-30L-17 27-JUL-17	29-JUL-17	R3786488
Surrogate: Chrysene d12	75.5		40-130	%	27-JUL-17	29-JUL-17	R3786488
Surrogate: Naphthalene d8	94.8		40-130	%	27-JUL-17	29-JUL-17	R3786488
Surrogate: Phenanthrene d10	102.1		40-130	%	27-JUL-17	29-JUL-17	R3786488
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	127		1.2	mg/L		26-JUL-17	
Alkalinity, Carbonate	2.22		0.00	D		00 !!!! 17	
Carbonate (CO3)	<0.60		0.60	mg/L		26-JUL-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		26-JUL-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	104		1.0	mg/L		22-JUL-17	R3781711
Ammonia by colour							
Ammonia, Total (as N)	4.86		0.10	mg/L		26-JUL-17	R3783260
Biochemical Oxygen Demand (BOD)							

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

L1962661 CONTD.... PAGE 3 of 6 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1962661-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 20-JUL-17							
Matrix: WASTE							
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	164		50	mg/L		22-JUL-17	R3784306
Carbonaceous BOD			_				
BOD Carbonaceous	169		50	mg/L		22-JUL-17	R3784306
Chloride in Water by IC Chloride (CI)	52.7		0.50	mg/L		22-JUL-17	R3782810
Conductivity	5		0.00				110702010
Conductivity	417		1.0	umhos/cm		22-JUL-17	R3781711
Fecal Coliforms, 1:10 dilution by QT97	0.4000		40	MDN1/400 1		04 1111 47	D070007
Fecal Coliforms Hardness Calculated	>24200		10	MPN/100mL		21-JUL-17	R3780067
Hardness (as CaCO3)	87.2	HTC	0.20	mg/L		26-JUL-17	
Mercury Total				-			
Mercury (Hg)-Total	0.0000137		0.0000050	mg/L	24-JUL-17	27-JUL-17	R3784534
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		22-JUL-17	R3782810
Nitrate+Nitrite	\0.020		0.020	1119/2		22 JOL-11	110102010
Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-JUL-17	
Nitrite in Water by IC							D
Nitrite (as N)	<0.010		0.010	mg/L		22-JUL-17	R3782810
Oil & Grease - Gravimetric Oil and Grease	93.6		5.0	mg/L		31-JUL-17	R3785820
Phenol (4AAP)				3-			
Phenols (4AAP)	<0.010	DLM	0.010	mg/L		26-JUL-17	R3782295
Phosphorus, Total Phosphorus (P)-Total	2.02		0.050	ma/l		25-JUL-17	D2704670
Sulfate in Water by IC	3.03		0.050	mg/L		20-JUL-11	R3781672
Sulfate (SO4)	19.5		0.30	mg/L		22-JUL-17	R3782810
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.290		0.0030	mg/L	25-JUL-17	25-JUL-17	R3782339
Arsenic (As)-Total Cadmium (Cd)-Total	0.00090 0.000881		0.00010 0.000050	mg/L mg/L	25-JUL-17 25-JUL-17	25-JUL-17 25-JUL-17	R3782339 R3782339
Calcium (Ca) Total	24.2		0.0000	mg/L	25-JUL-17	25-JUL-17	R3782339
Chromium (Cr)-Total	0.00145		0.00010	mg/L	25-JUL-17	25-JUL-17	R3782339
Cobalt (Co)-Total	0.00030		0.00010	mg/L	25-JUL-17	25-JUL-17	R3782339
Copper (Cu)-Total	0.156		0.00050	mg/L	25-JUL-17	25-JUL-17	R3782339
Iron (Fe)-Total Lead (Pb)-Total	0.490 0.00227		0.010 0.000050	mg/L	25-JUL-17 25-JUL-17	25-JUL-17 25-JUL-17	R3782339
Magnesium (Mg)-Total	6.48		0.00050	mg/L mg/L	25-JUL-17 25-JUL-17	25-JUL-17 25-JUL-17	R3782339 R3782339
Manganese (Mn)-Total	0.0444		0.0000	mg/L	25-JUL-17	25-JUL-17	R3782339
Nickel (Ni)-Total	0.00345		0.00050	mg/L	25-JUL-17	25-JUL-17	R3782339
Potassium (K)-Total	10.7		0.050	mg/L	25-JUL-17	25-JUL-17	R3782339
Sodium (Na)-Total	35.1		0.050	mg/L	25-JUL-17	25-JUL-17	R3782339
Zinc (Zn)-Total Total Organic Carbon by Combustion	0.124		0.0030	mg/L	25-JUL-17	25-JUL-17	R3782339
Total Organic Carbon Total Organic Carbon	68.4		5.0	mg/L		30-JUL-17	R3785424
Total Suspended Solids							
Total Suspended Solids	160		20	mg/L		24-JUL-17	R3781717
pH pH	6.95		0.10	pH units		22-JUL-17	R3781711
	0.93		0.10	priumo		22 JUL-11	1/3/01/11
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^{*} Refer to Referenced Information for Qualifiers (if any) and Methodology.

L1962661 CONTD....

Reference Information

PAGE 4 of 6 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

Tool mounda monorones	· · · · · · · · · · · · · · · · · · ·						
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- Water Alkalinity, Bicarbonate CALCULATION

WP

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

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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

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

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

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

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.

L1962661 CONTD....

PAGE 5 of 6 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.

3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.

2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.

3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.

4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

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 $44.5 - 0.2^{\circ}$ C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.

HARDNESS-CALC-WP Water Hardness Calculated APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

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

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

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

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

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

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

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

nitroprusside and measured colourmetrically.

NO2+NO3-CALC-WP Water Nitrate+Nitrite CALCULATION

NO2-IC-N-WP Water Nitrite in Water by IC EPA 300.1 (mod)

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

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

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

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

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

Grease is determined from the weight of the residue in the vial.

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

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

persulphate digestion of the sample.

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

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

monitoring (SIM) mode.

PH-WP Water pH APHA 4500H

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

reference electrode.

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

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

red complex which is measured colorimetrically.

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)

L1962661 CONTD....

PAGE 6 of 6 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

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

XYLENES-SUM-CALC-

Water

Sum of Xylene Isomer Concentrations

CALCULATED RESULT

WP

Total xylenes represents the sum of o-xylene and m&p-xylene.

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

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



Chain of Custody / A Canada Toll Fro www.als



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	/-GRP1-WP pkg inc ials for BTX,F1-F4						l, 250 ml Amber	Nutrient , 250 ml	Amb	er Phe	enols	2 x 25	50 ml	Amb	er Oil	& Gre	ase , 2	!50 ml	Bacte	ria (9
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Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 07-SEP-17

Report Date: 20-SEP-17 14:04 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1987621

Project P.O. #: NOT SUBMITTED

Job Reference: RANKIN INLET WWTP - MONTHLY EFFLUENT

C of C Numbers: Legal Site Desc:

Comments: NOTE: Cooler with drinking water bottles was sent by mistake instead of Waste Water bottles

- No PAH Bottles, F2-F4 amber vials or O&G

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



L1987621 CONTD.... PAGE 2 of 6 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1987621-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Simon doiron on 05-SEP-17 @ 13:30							
Matrix: Waste							
Miscellaneous Parameters							
F1-BTEX	<0.10		0.10	mg/L		14-SEP-17	
Fluoride (F)	0.067		0.020	mg/L		08-SEP-17	R3823739
Xylenes (Total)	<0.00064		0.00064	mg/L		13-SEP-17	
BTX plus F1 by GCMS Benzene	0.00050		0.00050			12-SEP-17	Danacana
Toluene	<0.00050 0.0011		0.00050 0.0010	mg/L mg/L		12-SEP-17 12-SEP-17	R3826286 R3826286
Ethyl benzene	<0.00050		0.00050	mg/L		12-SEP-17	R3826286
o-Xylene	<0.00050		0.00050	mg/L		12-SEP-17	R3826286
m+p-Xylenes	<0.00040		0.00040	mg/L		12-SEP-17	R3826286
F1 (C6-C10)	<0.10		0.10	mg/L		12-SEP-17	R3826286
Surrogate: 4-Bromofluorobenzene (SS)	89.3		70-130	%		12-SEP-17	R3826286
Nunavut WW Group 1							
Alkalinity, Bicarbonate Bicarbonate (HCO3)	121		1.2	mg/L		11-SEP-17	
Alkalinity, Carbonate	121		1.2	111g/L		TI-OLI -II	
Carbonate (CO3)	<0.60		0.60	mg/L		11-SEP-17	
Alkalinity, Hydroxide				-			
Hydroxide (OH)	<0.34		0.34	mg/L		11-SEP-17	
Alkalinity, Total (as CaCO3)	20.0		4.0			00.050.47	D0000004
Alkalinity, Total (as CaCO3)	99.0		1.0	mg/L		08-SEP-17	R3823061
Ammonia by colour Ammonia, Total (as N)	6.05		0.20	mg/L		13-SEP-17	R3828199
Biochemical Oxygen Demand (BOD)	0.00		0.20	g/ <u>_</u>		10 021 17	110020100
Biochemical Oxygen Demand	98		20	mg/L		08-SEP-17	R3829125
Carbonaceous BOD							
BOD Carbonaceous	82		20	mg/L		08-SEP-17	R3829125
Chloride in Water by IC Chloride (CI)	56.2		0.50	mg/L		08-SEP-17	R3823739
Conductivity	30.2		0.50	IIIg/L		00-3L1 -17	K3623739
Conductivity	410		1.0	umhos/cm		08-SEP-17	R3823061
Hardness Calculated							
Hardness (as CaCO3)	83.3	HTC	0.20	mg/L		12-SEP-17	
Mercury Total	0.0000074		0.0000050	/1	40 CED 47	00 CED 47	D0000477
Mercury (Hg)-Total Nitrate in Water by IC	0.0000074		0.0000050	mg/L	19-SEP-17	20-SEP-17	R3833477
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		08-SEP-17	R3823739
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		11-SEP-17	
Nitrite in Water by IC			0.01-	_ ,,		00.055 :-	D000000
Nitrite (as N)	<0.010		0.010	mg/L		08-SEP-17	R3823739
Oil & Grease - Gravimetric Oil and Grease	22.1		5.0	mg/L		15-SEP-17	R3829598
Phenol (4AAP)			0.0				1.552555
Phenois (4AAP)	0.0102		0.0010	mg/L		15-SEP-17	R3829084
Phosphorus, Total							
Phosphorus (P)-Total	1.46		0.050	mg/L		12-SEP-17	R3824544
Sulfate in Water by IC Sulfate (SO4)	28.0		0.30	mg/L		08-SEP-17	R3823739
Total Metals in Water by CRC ICPMS	20.0		0.30	IIIg/L		00-3EF-17	K3023/39
Aluminum (Al)-Total	0.113		0.0030	mg/L	11-SEP-17	11-SEP-17	R3824181
Arsenic (As)-Total	0.00098		0.00010	mg/L	11-SEP-17	11-SEP-17	R3824181
Cadmium (Cd)-Total	0.0000408		0.0000050	mg/L	11-SEP-17	11-SEP-17	R3824181

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

L1987621 CONTD.... PAGE 3 of 6 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1987621-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: Simon doiron on 05-SEP-17 @ 13:30							
Matrix: Waste							
Total Metals in Water by CRC ICPMS							
Calcium (Ca)-Total	24.3		0.050	mg/L	11-SEP-17	11-SEP-17	R3824181
Chromium (Cr)-Total	0.00054		0.00010	mg/L	11-SEP-17	11-SEP-17	R3824181
Cobalt (Co)-Total	0.00026		0.00010	mg/L	11-SEP-17	11-SEP-17	R3824181
Copper (Cu)-Total	0.0838		0.00050	mg/L	11-SEP-17	11-SEP-17	R3824181
Iron (Fe)-Total Lead (Pb)-Total	0.265 0.00213		0.010 0.000050	mg/L mg/L	11-SEP-17 11-SEP-17	11-SEP-17 11-SEP-17	R3824181 R3824181
Magnesium (Mg)-Total	5.48		0.00050	mg/L	11-SEP-17	11-SEP-17	R3824181
Manganese (Mn)-Total	0.0399		0.00010	mg/L	11-SEP-17	11-SEP-17	R3824181
Nickel (Ni)-Total	0.00347		0.00050	mg/L	11-SEP-17	11-SEP-17	R3824181
Potassium (K)-Total	6.53		0.050	mg/L	11-SEP-17	11-SEP-17	R3824181
Sodium (Na)-Total	27.3		0.050	mg/L	11-SEP-17	11-SEP-17	R3824181
Zinc (Zn)-Total	0.0606		0.0030	mg/L	11-SEP-17	11-SEP-17	R3824181
Total Organic Carbon by Combustion							
Total Organic Carbon	47.5		0.50	mg/L		12-SEP-17	R3827630
Total Suspended Solids Total Suspended Solids	98		10	mg/L		11-SEP-17	R3824398
pH	90		10	iiig/L		11-021-17	113024330
рН	7.02		0.10	pH units		08-SEP-17	R3823061

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

L1987621 CONTD....

Reference Information

PAGE 4 of 6 Version: FINAL

Sample Parameter Qualifier Kev:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

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- Water Alkalinity, Bicarbonate CALCULATION WP

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

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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.

Reference Information

L1987621 CONTD....
PAGE 5 of 6
Version: FINAL

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.

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

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
- 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.

4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

HARDNESS-CALC-WP Water Hardness Calculated APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

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

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

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

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

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

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

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

nitroprusside and measured colourmetrically.

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

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

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

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

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

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

Grease is determined from the weight of the residue in the vial.

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

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

persulphate digestion of the sample.

PH-WP Water pH APHA 4500H

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

reference electrode.

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

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

red complex which is measured colorimetrically.

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

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

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

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

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

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.

L1987621 CONTD....

PAGE 6 of 6 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

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

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.

WT

D.L. - The reporting limit.

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

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

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



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	Vork Order# o use only)				ALS Conta	act:	Craig Riddell	Sampled By:	Simon Doiron	BTX,F1-F4-WF	PAH, PANH-WP	NUNAVUT-WW	d∧	TC,EC-QT97-WP							₽
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Nunavut-WW bottles) + 5 \	V-GRP1-WP pkg in Vials for BTX,F1-F4	ncludes 1 4 and 1 L	L BOD/C Amber fo	BOD, 1 L Rou r PAH's = Tot	tine, 250 ml Metals al of 15 Bottles per	s , 40 r sam	ml Mercury Via ple.	l, 250 ml Amber	Nutrient , 250 ml ,	Ambe	r Phe	enols,	2 x 2	50 ml	Ambe	er Oil	& Grea	se , 25	0 ml Ba	acteria	(9
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Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 27-SEP-17

Report Date: 06-OCT-17 10:43 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L1998526

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L1998526 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1998526-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 26-SEP-17 @ 14:00							
Matrix: WASTE							
BTEX							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		29-SEP-17	R3842447
Toluene	0.0064		0.0010	mg/L		29-SEP-17	R3842447
Ethyl benzene	<0.00050		0.00050	mg/L		29-SEP-17	R3842447
o-Xylene	<0.00050		0.00050	mg/L		29-SEP-17	R3842447
m+p-Xylenes	0.00071		0.00040	mg/L		29-SEP-17	R3842447
F1 (C6-C10)	<0.10		0.10	mg/L		29-SEP-17	R3842447
Surrogate: 4-Bromofluorobenzene (SS)	102.3		70-130	%		29-SEP-17	R3842447
CCME Total Hydrocarbons	0.40		0.40			05 OOT 47	
F1-BTEX	<0.10		0.10	mg/L		05-OCT-17	
Sum of Xylene Isomer Concentrations Xylenes (Total)	0.00071		0.00064	mg/L		02-OCT-17	
Miscellaneous Parameters	0.00071		0.00004	iiig/L		02-001-17	
Fluoride (F)	0.129		0.020	mg/L		28-SEP-17	R3842534
Total and E. coli, 1:10 dilution by QT97	0.120		0.020	9/ -			1.00-12004
Total Coliforms	>24200		10	MPN/100mL		27-SEP-17	R3840098
Escherichia Coli	>24200		10	MPN/100mL		27-SEP-17	R3840098
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000164		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
2-Methyl Naphthalene	0.000192		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
Acenaphthene	0.000036		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
Acenaphthylene	<0.000020		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
Anthracene	<0.000010		0.000010	mg/L	29-SEP-17	01-OCT-17	R3843371
Acridine	<0.000020		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
Benzo(a)anthracene	<0.000010	DLM	0.000010	mg/L	29-SEP-17	01-OCT-17 01-OCT-17	R3843371
Benzo(a)pyrene Benzo(b&j)fluoranthene	<0.00050 <0.0010	DLM	0.00050 0.0010	mg/L mg/L	29-SEP-17 29-SEP-17	01-OCT-17 01-OCT-17	R3843371 R3843371
Benzo(g,h,i)perylene	<0.0010	DLM	0.0010	mg/L	29-SEP-17	01-OCT-17 01-OCT-17	R3843371
Benzo(k)fluoranthene	<0.0020	DLM	0.0020	mg/L	29-SEP-17	01-OCT-17	R3843371
Chrysene	<0.00020		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
Dibenzo(a,h)anthracene	<0.00050	DLM	0.00050	mg/L	29-SEP-17	01-OCT-17	R3843371
Fluoranthene	<0.000020		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
Fluorene	<0.000020		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
Indeno(1,2,3-cd)pyrene	<0.0010	DLM	0.0010	mg/L	29-SEP-17	01-OCT-17	R3843371
Naphthalene	0.000174		0.000050	mg/L	29-SEP-17	01-OCT-17	R3843371
Phenanthrene	<0.000050		0.000050	mg/L	29-SEP-17	01-OCT-17	R3843371
Pyrene	0.000011	EMPC	0.000010	mg/L	29-SEP-17	01-OCT-17	R3843371
Quinoline	0.000145		0.000020	mg/L	29-SEP-17	01-OCT-17	R3843371
B(a)P Total Potency Equivalent	<0.00066		0.00066	mg/L	29-SEP-17	01-OCT-17	R3843371
Surrogate: Acenaphthene d10 Surrogate: Acridine d9	91.7		40-130	%	29-SEP-17 29-SEP-17	01-OCT-17 01-OCT-17	R3843371
Surrogate: Actionie de Surrogate: Chrysene d12	110.1 62.9		40-130 40-130	% %	29-SEP-17 29-SEP-17	01-OCT-17 01-OCT-17	R3843371 R3843371
Surrogate: Naphthalene d8	143.2	SOL:MI	40-130	%	29-SEP-17 29-SEP-17	01-OCT-17 01-OCT-17	R3843371
Surrogate: Phenanthrene d10	96.4		40-130	%	29-SEP-17	01-OCT-17	R3843371
Nunavut WW Group 1	55.7		.5 .50				
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	147		1.2	mg/L		29-SEP-17	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		29-SEP-17	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		29-SEP-17	
Alkalinity, Total (as CaCO3)							

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

L1998526 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1998526-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 26-SEP-17 @ 14:00							
Matrix: WASTE							
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	120		1.0	mg/L		28-SEP-17	R3840815
Ammonia by colour Ammonia, Total (as N)	6.6		1.0	mg/L		28-SEP-17	R3841233
Biochemical Oxygen Demand (BOD) Biochemical Oxygen Demand	128		50	mg/L		28-SEP-17	R3846502
Carbonaceous BOD BOD Carbonaceous	115		50	mg/L		28-SEP-17	R3846502
Chloride in Water by IC Chloride (CI)	62.4			mg/L		28-SEP-17	
Conductivity			0.50				R3842534
Conductivity Fecal coliforms, 1:10 dilution by QT97	507		1.0	umhos/cm		28-SEP-17	R3840815
Fecal Coliforms Hardness Calculated	>24200		10	MPN/100mL		27-SEP-17	R3840093
Hardness (as CaCO3)	199	HTC	0.20	mg/L		03-OCT-17	
Mercury Total Mercury (Hg)-Total	<0.000025		0.000025	mg/L	27-SEP-17	28-SEP-17	R3840936
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		28-SEP-17	R3842534
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-OCT-17	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		28-SEP-17	R3842534
Oil & Grease - Gravimetric Oil and Grease	34.3		5.0	mg/L		04-OCT-17	R3846333
Phenol (4AAP) Phenols (4AAP)	0.0096		0.0010	mg/L		05-OCT-17	R3846807
Phosphorus, Total							
Phosphorus (P)-Total Sulfate in Water by IC	2.55		0.050	mg/L		29-SEP-17	R3841107
Sulfate (SO4)	30.3		0.30	mg/L		28-SEP-17	R3842534
Total Metals in Water by CRC ICPMS Aluminum (Al)-Total	0.233		0.0030	mg/L	02-OCT-17	02-OCT-17	R3844274
Antimony (Sb)-Total	0.00023		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Arsenic (As)-Total	0.0139		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Barium (Ba)-Total	0.0669		0.000050	mg/L	02-OCT-17	02-OCT-17	R3844274
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Bismuth (Bi)-Total	0.000259		0.000050	mg/L	02-OCT-17	02-OCT-17	R3844274
Boron (B)-Total	0.067		0.010	mg/L	02-OCT-17	02-OCT-17	R3844274
Cadmium (Cd)-Total	0.0000946		0.0000050	mg/L	02-OCT-17	02-OCT-17	R3844274
Calcium (Ca)-Total	62.2		0.050	mg/L	02-OCT-17	02-OCT-17	R3844274
Cesium (Cs)-Total	0.000099		0.000010	mg/L	02-OCT-17	02-OCT-17	R3844274
Chromium (Cr)-Total	0.00065		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Cobalt (Co)-Total	0.00184		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Copper (Cu)-Total	0.117		0.00050	mg/L	02-OCT-17	02-OCT-17	R3844274
Iron (Fe)-Total	6.02		0.010	mg/L	02-OCT-17	02-OCT-17	R3844274
Lead (Pb)-Total	0.00151		0.000050	mg/L	02-OCT-17	02-OCT-17	R3844274
Lithium (Li)-Total	0.0064		0.0010	mg/L	02-OCT-17	02-OCT-17	R3844274
Magnesium (Mg)-Total	10.6		0.0050	mg/L	02-OCT-17	02-OCT-17	R3844274
Manganese (Mn)-Total	0.468		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Molybdenum (Mo)-Total	0.000387		0.000050	mg/L	02-OCT-17	02-OCT-17	R3844274
Nickel (Ni)-Total	0.00405		0.00050	mg/L	02-OCT-17	02-OCT-17	R3844274

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

L1998526 CONTD.... PAGE 4 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1998526-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 26-SEP-17 @ 14:00							
Matrix: WASTE							
Total Metals in Water by CRC ICPMS							
Potassium (K)-Total	13.4		0.050	mg/L	02-OCT-17	02-OCT-17	R3844274
Phosphorus (P)-Total	2.31		0.050	mg/L	02-OCT-17	02-OCT-17	R3844274
Rubidium (Rb)-Total	0.0125		0.00020	mg/L	02-OCT-17	02-OCT-17	R3844274
Selenium (Se)-Total	0.000246		0.000050	mg/L	02-OCT-17	02-OCT-17	R3844274
Silicon (Si)-Total	2.38		0.10	mg/L	02-OCT-17	02-OCT-17	R3844274
Silver (Ag)-Total Sodium (Na)-Total	0.000043 45.4		0.000010 0.050	mg/L mg/L	02-OCT-17 02-OCT-17	02-OCT-17 02-OCT-17	R3844274 R3844274
Strontium (Sr)-Total	0.346		0.00020	mg/L	02-OCT-17 02-OCT-17	02-OCT-17 02-OCT-17	R3844274
Sulfur (S)-Total	11.4		0.50	mg/L	02-OCT-17	02-OCT-17	R3844274
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	02-OCT-17	02-OCT-17	R3844274
Thallium (TI)-Total	0.000011		0.000010	mg/L	02-OCT-17	02-OCT-17	R3844274
Thorium (Th)-Total	<0.00010		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Tin (Sn)-Total	0.00038		0.00010	mg/L	02-OCT-17	02-OCT-17	R3844274
Titanium (Ti)-Total	0.00104		0.00030	mg/L	02-OCT-17	02-OCT-17	R3844274
Tungsten (W)-Total Uranium (U)-Total	<0.00010 0.000376		0.00010	mg/L	02-OCT-17 02-OCT-17	02-OCT-17	R3844274
Vanadium (V)-Total	0.000376		0.000010 0.00050	mg/L mg/L	02-OCT-17 02-OCT-17	02-OCT-17 02-OCT-17	R3844274 R3844274
Zinc (Zn)-Total	0.133		0.00030	mg/L	02-OCT-17 02-OCT-17	02-OCT-17 02-OCT-17	R3844274
Zirconium (Zr)-Total	0.000396		0.000060	mg/L	02-OCT-17	02-OCT-17	R3844274
Total Organic Carbon by Combustion							
Total Organic Carbon	50.4		2.5	mg/L		05-OCT-17	R3847782
Total Suspended Solids							
Total Suspended Solids	140		20	mg/L		02-OCT-17	R3846000
pH pH	7.17		0.10	pH units		28-SEP-17	R3840815
				'			

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

L1998526 CONTD....

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Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
EMPC	Estimated Maximum Possible Concentration. Parameter detected but didn't meet all criteria for positive identification.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

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- Water Alkalinity, Bicarbonate CALCULATION

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

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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.

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Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

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

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
- 3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
- 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
- 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

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.

Dissolved Calcium and Magnesium concentrations are preferritally used for the nardness calculation.

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

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

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

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

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

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

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

NO2+NO3-CALC-WP Water Nitrate+Nitrite CALCULATION

NO2-IC-N-WP Water Nitrite in Water by IC EPA 300.1 (mod)

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

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

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

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

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

Grease is determined from the weight of the residue in the vial.

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

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

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

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

PH-WP Water pH APHA 4500H

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

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

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

L1998526 CONTD....

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Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description** EPA 300.1 (mod) SO4-IC-N-WP Water Sulfate in Water by IC Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TOTSUS-WP Water Total Suspended Solids APHA 2540 D (modified) Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.

TC,EC10-QT97-WP Total and E. coli, 1:10 dilution by QT97 **APHA 9223B QT97**

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

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(ALS) En	31LO	uwenc	.a,

Chain of Custody / Analytical Request Form Canada Toll Free: 1 800 668 9878

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Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 27-OCT-17

Report Date: 10-NOV-17 10:54 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2014380

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L2014380 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L 2014290 1 DANIZIN INI ET WATER FEET LIENT	_						
L2014380-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 25-OCT-17 @ 13:30							
Matrix: WASTE BTEX plus F1-F4							
•							
BTX plus F1 by GCMS Benzene	<0.00050		0.00050	mg/L		02-NOV-17	R3872853
Toluene	<0.0010		0.0010	mg/L		02-NOV-17	R3872853
Ethyl benzene	<0.00050		0.00050	mg/L		02-NOV-17	R3872853
o-Xylene	<0.00050		0.00050	mg/L		02-NOV-17	R3872853
m+p-Xylenes	<0.00040		0.00040	mg/L		02-NOV-17	R3872853
F1 (C6-C10)	<0.10		0.10	mg/L		02-NOV-17	R3872853
Surrogate: 4-Bromofluorobenzene (SS)	94.7		70-130	%		02-NOV-17	R3872853
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.47		0.10	mg/L	31-OCT-17	02-NOV-17	R3873470
F3 (C16-C34)	7.74		0.25	mg/L	31-OCT-17	02-NOV-17	R3873470
F4 (C34-C50)	3.15		0.25	mg/L	31-OCT-17	02-NOV-17	R3873470
Surrogate: 2-Bromobenzotrifluoride	91.8		60-140	%	31-OCT-17	02-NOV-17	R3873470
CCME Total Hydrocarbons F1-BTEX	-0.40		0.40	m c /l		07-NOV-17	
F1-BTEX F2-Naphth	<0.10 0.47		0.10 0.10	mg/L mg/L		07-NOV-17 07-NOV-17	
F3-PAH	7.74		0.10	mg/L		07-NOV-17 07-NOV-17	
Total Hydrocarbons (C6-C50)	11.4		0.23	mg/L		07-NOV-17	
Sum of Xylene Isomer Concentrations	11.4		0.00	mg/ L		07 140 17	
Xylenes (Total)	<0.00064		0.00064	mg/L		02-NOV-17	
, , , , , , , , , , , , , , , , , , , ,				3			
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000073		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
2-Methyl Naphthalene	0.000093		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
Acenaphthene	<0.000020		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
Acenaphthylene	<0.000020		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
Anthracene	<0.000010		0.000010	mg/L	03-NOV-17	07-NOV-17	R3878115
Acridine	<0.000020		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
Benzo(a)anthracene	<0.000010		0.000010	mg/L	03-NOV-17	07-NOV-17	R3878115
Benzo(a)pyrene	<0.0000050 <0.000010		0.0000050	mg/L	03-NOV-17 03-NOV-17	07-NOV-17 07-NOV-17	R3878115 R3878115
Benzo(b&j)fluoranthene Benzo(g,h,i)perylene	<0.000010		0.000010	mg/L mg/L	03-NOV-17	07-NOV-17 07-NOV-17	R3878115
Benzo(k)fluoranthene	<0.000020		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
Chrysene	<0.000010		0.000010	mg/L	03-NOV-17	07-NOV-17	R3878115
Dibenzo(a,h)anthracene	<0.000050		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
Fluoranthene	<0.000020		0.000000	mg/L	03-NOV-17	07-NOV-17	R3878115
Fluorene	0.000030	EMPC	0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	03-NOV-17	07-NOV-17	R3878115
Naphthalene	<0.000050		0.000050	mg/L	03-NOV-17	07-NOV-17	R3878115
Phenanthrene	<0.000050		0.000050	mg/L	03-NOV-17	07-NOV-17	R3878115
Pyrene	<0.000010		0.000010	mg/L	03-NOV-17	07-NOV-17	R3878115
Quinoline	<0.000020		0.000020	mg/L	03-NOV-17	07-NOV-17	R3878115
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	03-NOV-17	07-NOV-17	R3878115
Surrogate: Acenaphthene d10	107.0		40-130	%	03-NOV-17	07-NOV-17	R3878115
Surrogate: Acridine d9	109.3		40-130	%	03-NOV-17	07-NOV-17	R3878115
Surrogate: Chrysene d12	110.6		40-130	%	03-NOV-17	07-NOV-17	R3878115
Surrogate: Naphthalene d8	69.9		40-130	%	03-NOV-17	07-NOV-17	R3878115
Surrogate: Phenanthrene d10	103.5		40-130	%	03-NOV-17	07-NOV-17	R3878115
Nunavut WW Group 1							
Alkalinity, Bicarbonate Bicarbonate (HCO3)	99.4		1.2	mg/L		31-OCT-17	
Alkalinity, Carbonate	55.7		1.2	y, L		3. 33. 17	
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^{*} Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2014380 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2014380-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 25-OCT-17 @ 13:30							
Matrix: WASTE							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		31-OCT-17	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		31-OCT-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	81.5		1.0	mg/L		28-OCT-17	R3871047
Ammonia by colour	01.0		1.0	9/ =			110071017
Ammonia, Total (as N)	6.57		0.20	mg/L		01-NOV-17	R3872484
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	59		20	mg/L		27-OCT-17	R3872534
Carbonaceous BOD			00			07 OOT 47	D0070504
BOD Carbonaceous	53		20	mg/L		27-OCT-17	R3872534
Chloride in Water by IC Chloride (CI)	51.1		0.50	mg/L		27-OCT-17	R3869468
Conductivity			5.00	9, _		557 17	.10000-00
Conductivity	379		1.0	umhos/cm		28-OCT-17	R3871047
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	>24200	PEHR	10	MPN/100mL		27-OCT-17	R3868530
Hardness Calculated							
Hardness (as CaCO3)	86.6	HTC	0.20	mg/L		10-NOV-17	
Mercury Total Mercury (Hg)-Total	<0.000010		0.000010	mg/L	27-OCT-17	31-OCT-17	R3871205
Nitrate in Water by IC	<0.000010		0.000010	IIIg/L	27-001-17	31-001-17	1307 1203
Nitrate (as N)	0.047		0.020	mg/L		27-OCT-17	R3869468
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-OCT-17	
Nitrite in Water by IC				,,		07.007.47	
Nitrite (as N)	0.013		0.010	mg/L		27-OCT-17	R3869468
Oil & Grease - Gravimetric Oil and Grease	9.9		5.0	mg/L		03-NOV-17	R3873940
Phenol (4AAP)	0.0		0.0	9/2		00110111	110070040
Phenols (4AAP)	0.0050		0.0010	mg/L		06-NOV-17	R3877989
Phosphorus, Total							
Phosphorus (P)-Total	1.05		0.050	mg/L		31-OCT-17	R3870696
Sulfate in Water by IC	00.5		0.00			07 OOT 47	D0000400
Sulfate (SO4) Total Metals in Water by CRC ICPMS	26.5		0.30	mg/L		27-OCT-17	R3869468
Aluminum (Al)-Total	0.194		0.0030	mg/L	01-NOV-17	09-NOV-17	R3880368
Arsenic (As)-Total	0.00076		0.00010	mg/L	01-NOV-17	09-NOV-17	R3880368
Cadmium (Cd)-Total	0.0000458		0.000010	mg/L	01-NOV-17	09-NOV-17	R3880368
Calcium (Ca)-Total	24.0		0.050	mg/L	01-NOV-17	09-NOV-17	R3880368
Chromium (Cr)-Total	0.00065		0.00010	mg/L	01-NOV-17	09-NOV-17	R3880368
Cobalt (Co)-Total	0.00020		0.00010	mg/L	01-NOV-17	09-NOV-17	R3880368
Copper (Cu)-Total	0.0888		0.00050	mg/L	01-NOV-17	09-NOV-17	R3880368
Iron (Fe)-Total	0.195		0.010	mg/L	01-NOV-17	09-NOV-17	R3880368
Lead (Pb)-Total	0.00116		0.000050	mg/L	01-NOV-17	09-NOV-17	R3880368
Magnesium (Mg)-Total	6.47		0.0050	mg/L	01-NOV-17	09-NOV-17	R3880368
Manganese (Mn)-Total	0.0245		0.00010	mg/L	01-NOV-17	09-NOV-17	R3880368
Nickel (Ni)-Total	0.00201		0.00050	mg/L	01-NOV-17	09-NOV-17	R3880368
Potassium (K)-Total Sodium (Na)-Total	8.53 33.9		0.050 0.050	mg/L mg/L	01-NOV-17 01-NOV-17	09-NOV-17 09-NOV-17	R3880368 R3880368
Zinc (Zn)-Total	0.0513		0.000	mg/L	01-NOV-17 01-NOV-17	09-NOV-17	R3880368
Total Organic Carbon by Combustion	0.0010		0.0000	9/ -	31 113 V 17	30110111	1.0000000
. Star Organio Carbon by Combustion							

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

L2014380 CONTD.... PAGE 4 of 7 Version: FINAL

L2014380-1 RANKIN INLET WWTP - EFFLUENT Sampled By: SD on 25 OCT-17 to 13.30 Metrix WASTE Total Organic Carbon by Combustion Total Suspended Solids Total Susp	Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
Matrix: WASTE Total Organic Carbon by Combustion Total Organic Carbon Total Suspended Solids	L2014380-1 RANKIN INLET WWTP - EFFLUENT							
Total Organic Carbon by Combustion 42.0 0.50 mg/L 30-OCT-17 R3870008 Total Suspended Solids 56.0 5.0 mg/L 31-OCT-17 R3871672 pH								
Total Suspended Solids Total Suspended Solids 56.0 pH 56.0 50.0 mg/L 31-OCT-17 R3871672								
Total Suspended Solids 56.0 5.0 mg/L 31-OCT-17 R3871672 pH	Total Organic Carbon by Combustion Total Organic Carbon	42.0		0.50	mg/L		30-OCT-17	R3870008
pH	Total Suspended Solids	FC 0		F 0	ma/l		21 OCT 17	D2074672
pH 7.10 0.10 pH units 28-OCT-17 R3871047	pH	56.0		5.0	mg/L		31-001-17	K38/16/2
	рН	7.10		0.10	pH units		28-OCT-17	R3871047

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

L2014380 CONTD....

PAGE 5 of 7 Version: FINAL

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
EMPC	Estimated Maximum Possible Concentration. Parameter detected but didn't meet all criteria for positive identification.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

Test Method References:

Matrix	Test Description	Method Reference**
\Mator	Alkalinity Carbonato	CALCULATION
_	Matrix Nater	

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- Water Alkalinity, Bicarbonate CALCULATION WP

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

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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

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

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

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

L2014380 CONTD....

PAGE 6 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

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.

Fecal coliforms, 1:10 dilution by QT97 Water 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.

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

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 APHA 4500 NH3 F Water Ammonia by colour

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

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

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

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

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

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

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

Grease is determined from the weight of the residue in the vial.

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

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

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

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

PH-WP **APHA 4500H** Water

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.

L2014380 CONTD....

PAGE 7 of 7 Version: FINAL

Reference Information

EPA 300.1 (mod)

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

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

Sulfate in Water by IC

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

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

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

WP

SO4-IC-N-WP

Total xylenes represents the sum of o-xylene and m&p-xylene.

Water

** 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.

Applytical results in unsigned test reports with the DRAFT watermark are subject to cha

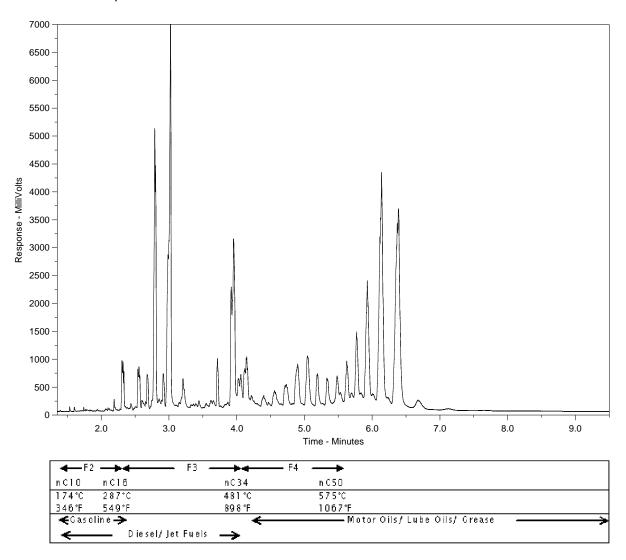
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2014380-1

Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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

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(ALS)	Environmentat



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COC# ____

(ALS) Enuironmental				L2014380-COFC				Page of												
Report To				Кероптоппастопа						· .					·					
Company:	y: Nunavut CGS - Rankin Inlet (W8133)			Standard Other					Service Requested (Rush for routine analysis subject to availability)											
Contact:	SIMON DOIDON			☑PDF ☐Excel ☐Digital ☐Fax					Regular (Standard Turnaround Times - Business Days)											
Address:	Box 490	· · · · · · · · · · · · · · · · · · ·	Light Confirm TAT																	
Rankin Inlet , NU, X0C 0G0									Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT											
Phone:	867-645-8155 Celi#:			Email 2: mlusty@gov.nu.ca Email 3:					Same Day or Weekend Emergency - Contact ALS to Confirm TAT Analysis Request											
Invoice To	nvoice To Same as Report?			Client / Project Information																
Hardcopy of Invoice with Report?				Job #: Rankin Inlet WWTP- Monthly Effluent					noica T	te bel	ow Fil	tered, P	reserv	ed or I	ooth (F	, P, F/	<u>P)</u>			
Company:				PO / AFE:					 					 	 					
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(lab use only)				LS ontact: Sampled By: Simon Doiron				A-HNA	UT-WW								of Co			
Sample #	Sample Identification (This description will appear on the report)			Date Sampled	Time Sampled	Sample Type	BTX,F1	PAH,PANH-WP	UNAV				:				Number of Container:			
	Rankin Inlet WWTP - Effluent			sct 25/17	/3730	Waste	x	×	×		_		+-	┼┤	┟╼┿		15			
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Nunavut-WW pottles) + 5 V	-GRP1-WP pkg includes 1 L BOD/C ials for BTX,F1-F4 and 1 L Amber fo	POD: 1 Davidina Oca		4 4 4 4	250 ml Amber	Nutrient , 250 ml /	Ambe	r Phe	nols,	2 x 25	etc) i0 ml/	Amber (dous E Dil & G)etails rease	, 250	ml Bac	teria (9			
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Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 01-DEC-17

Report Date: 19-DEC-17 13:32 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2029922

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L2029922 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2029922-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 30-NOV-17 @ 13:30							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene Benzene	<0.00050		0.00050	mg/L		07-DEC-17	R3905849
Toluene	<0.0010		0.0010	mg/L		07-DEC-17	R3905849
Ethyl benzene	<0.00050		0.00050	mg/L		07-DEC-17	R3905849
o-Xylene	<0.00050		0.00050	mg/L		07-DEC-17	R3905849
m+p-Xylenes	<0.00040		0.00040	mg/L		07-DEC-17	R3905849
F1 (C6-C10)	<0.10		0.10	mg/L		07-DEC-17	R3905849
Surrogate: 4-Bromofluorobenzene (SS)	91.5		70-130	%		07-DEC-17	R3905849
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.74		0.10	mg/L	02-DEC-17	02-DEC-17	R3904673
F3 (C16-C34)	12.3		0.25	mg/L	02-DEC-17	02-DEC-17	R3904673
F4 (C34-C50)	4.63		0.25	mg/L	02-DEC-17	02-DEC-17	R3904673
Surrogate: 2-Bromobenzotrifluoride	84.5		60-140	%	02-DEC-17	02-DEC-17	R3904673
CCME Total Hydrocarbons F1-BTEX	-0.10		0.40	ma/l		10_DEC 17	
F2-Naphth	<0.10 0.74		0.10 0.10	mg/L mg/L		19-DEC-17 19-DEC-17	
F3-PAH	12.3		0.10	mg/L		19-DEC-17	
Total Hydrocarbons (C6-C50)	17.7		0.23	mg/L		19-DEC-17	
Sum of Xylene Isomer Concentrations			0.00	g/ _		10 520 11	
Xylenes (Total)	<0.00064		0.00064	mg/L		07-DEC-17	
				•			
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000052		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
2-Methyl Naphthalene	0.000061		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
Acenaphthene	<0.000020		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
Acenaphthylene	<0.000020		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
Anthracene	<0.000010		0.000010	mg/L	13-DEC-17	18-DEC-17	R3915886
Acridine	<0.000020		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
Benzo(a)anthracene	<0.000010	DLM	0.000010	mg/L	13-DEC-17	18-DEC-17	R3915886
Benzo(a)pyrene	<0.00050	DLM	0.00050	mg/L	13-DEC-17 13-DEC-17	18-DEC-17 18-DEC-17	R3915886
Benzo(b&j)fluoranthene Benzo(g,h,i)perylene	<0.0010 <0.0020	DLM	0.0010 0.0020	mg/L mg/L	13-DEC-17	18-DEC-17	R3915886 R3915886
Benzo(k)fluoranthene	<0.0020	DLM	0.0020	mg/L	13-DEC-17	18-DEC-17	R3915886
Chrysene	<0.00020	22	0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
Dibenzo(a,h)anthracene	<0.00050	DLM	0.00050	mg/L	13-DEC-17	18-DEC-17	R3915886
Fluoranthene	<0.000020		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
Fluorene	<0.000020		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
Indeno(1,2,3-cd)pyrene	<0.0010	DLM	0.0010	mg/L	13-DEC-17	18-DEC-17	R3915886
Naphthalene	<0.000050		0.000050	mg/L	13-DEC-17	18-DEC-17	R3915886
Phenanthrene	<0.000050		0.000050	mg/L	13-DEC-17	18-DEC-17	R3915886
Pyrene	<0.000010		0.000010	mg/L	13-DEC-17	18-DEC-17	R3915886
Quinoline	0.000044		0.000020	mg/L	13-DEC-17	18-DEC-17	R3915886
B(a)P Total Potency Equivalent	<0.00066		0.00066	mg/L	13-DEC-17	18-DEC-17	R3915886
Surrogate: Acenaphthene d10	86.7		40-130	%	13-DEC-17	18-DEC-17	R3915886
Surrogate: Acridine d9	102.1		40-130	%	13-DEC-17	18-DEC-17	R3915886
Surrogate: Chrysene d12	88.6		40-130	%	13-DEC-17	18-DEC-17	R3915886
Surrogate: Naphthalene d8	119.1		40-130	%	13-DEC-17	18-DEC-17	R3915886
Surrogate: Phenanthrene d10	94.0		40-130	%	13-DEC-17	18-DEC-17	R3915886
Nunavut WW Group 1							
Alkalinity, Bicarbonate Bicarbonate (HCO3)	143		1.2	mg/L		05-DEC-17	
Alkalinity, Carbonate	143		1.2	my/L		00-020-17	
Airaillity, Carbonate							

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

L2029922 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L 2020022 4 DANIZIN INI ET WWTD FEEL LENT							
L2029922-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 30-NOV-17 @ 13:30							
Matrix: WASTE							
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		05-DEC-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		05-DEC-17	
Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3)	117		1.0	mg/L		02-DEC-17	R3903871
Ammonia by colour Ammonia, Total (as N)						05-DEC-17	
Biochemical Oxygen Demand (BOD)	9.23		0.20	mg/L		03-DEC-17	R3905581
Biochemical Oxygen Demand	153		50	mg/L		02-DEC-17	R3908355
Carbonaceous BOD BOD Carbonaceous	138		20	mg/L		02-DEC-17	R3908355
Chloride in Water by IC Chloride (Cl)	64.8		0.50	mg/L		01-DEC-17	R3906438
Conductivity Conductivity	537		1.0	umhos/cm		02-DEC-17	R3903871
Fecal coliforms, 1:10 dilution by QT97 Fecal Coliforms	>24200			MPN/100mL		01-DEC-17	R3900510
Hardness Calculated		нтс					1.0000010
Hardness (as CaCO3) Mercury Total	96.8	1110	0.20	mg/L		06-DEC-17	
Mercury (Hg)-Total Nitrate in Water by IC	0.000015		0.000010	mg/L	05-DEC-17	06-DEC-17	R3905952
Nitrate (as N)	<0.020		0.020	mg/L		01-DEC-17	R3906438
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		07-DEC-17	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		01-DEC-17	R3906438
Oil & Grease - Gravimetric Oil and Grease	25.0		5.0	mg/L		08-DEC-17	R3907514
Phenol (4AAP) Phenols (4AAP)	0.0118		0.0010	mg/L		07-DEC-17	R3906727
Phosphorus, Total Phosphorus (P)-Total						05-DEC-17	
Sulfate in Water by IC	2.71		0.10	mg/L		03-DEC-17	R3905383
Sulfate (SO4)	30.8		0.30	mg/L		01-DEC-17	R3906438
Total Metals in Water by CRC ICPMS							
Aluminum (AI)-Total	0.258		0.0030	mg/L	05-DEC-17	05-DEC-17	R3905442
Arsenic (As)-Total	0.00104		0.00010	mg/L	05-DEC-17	05-DEC-17	R3905442
Cadmium (Cd)-Total	0.0000816		0.0000050	mg/L	05-DEC-17	05-DEC-17	R3905442
Calcium (Ca)-Total	24.5		0.050	mg/L	05-DEC-17	05-DEC-17	R3905442
Chromium (Cr)-Total	0.00102		0.00010	mg/L	05-DEC-17	05-DEC-17	R3905442
Cobalt (Co)-Total	0.00027		0.00010	mg/L	05-DEC-17	05-DEC-17	R3905442
Copper (Cu)-Total	0.209		0.00050	mg/L	05-DEC-17	05-DEC-17	R3905442
Iron (Fe)-Total	0.243		0.010	mg/L	05-DEC-17	05-DEC-17	R3905442
Lead (Pb)-Total	0.00838		0.000050	mg/L	05-DEC-17	05-DEC-17	R3905442
Magnesium (Mg)-Total	8.62		0.0050	mg/L	05-DEC-17	05-DEC-17	R3905442
Manganese (Mn)-Total	0.0471		0.00010	mg/L	05-DEC-17	05-DEC-17	R3905442
Nickel (Ni)-Total	0.00345		0.00050	mg/L	05-DEC-17	05-DEC-17	R3905442
Potassium (K)-Total	12.5		0.050	mg/L	05-DEC-17	05-DEC-17	R3905442
Sodium (Na)-Total	46.1		0.050	mg/L	05-DEC-17	05-DEC-17	R3905442
Zinc (Zn)-Total	0.0935		0.0030	mg/L	05-DEC-17	05-DEC-17	R3905442
Total Organic Carbon by Combustion							

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

L2029922 CONTD.... PAGE 4 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2029922-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SD on 30-NOV-17 @ 13:30							
Matrix: WASTE							
Total Organic Carbon by Combustion Total Organic Carbon	97.0		5.0	mg/L		11-DEC-17	R3911407
Total Suspended Solids Total Suspended Solids	95.0		6.3	ma/l		04-DEC-17	D2005474
pH	85.0		6.3	mg/L		04-DEC-17	R3905474
pH	6.99		0.10	pH units		02-DEC-17	R3903871

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

L2029922 CONTD....

Reference Information

PAGE 5 of 7 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Toot Mathad Deferences

rest Metriod 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- Water Alkalinity. Bicarbonate CALCULATION WP

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 CALCULATION Water Alkalinity, Hydroxide

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 Carbonaceous BOD APHA 5210 B Water

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

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

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

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

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

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

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

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

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

EC-WP Water Conductivity **APHA 2510B**

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

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

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

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

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

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.

L2029922 CONTD....

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Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

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.

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

FPA245.7 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.

Phosphorus, Total

APHA 4500 P PHOSPHORUS

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

PAH, PANH-WP

Water

Polyaromatic Hydrocarbons (PAHs)

EPA SW 846/8270-GC/MS

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

PH-WP

Water

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.

PHENOI S-4AAP-WT

Water

Phenol (4AAP)

pΗ

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)

L2029922 CONTD....

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Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

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

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

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

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

WD

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.



Workorder: L2029922 Report Date: 19-DEC-17 Page 1 of 8

Client: Nunavut Community & Government Services - Rankin Inlet

P.O. Box 490

Rankin Inlet NU X0C 0G0

Contact: SIMON DOIRON

Test M	atrix Reference	Result Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-WP W	/ater					
Batch R3903871						
WG2677561-9 LCS						
Alkalinity, Total (as CaCO3)		101.6	%		85-115	02-DEC-17
WG2677561-6 MB		4.0				
Alkalinity, Total (as CaCO3)		<1.0	mg/L		1	02-DEC-17
BOD-CBOD-WP W	/ater					
Batch R3908355						
WG2676424-2 LCS		400.5	0/			
BOD Carbonaceous		100.5	%		85-115	02-DEC-17
WG2676424-1 MB BOD Carbonaceous		<2.0	mg/L		2	02-DEC-17
	_	~2.0	mg/L		۷	02-DEC-17
	/ater					
Batch R3908355						
WG2676424-2 LCS Biochemical Oxygen Demai	nd	94.2	%		85-115	02 DEC 47
• •	iu	J 1 .2	/0		60-115	02-DEC-17
WG2676424-1 MB Biochemical Oxygen Demai	nd	<2.0	mg/L		2	02-DEC-17
BTEXS+F1-HSMS-WP W	/ater		•			
Batch R3905849						
WG2678443-2 LCS						
Benzene		100.4	%		70-130	06-DEC-17
Toluene		110.6	%		70-130	06-DEC-17
Ethyl benzene		114.4	%		70-130	06-DEC-17
o-Xylene		125.5	%		70-130	06-DEC-17
m+p-Xylenes		114.5	%		70-130	06-DEC-17
WG2678443-3 LCS						
F1 (C6-C10)		119.4	%		70-130	06-DEC-17
WG2678443-1 MB						
Benzene		<0.00050	mg/L		0.0005	06-DEC-17
Toluene		<0.0010	mg/L		0.001	06-DEC-17
Ethyl benzene		<0.00050	mg/L		0.0005	06-DEC-17
o-Xylene		<0.00030	mg/L		0.0003	06-DEC-17
m+p-Xylenes		<0.00040	mg/L		0.0004	06-DEC-17
F1 (C6-C10)		<0.10	mg/L		0.1	06-DEC-17
Surrogate: 4-Bromofluorobe	/==\	95.0	%		70-130	06-DEC-17

C-TOC-HTC-WP Water



Workorder: L2029922

Report Date: 19-DEC-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP	Water							
Batch R3911407								
WG2682328-2 LCS Total Organic Carbon			100.6		%		80-120	11-DEC-17
WG2682328-1 MB Total Organic Carbon			<0.50		mg/L		0.5	11-DEC-17
CL-IC-N-WP	Water							
Batch R3906438 WG2675901-10 LCS Chloride (CI)			100.9		%		90-110	01-DEC-17
WG2675901-9 MB Chloride (CI)			<0.50		mg/L		0.5	01-DEC-17
EC-WP	Water							
Batch R3903871								
WG2677561-8 LCS Conductivity			99.4		%		90-110	02-DEC-17
WG2677561-6 MB Conductivity			<1.0		umhos/cm		1	02-DEC-17
F2-F4-FID-WP	Water							
Batch R3904673								
WG2676572-2 LCS F2 (C10-C16)			92.0		%		70-130	02-DEC-17
F3 (C16-C34)			94.1		%		70-130 70-130	02-DEC-17 02-DEC-17
F4 (C34-C50)			95.0		%		70-130	02-DEC-17 02-DEC-17
WG2676572-1 MB			33.3		,-		70 100	02 020 17
F2 (C10-C16)			<0.10		mg/L		0.1	02-DEC-17
F3 (C16-C34)			<0.25		mg/L		0.25	02-DEC-17
F4 (C34-C50)			<0.25		mg/L		0.25	02-DEC-17
Surrogate: 2-Bromober	zotrifluoride		84.2		%		60-140	02-DEC-17
FC10-QT97-WP	Water							
Batch R3900510 WG2676194-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	01-DEC-17
HG-T-CVAF-WP	Water							
Batch R3905952								
WG2678944-2 LCS Mercury (Hg)-Total			97.5		%		80-120	06-DEC-17
WG2678944-1 MB								



Workorder: L2029922 Report Date: 19-DEC-17 Page 3 of 8

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAF-WP	Water							
Batch R3905952 WG2678944-1 MB Mercury (Hg)-Total			<0.0000050		mg/L		0.000005	06-DEC-17
MET-T-CCMS-WP	Water							
Batch R3905442								
WG2677711-2 LCS Aluminum (Al)-Total			107.8		%		80-120	05-DEC-17
Arsenic (As)-Total			103.1		%		80-120	05-DEC-17
Cadmium (Cd)-Total			102.8		%		80-120	05-DEC-17
Calcium (Ca)-Total			102.6		%		80-120	05-DEC-17
Chromium (Cr)-Total			105.2		%		80-120	05-DEC-17
Cobalt (Co)-Total			102.7		%		80-120	05-DEC-17
Copper (Cu)-Total			103.6		%		80-120	05-DEC-17
Iron (Fe)-Total			103.3		%		80-120	05-DEC-17
Lead (Pb)-Total			103.6		%		80-120	05-DEC-17
Magnesium (Mg)-Total			113.9		%		80-120	05-DEC-17
Manganese (Mn)-Total			104.9		%		80-120	05-DEC-17
Nickel (Ni)-Total			102.0		%		80-120	05-DEC-17
Potassium (K)-Total			102.6		%		80-120	05-DEC-17
Sodium (Na)-Total			108.0		%		80-120	05-DEC-17
Zinc (Zn)-Total			100.7		%		80-120	05-DEC-17
WG2677711-1 MB Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-DEC-17
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-DEC-17
Cadmium (Cd)-Total			<0.00000		mg/L		0.000005	05-DEC-17
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-DEC-17
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-DEC-17
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-DEC-17
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-DEC-17
Iron (Fe)-Total			<0.010		mg/L		0.01	05-DEC-17
Lead (Pb)-Total			<0.00005	0	mg/L		0.00005	05-DEC-17
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-DEC-17
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-DEC-17
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-DEC-17
Potassium (K)-Total			< 0.050		mg/L		0.05	05-DEC-17
Sodium (Na)-Total			< 0.050		mg/L		0.05	05-DEC-17



Workorder: L2029922

Report Date: 19-DEC-17 Page 4 of 8

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP Batch R3905442 WG2677711-1 MB Zinc (Zn)-Total	Water		<0.0030		mg/L		0.003	05-DEC-17
NH3-COL-WP	Water							
Batch R3905581 WG2678101-6 LCS Ammonia, Total (as N)			98.5		%		85-115	05-DEC-17
WG2678101-5 MB Ammonia, Total (as N)			<0.010		mg/L		0.01	05-DEC-17
NO2-IC-N-WP	Water							
Batch R3906438 WG2675901-10 LCS Nitrite (as N)			99.6		%		90-110	01-DEC-17
WG2675901-9 MB Nitrite (as N)			<0.010		mg/L		0.01	01-DEC-17
NO3-IC-N-WP	Water							
Batch R3906438 WG2675901-10 LCS Nitrate (as N)			100.4		%		90-110	01-DEC-17
WG2675901-9 MB Nitrate (as N)			<0.020		mg/L		0.02	01-DEC-17
OG-GRAV-WP	Water							
Batch R3907514 WG2679923-2 LCS Oil and Grease			92.0		%		70-130	08-DEC-17
WG2679923-1 MB Oil and Grease			<5.0		mg/L		5	08-DEC-17
P-T-COL-WP	Water							
Batch R3905383 WG2678016-10 LCS Phosphorus (P)-Total			95.4		%		80-120	05-DEC-17
WG2678016-9 MB Phosphorus (P)-Total			<0.010		mg/L		0.01	05-DEC-17
PAH,PANH-WP	Water							



Workorder: L2029922 Report Date: 19-DEC-17 Page 5 of 8

PAH,PANH-WP W Batch R3915886 WG2684541-2 LCS 1-Methyl Naphthalene 2-Methyl Naphthalene	/ater			 	
WG2684541-2 LCS 1-Methyl Naphthalene					
1-Methyl Naphthalene					
		00.0	0/		
z-ivietnyi Napritnaiene		86.2	%	60-130	18-DEC-17
A		85.6	%	60-130	18-DEC-17
Acenaphthene		84.7	%	60-130	18-DEC-17
Acenaphthylene		89.5	%	60-130	18-DEC-17
Anthracene		71.1	%	60-130	18-DEC-17
Acridine		78.5	%	60-130	18-DEC-17
Benzo(a)anthracene		73.4	%	60-130	18-DEC-17
Benzo(a)pyrene		78.6	%	60-130	18-DEC-17
Benzo(b&j)fluoranthene		80.6	%	60-130	18-DEC-17
Benzo(g,h,i)perylene		87.2	%	60-130	18-DEC-17
Benzo(k)fluoranthene		83.0	%	60-130	18-DEC-17
Chrysene		87.8	%	60-130	18-DEC-17
Dibenzo(a,h)anthracene		88.5	%	60-130	18-DEC-17
Fluoranthene		81.9	%	60-130	18-DEC-17
Fluorene		77.3	%	60-130	18-DEC-17
Indeno(1,2,3-cd)pyrene		87.2	%	60-130	18-DEC-17
Naphthalene		96.0	%	50-130	18-DEC-17
Phenanthrene		76.1	%	60-130	18-DEC-17
Pyrene		82.5	%	60-130	18-DEC-17
Quinoline		71.7	%	60-130	18-DEC-17
WG2684541-1 MB					
1-Methyl Naphthalene		<0.000020	mg/L	0.00002	18-DEC-17
2-Methyl Naphthalene		<0.000020	mg/L	0.00002	18-DEC-17
Acenaphthene		<0.000020	mg/L	0.00002	18-DEC-17
Acenaphthylene		<0.000020	mg/L	0.00002	18-DEC-17
Anthracene		<0.000010	mg/L	0.00001	18-DEC-17
Acridine		<0.000020	mg/L	0.00002	18-DEC-17
Benzo(a)anthracene		<0.000010	mg/L	0.00001	18-DEC-17
Benzo(a)pyrene		<0.0000050	mg/L	0.000005	18-DEC-17
Benzo(b&j)fluoranthene		<0.000010	mg/L	0.00001	18-DEC-17
Benzo(g,h,i)perylene		<0.000020	mg/L	0.00002	18-DEC-17
Benzo(k)fluoranthene		<0.000010	mg/L	0.00001	18-DEC-17
Chrysene		<0.000020	mg/L	0.00002	18-DEC-17
Dibenzo(a,h)anthracene		<0.000050	mg/L	0.000005	18-DEC-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	Water							
Batch R391588	6							
WG2684541-1 MB Fluoranthene			<0.00002	0	mg/L		0.00002	18-DEC-17
Fluorene			<0.00002	0	mg/L		0.00002	18-DEC-17
Indeno(1,2,3-cd)pyren	ne		<0.00001	0	mg/L		0.00001	18-DEC-17
Naphthalene			<0.00005	0	mg/L		0.00005	18-DEC-17
Phenanthrene			<0.00005	0	mg/L		0.00005	18-DEC-17
Pyrene			<0.00001	0	mg/L		0.00001	18-DEC-17
Quinoline			<0.00002	0	mg/L		0.00002	18-DEC-17
Surrogate: Acenaphth	ene d10		85.6		%		40-130	18-DEC-17
Surrogate: Acridine de	9		94.7		%		40-130	18-DEC-17
Surrogate: Chrysene of	d12		99.0		%		40-130	18-DEC-17
Surrogate: Naphthaler	ne d8		87.2		%		40-130	18-DEC-17
Surrogate: Phenanthre	ene d10		82.8		%		40-130	18-DEC-17
PH-WP	Water							
Batch R390387 WG2677561-7 LCS pH			7.38		pH units		7.3-7.5	02-DEC-17
PHENOLS-4AAP-WT Batch R390672 WG2679726-6 LCS								
Phenols (4AAP)			103.2		%		85-115	07-DEC-17
WG2679726-5 MB Phenols (4AAP)			<0.0010		mg/L		0.001	07-DEC-17
SO4-IC-N-WP	Water							
Batch R390643								
WG2675901-10 LCS Sulfate (SO4)			101.3		%		90-110	01-DEC-17
WG2675901-9 MB Sulfate (SO4)			<0.30		mg/L		0.3	01-DEC-17
SOLIDS-TOTSUS-WP	Water							
Batch R390547 WG2676850-6 LCS								
Total Suspended Solid			100.0		%		85-115	04-DEC-17
WG2676850-5 MB Total Suspended Solid	ds		<5.0		mg/L		5	04-DEC-17

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Legend:

ALS Control Limit (Data Quality Objectives) Limit

DUP Duplicate

Relative Percent Difference RPD

N/A Not Available

Laboratory Control Sample LCS Standard Reference Material SRM

MS Matrix Spike

MSD

Matrix Spike Duplicate
Average Desorption Efficiency
Method Blank ADE

MB

Internal Reference Material IRM Certified Reference Material CRM Continuing Calibration Verification CCV CVS Calibration Verification Standard LCSD Laboratory Control Sample Duplicate

Workorder: L2029922 Report Date: 19-DEC-17 Page 8 of 8

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
рН							
	1	30-NOV-17 13:30	02-DEC-17 12:00	0.25	47	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes. Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2029922 were received on 01-DEC-17 13:40.

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 predetermined data quality objectives to provide confidence in the accuracy of associated test results.

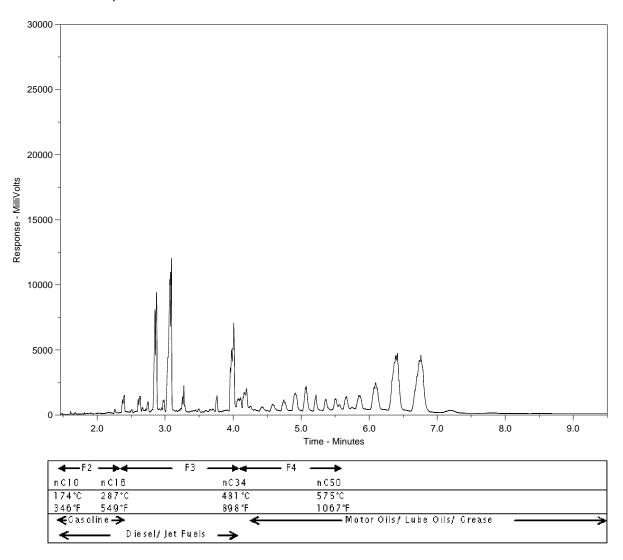
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2029922-1

Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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





L2029922-COFC

COC#	

Report To		_! 	1202002	2-00/0		1_		_					1 age		⁰¹
Company:	Nunavut CGS - Rankin Inlet (W8133)	Standar	☑Standard ☐Other					Service Requested (Rush for routine analysis subject to availability)							
Contact:	SIMON DOIRON	PDF	d Other	- Dointel			egular (Standard Turnaround Times - Business Days)								
Address:	Box 490	-							Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT						
	Rankin Inlet , NU, X0C 0G0	Email 1: Email 2:						ncy (1-2	Bus. Days) - 1009	6 Surch	arge - Cor	tact ALS	to Confi	m TAT
Phone:	867-645-8155 Cell#:		Email 2: mlusty@gov.nu.ca Email 3:					ay or W	ekend Err				Confirm '	TAT	
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Sample #	Sample Identification (This description will appear on the report)	·	Date Sampled	Time Sampled	Sample Type	BTX,F1-F4-WF	PAH,PANH-WP	UNAVU							umper
	Rankin Inlet WWTP - Effluent		11/30/17	13.30 Pm	Waste	×	X	x		-	 		+-	+	
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lunavut-WW-0 ottles) + 5 Via	Special Instructions / Regulations with water or land GRP1-WP pkg includes 1 L BOD/CBOD, 1 L Routine, 250 ml Mals for BTX,F1-F4 and 1 L Amber for PAH's = Total of 15 Bottle			uatic Life/BC (250 ml Amber I	SR - Commerci Nutrient , 250 ml /	al/AB Ambe	Tier r Phe	1 - Na nols, 2	tural, et	c) / Ha ni Amb	zardo er Oil	us Deta	i is se . 250) ml B:	acteria (9
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Nunavut Community & Government

Services - Rankin Inlet ATTN: SIMON DOIRON

P.O. Box 490

Rankin Inlet NU XOC 0G0

Date Received: 19-DEC-17

Report Date: 02-JAN-18 15:15 (MT)

Version: FINAL

Client Phone: 867-645-8155

Certificate of Analysis

Lab Work Order #: L2037105

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 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L2037105 CONTD.... PAGE 2 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2037105-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 18-DEC-17 @ 13:30							
Matrix: WASTE							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		29-DEC-17	R3927531
Toluene	<0.0010		0.0010	mg/L		29-DEC-17	R3927531
Ethyl benzene	<0.00050		0.00050	mg/L		29-DEC-17	R3927531
o-Xylene	0.00053		0.00050	mg/L		29-DEC-17	R3927531
m+p-Xylenes	0.00123		0.00040	mg/L		29-DEC-17	R3927531
F1 (C6-C10)	<0.10		0.10	mg/L		29-DEC-17	R3927531
Surrogate: 4-Bromofluorobenzene (SS)	83.8		70-130	%		29-DEC-17	R3927531
CCME PHC F2-F4 in Water							
F2 (C10-C16)	0.69		0.10	mg/L	27-DEC-17	28-DEC-17	R3923572
F3 (C16-C34)	9.13		0.25	mg/L	27-DEC-17	28-DEC-17	R3923572
F4 (C34-C50)	4.04		0.25	mg/L	27-DEC-17	28-DEC-17	R3923572
Surrogate: 2-Bromobenzotrifluoride	83.2		60-140	%	27-DEC-17	28-DEC-17	R3923572
CCME Total Hydrocarbons	0.40		0.40	c- /I		00 1411 40	
F1-BTEX	<0.10		0.10	mg/L		02-JAN-18	
F2-Naphth F3-PAH	0.69 9.13		0.10 0.25	mg/L mg/L		02-JAN-18 02-JAN-18	
Total Hydrocarbons (C6-C50)	13.9		0.25	"		02-JAN-18 02-JAN-18	
	13.9		0.36	mg/L		02-JAIN-10	
Sum of Xylene Isomer Concentrations Xylenes (Total)	0.00177		0.00064	mg/L		02-JAN-18	
Miscellaneous Parameters	0.00177		0.00004	1119/2		02 07 (17 10	
Fecal Coliforms	>24200		10	MPN/100mL		19-DEC-17	R3916572
Fluoride (F)	0.053		0.020	mg/L		19-DEC-17	R3917224
Total Coliform and E.coli by MPN QT97	0.000		0.020	IIIg/L		15 DEO 17	13317224
Total Coliforms	>2420		1	MPN/100mL		19-DEC-17	R3916512
Escherichia Coli	>2420		1	MPN/100mL		19-DEC-17	R3916512
Polyaromatic Hydrocarbons (PAHs)	-						
1-Methyl Naphthalene	0.000064		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
2-Methyl Naphthalene	0.000073		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
Acenaphthene	<0.000020		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
Acenaphthylene	<0.000020		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
Anthracene	<0.000010		0.000010	mg/L	22-DEC-17	22-DEC-17	R3924752
Acridine	<0.000020		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
Benzo(a)anthracene	<0.000010		0.000010	mg/L	22-DEC-17	22-DEC-17	R3924752
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	22-DEC-17	22-DEC-17	R3924752
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	22-DEC-17	22-DEC-17	R3924752
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	22-DEC-17	22-DEC-17	R3924752
Chrysene	<0.000020		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
Dibenzo(a,h)anthracene Fluoranthene	<0.000050		0.0000050	mg/L	22-DEC-17 22-DEC-17	22-DEC-17	R3924752
Fluorantnene Fluorene	<0.000020 <0.000020		0.000020	mg/L mg/L	22-DEC-17 22-DEC-17	22-DEC-17 22-DEC-17	R3924752 R3924752
Indeno(1,2,3-cd)pyrene	<0.000020		0.000020	mg/L	22-DEC-17 22-DEC-17	22-DEC-17 22-DEC-17	R3924752 R3924752
Naphthalene	<0.000010		0.000010	mg/L	22-DEC-17 22-DEC-17	22-DEC-17 22-DEC-17	R3924752 R3924752
Phenanthrene	<0.000050		0.000050	mg/L	22-DEC-17 22-DEC-17	22-DEC-17 22-DEC-17	R3924752 R3924752
Pyrene	<0.000030		0.000030	mg/L	22-DEC-17 22-DEC-17	22-DEC-17 22-DEC-17	R3924752
Quinoline	0.000010	EMPC	0.000010	mg/L	22-DEC-17	22-DEC-17	R3924752
B(a)P Total Potency Equivalent	<0.000030		0.000020	mg/L	22-DEC-17	22-DEC-17	R3924752
Surrogate: Acenaphthene d10	59.0		40-130	%	22-DEC-17	22-DEC-17	R3924752
Surrogate: Acridine d9	112.7		40-130	%	22-DEC-17	22-DEC-17	R3924752
Surrogate: Chrysene d12	59.1		40-130	%	22-DEC-17	22-DEC-17	R3924752
Surrogate: Naphthalene d8	87.2		40-130	%	22-DEC-17	22-DEC-17	R3924752

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

L2037105 CONTD.... PAGE 3 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
LOCOZZAGE A DANIZINI INIJET MUNTO EFFILIENT							
L2037105-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 18-DEC-17 @ 13:30							
Matrix: WASTE							
Polyaromatic Hydrocarbons (PAHs) Surrogate: Phenanthrene d10	88.1		40-130	%	22-DEC-17	22-DEC-17	R3924752
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	127		1.2	mg/L		22-DEC-17	
Alkalinity, Carbonate Carbonate (CO3)	<0.60		0.60	mg/L		22-DEC-17	
Alkalinity, Hydroxide Hydroxide (OH)	<0.34		0.34	mg/L		22-DEC-17	
Alkalinity, Total (as CaCO3)	\U.U4		0.54	g/ L		LL DLO-17	
Alkalinity, Total (as CaCO3)	104		1.0	mg/L		21-DEC-17	R3917959
Ammonia by colour							
Ammonia, Total (as N)	6.2		1.0	mg/L		21-DEC-17	R3918427
Biochemical Oxygen Demand (BOD) Biochemical Oxygen Demand	146	BODF	20	mg/L		22-DEC-17	D2024204
Carbonaceous BOD	140	בטטו	20	illy/L		22-DEU-11	R3924391
BOD Carbonaceous	110	BODF	20	mg/L		22-DEC-17	R3924391
Chloride in Water by IC							
Chloride (CI)	63.0		0.50	mg/L		19-DEC-17	R3917224
Conductivity	404		4.0			04 DEC 47	D2047050
Conductivity	491		1.0	umhos/cm		21-DEC-17	R3917959
Hardness Calculated Hardness (as CaCO3)	100	HTC	0.20	mg/L		21-DEC-17	
Mercury Total				<i>y</i> –			
Mercury (Hg)-Total	<0.000050		0.000050	mg/L	19-DEC-17	28-DEC-17	R3923911
Nitrate in Water by IC						10.5=6 :=	
Nitrate (as N)	<0.020		0.020	mg/L		19-DEC-17	R3917224
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		21-DEC-17	
Nitrite in Water by IC	10.0.0		0.0.0				
Nitrite (as N)	<0.010		0.010	mg/L		19-DEC-17	R3917224
Oil & Grease - Gravimetric							
Oil and Grease	28.0		5.0	mg/L		27-DEC-17	R3923567
Phenol (4AAP) Phenols (4AAP)	0.0084		0.0010	mg/L		21-DEC-17	R3917747
Phosphorus, Total	0.0004		0.0010	IIIg/L		21-050-17	11.0311141
Phosphorus (P)-Total	1.82		0.050	mg/L		27-DEC-17	R3921089
Sulfate in Water by IC							
Sulfate (SO4)	29.4		0.30	mg/L		19-DEC-17	R3917224
Total Metals in Water by CRC ICPMS	0.404		0.0000	m c /l	20 DEC 47	20-DEC-17	D2047054
Aluminum (AI)-Total Arsenic (As)-Total	0.161 0.00090		0.0030 0.00010	mg/L mg/L	20-DEC-17 20-DEC-17	20-DEC-17 20-DEC-17	R3917051 R3917051
Cadmium (Cd)-Total	0.00090		0.00010	mg/L	20-DEC-17 20-DEC-17	20-DEC-17 20-DEC-17	R3917051
Calcium (Ca)-Total	27.7		0.050	mg/L	20-DEC-17	20-DEC-17	R3917051
Chromium (Cr)-Total	0.00084		0.00010	mg/L	20-DEC-17	20-DEC-17	R3917051
Cobalt (Co)-Total	0.00019		0.00010	mg/L	20-DEC-17	20-DEC-17	R3917051
Copper (Cu)-Total	0.166		0.00050	mg/L	20-DEC-17	20-DEC-17	R3917051
Iron (Fe)-Total	0.167		0.010	mg/L	20-DEC-17	20-DEC-17	R3917051
Lead (Pb)-Total	0.00102		0.000050	mg/L	20-DEC-17	20-DEC-17	R3917051
Magnesium (Mg)-Total	7.53		0.0050	mg/L	20-DEC-17	20-DEC-17	R3917051
Manganese (Mn)-Total Nickel (Ni)-Total	0.0363		0.00010	mg/L	20-DEC-17	20-DEC-17	R3917051
Potassium (K)-Total	0.00246 9.53		0.00050 0.050	mg/L mg/L	20-DEC-17 20-DEC-17	20-DEC-17 20-DEC-17	R3917051 R3917051
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^{*} Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2037105 CONTD.... PAGE 4 of 7 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2037105-1 RANKIN INLET WWTP - EFFLUENT							
Sampled By: SIMON DOIRON on 18-DEC-17 @ 13:30							
Matrix: WASTE							
Total Metals in Water by CRC ICPMS Sodium (Na)-Total	40.7		0.050	mg/L	20-DEC-17	20-DEC-17	R3917051
Zinc (Zn)-Total	0.0761		0.0030	mg/L	20-DEC-17	20-DEC-17	R3917051
Total Organic Carbon by Combustion				,,		00 050 47	
Total Organic Carbon Total Suspended Solids	85.9		5.0	mg/L		28-DEC-17	R3923569
Total Suspended Solids	90.0		5.0	mg/L		20-DEC-17	R3917096
pH pH	6.91		0.10	pH units		21-DEC-17	R3917959
	•				*		

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

L2037105 CONTD....

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Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
BODF	BOD analyzed from frozen (preserved) sample. Hold time for unpreserved samples was exceeded, but freezing extends hold time to at least 1 month [ISO 5667-3 (2012)].
EMPC	Estimated Maximum Possible Concentration. Parameter detected but didn't meet all criteria for positive identification.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

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

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

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

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

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

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

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

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

BOD-CBOD-WP Water Carbonaceous BOD APHA 5210 B

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

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

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

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

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph.

Target compound concentrations are measured using mass spectrometry detection.

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

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

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

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

EC-WP Water Conductivity APHA 2510B

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

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.

L2037105 CONTD....

PAGE 6 of 7 Version: FINAL

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

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

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
- 3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

- 1. All extraction and analysis holding times were met.
- 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
- 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
- 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

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

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

FC10-QT97-WP Water Fecal coliforms, 1:10 dilution by QT97 APHA 9223B QT97

Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Fecal (thermotolerant) coliform bacteria are determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 44.5 – 0.2°C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.

HARDNESS-CALC-WP Water Hardness Calculated APHA 2340B

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

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

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

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

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

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

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

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

NO2+NO3-CALC-WP Water Nitrate+Nitrite CALCULATION

NO2-IC-N-WP Water Nitrite in Water by IC EPA 300.1 (mod)

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

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

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

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

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

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

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

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

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

PH-WP Water pH APHA 4500H

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

L2037105 CONTD....

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Reference Information

Test Method References:

ALS Test Code Matrix Method Reference** **Test Description**

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

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

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

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

SOLIDS-TOTSUS-WP Water **Total Suspended Solids** APHA 2540 D (modified) Total suspended solids in aquesous matrices is determined gravimetrically after drying the residue at 103 105°C.

TC,EC-QT97-WP Water Total Coliform and E.coli by MPN QT97 APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a 97-well packet. The packet is incubated at 35.0 – 0.5°C for 18 or 24 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.

XYLENES-SUM-CALC-

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.



Workorder: L2037105 Report Date: 02-JAN-18 Page 1 of 9

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 R391795	9							
WG2689449-5 DUF Alkalinity, Total (as Ca		L2037105-1 104	104		mg/L	0.0	20	21-DEC-17
WG2689449-4 LCS Alkalinity, Total (as Ca			100.0		%		85-115	21-DEC-17
WG2689449-1 MB Alkalinity, Total (as Ca	aCO3)		<1.0		mg/L		1	21-DEC-17
BOD-CBOD-WP	Water							
Batch R392439	1							
WG2689405-2 LCS BOD Carbonaceous	i		92.4		%		85-115	22-DEC-17
WG2689405-1 MB BOD Carbonaceous			<2.0		mg/L		2	22-DEC-17
BOD-WP	Water							
Batch R392439	1							
WG2689405-2 LCS								
Biochemical Oxygen I			95.1		%		85-115	22-DEC-17
WG2689405-1 MB								
Biochemical Oxygen I	Demand		<2.0		mg/L		2	22-DEC-17
BTEXS+F1-HSMS-WP	Water							
Batch R392753	1							
WG2691906-2 LCS Benzene			98.1		%		70-130	29-DEC-17
Toluene			107.2		%		70-130	29-DEC-17 29-DEC-17
Ethyl benzene			108.4		%		70-130	29-DEC-17 29-DEC-17
o-Xylene			119.6		%		70-130	29-DEC-17 29-DEC-17
m+p-Xylenes			116.5		%		70-130	29-DEC-17 29-DEC-17
			110.5		70		70-130	29-DEC-17
WG2691906-3 LCS F1 (C6-C10)			101.6		%		70-130	29-DEC-17
WG2691906-1 MB Benzene			<0.00050		mg/L		0.0005	29-DEC-17
Toluene			<0.0010		mg/L		0.001	29-DEC-17
Ethyl benzene			<0.00050		mg/L		0.0005	29-DEC-17
o-Xylene			<0.00030		mg/L		0.0003	29-DEC-17
m+p-Xylenes			<0.00040		mg/L		0.0004	29-DEC-17
F1 (C6-C10)			<0.10		mg/L		0.1	29-DEC-17
Surrogate: 4-Bromoflu	ıorobenzene (SS)	88.8		%		70-130	29-DEC-17
C-TOC-HTC-WP	Water	,						

C-TOC-HTC-WP Water



Workorder: L2037105

Report Date: 02-JAN-18

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Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOC-HTC-WP		Water							
Batch R3	923569								
WG2691557-7 Total Organic C	DUP arbon		L2037105-1 85.9	98.2		mg/L	13	20	28-DEC-17
WG2691557-6 Total Organic C	LCS arbon			97.3		%		80-120	28-DEC-17
WG2691557-5 Total Organic C	MB arbon			<0.50		mg/L		0.5	28-DEC-17
CL-IC-N-WP		Water							
Batch R3	917224								
WG2687136-2 Chloride (CI)	LCS			99.5		%		90-110	19-DEC-17
WG2687136-1 Chloride (CI)	MB			<0.50		mg/L		0.5	19-DEC-17
EC-WP		Water							
Batch R3	917959								
WG2689449-5 Conductivity	DUP		L2037105-1 491	491		umhos/cm	0.0	10	21-DEC-17
WG2689449-3 Conductivity	LCS			100.7		%		90-110	21-DEC-17
WG2689449-1 Conductivity	MB			<1.0		umhos/cm		1	21-DEC-17
F-IC-N-WP		Water							
Batch R3	917224								
WG2687136-2 Fluoride (F)	LCS			101.9		%		90-110	19-DEC-17
WG2687136-1 Fluoride (F)	МВ			<0.020		mg/L		0.02	19-DEC-17
F2-F4-FID-WP		Water							
Batch R3	923572								
WG2690730-2	LCS								
F2 (C10-C16)				87.5		%		70-130	28-DEC-17
F3 (C16-C34)				94.5		%		70-130	28-DEC-17
F4 (C34-C50)				95.1		%		70-130	28-DEC-17
WG2690730-1 F2 (C10-C16)	MB			<0.10		mg/L		0.1	28-DEC-17
F3 (C16-C34)				<0.25		mg/L		0.25	28-DEC-17
F4 (C34-C50)				<0.25		mg/L		0.25	28-DEC-17
Surrogate: 2-Br	omobenz	zotrifluoride		86.3		%		60-140	28-DEC-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAF-WP	Water							
Batch R3923911 WG2691360-2 LCS Mercury (Hg)-Total			94.7		%		80-120	28-DEC-17
WG2691360-1 MB Mercury (Hg)-Total			<0.00000	5C	mg/L		0.000005	28-DEC-17
MET-T-CCMS-WP	Water							
Batch R3917051 WG2687994-2 LCS Aluminum (Al)-Total			103.0		%		80-120	20-DEC-17
Arsenic (As)-Total			102.2		%		80-120	20-DEC-17 20-DEC-17
Cadmium (Cd)-Total			101.6		%		80-120	20-DEC-17 20-DEC-17
Calcium (Ca)-Total			101.9		%		80-120	20-DEC-17
Chromium (Cr)-Total			102.2		%		80-120	20-DEC-17
Cobalt (Co)-Total			101.6		%		80-120	20-DEC-17
Copper (Cu)-Total			102.8		%		80-120	20-DEC-17
Iron (Fe)-Total			97.4		%		80-120	20-DEC-17
Lead (Pb)-Total			100.6		%		80-120	20-DEC-17
Magnesium (Mg)-Total			108.1		%		80-120	20-DEC-17
Manganese (Mn)-Total			103.6		%		80-120	20-DEC-17
Nickel (Ni)-Total			101.9		%		80-120	20-DEC-17
Potassium (K)-Total			102.6		%		80-120	20-DEC-17
Sodium (Na)-Total			102.0		%		80-120	20-DEC-17
Zinc (Zn)-Total			100.5		%		80-120	20-DEC-17
WG2687994-1 MB Aluminum (Al)-Total			<0.0030		mg/L		0.003	20-DEC-17
Arsenic (As)-Total			<0.00010		mg/L		0.0001	20-DEC-17
Cadmium (Cd)-Total			<0.00000	5C	mg/L		0.000005	20-DEC-17
Calcium (Ca)-Total			<0.050		mg/L		0.05	20-DEC-17
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	20-DEC-17
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	20-DEC-17
Copper (Cu)-Total			<0.00050		mg/L		0.0005	20-DEC-17
Iron (Fe)-Total			<0.010		mg/L		0.01	20-DEC-17
Lead (Pb)-Total			<0.00005	0	mg/L		0.00005	20-DEC-17
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	20-DEC-17
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	20-DEC-17
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	20-DEC-17
Potassium (K)-Total			<0.050		mg/L		0.05	20-DEC-17



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Report Date: 02-JAN-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	Water							
Batch R3917051 WG2687994-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	20-DEC-17
Zinc (Zn)-Total			<0.0030		mg/L		0.003	20-DEC-17
NH3-COL-WP	Water							
Batch R3918427 WG2689708-6 LCS Ammonia, Total (as N)			101.7		%		85-115	21-DEC-17
WG2689708-5 MB Ammonia, Total (as N)			<0.010		mg/L		0.01	21-DEC-17
NO2-IC-N-WP	Water		10.0.0				0.01	ZI DLO II
Batch R3917224	Traio.							
WG2687136-2 LCS Nitrite (as N)			101.7		%		90-110	19-DEC-17
WG2687136-1 MB Nitrite (as N)			<0.010		mg/L		0.01	19-DEC-17
NO3-IC-N-WP	Water							
Batch R3917224								
WG2687136-2 LCS Nitrate (as N)			100.2		%		90-110	19-DEC-17
WG2687136-1 MB Nitrate (as N)			<0.020		mg/L		0.02	19-DEC-17
OG-GRAV-WP	Water							
Batch R3923567								
WG2690464-2 LCS Oil and Grease			96.8		%		70-130	27-DEC-17
WG2690464-1 MB Oil and Grease			<5.0		mg/L		5	27-DEC-17
P-T-COL-WP	Water							
Batch R3921089 WG2690501-6 LCS								
Phosphorus (P)-Total			96.8		%		80-120	27-DEC-17
WG2690501-5 MB Phosphorus (P)-Total			<0.010		mg/L		0.01	27-DEC-17
PAH,PANH-WP	Water							



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PAH,PANH-WP Water Batch R3924752 WG2690839-2 LCS 1-Methyl Naphthalene 2-Methyl Naphthalene Acenaphthene Acenaphthylene Anthracene	er	91.1 89.0 77.6	% %	60-130	00 DEC :-
WG2690839-2 LCS 1-Methyl Naphthalene 2-Methyl Naphthalene Acenaphthene Acenaphthylene		89.0		60-130	00 BEC 17
1-Methyl Naphthalene 2-Methyl Naphthalene Acenaphthene Acenaphthylene		89.0		60-130	00 BEC :-
2-Methyl Naphthalene Acenaphthene Acenaphthylene		89.0		60-130	
Acenaphthene Acenaphthylene			%		22-DEC-17
Acenaphthylene		77.6		60-130	22-DEC-17
			%	60-130	22-DEC-17
Anthrocono		87.5	%	60-130	22-DEC-17
		71.1	%	60-130	22-DEC-17
Acridine		80.6	%	60-130	22-DEC-17
Benzo(a)anthracene		71.0	%	60-130	22-DEC-17
Benzo(a)pyrene		75.5	%	60-130	22-DEC-17
Benzo(b&j)fluoranthene		77.4	%	60-130	22-DEC-17
Benzo(g,h,i)perylene		89.7	%	60-130	22-DEC-17
Benzo(k)fluoranthene		84.9	%	60-130	22-DEC-17
Chrysene		89.5	%	60-130	22-DEC-17
Dibenzo(a,h)anthracene		84.1	%	60-130	22-DEC-17
Fluoranthene		75.8	%	60-130	22-DEC-17
Fluorene		86.7	%	60-130	22-DEC-17
Indeno(1,2,3-cd)pyrene		75.2	%	60-130	22-DEC-17
Naphthalene		83.3	%	50-130	22-DEC-17
Phenanthrene		73.5	%	60-130	22-DEC-17
Pyrene		81.6	%	60-130	22-DEC-17
Quinoline		79.7	%	60-130	22-DEC-17
WG2690839-1 MB					
1-Methyl Naphthalene		<0.000020	mg/L	0.00002	22-DEC-17
2-Methyl Naphthalene		<0.000020	mg/L	0.00002	22-DEC-17
Acenaphthene		<0.000020	mg/L	0.00002	22-DEC-17
Acenaphthylene		<0.000020	mg/L	0.00002	22-DEC-17
Anthracene		<0.000010	mg/L	0.00001	22-DEC-17
Acridine		<0.000020	mg/L	0.00002	22-DEC-17
Benzo(a)anthracene		<0.000010	mg/L	0.00001	22-DEC-17
Benzo(a)pyrene		<0.0000050	mg/L	0.000005	22-DEC-17
Benzo(b&j)fluoranthene		<0.000010	mg/L	0.00001	22-DEC-17
Benzo(g,h,i)perylene		<0.000020	mg/L	0.00002	22-DEC-17
Benzo(k)fluoranthene		<0.000010	mg/L	0.00001	22-DEC-17
Chrysene		<0.000020	mg/L	0.00002	22-DEC-17
Dibenzo(a,h)anthracene		<0.0000050	mg/L	0.000005	22-DEC-17



		Workorder:	L2037105		Report Date: 02	2-JAN-18	Pa	ge 6 of
lest lest	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP	Water							
Batch R3924	752							
WG2690839-1 MI Fluoranthene	В		<0.000020		mg/L		0.00002	22-DEC-17
Fluorene			<0.000020		mg/L		0.00002	22-DEC-17
Indeno(1,2,3-cd)pyr	ene		<0.000010		mg/L		0.00001	22-DEC-17
Naphthalene			<0.000050		mg/L		0.00005	22-DEC-17
Phenanthrene			<0.000050		mg/L		0.00005	22-DEC-17
Pyrene			<0.000010		mg/L		0.00001	22-DEC-17
Quinoline			<0.000020		mg/L		0.00002	22-DEC-17
Surrogate: Acenaph	nthene d10		112.1		%		40-130	22-DEC-17
Surrogate: Acridine	d9		123.4		%		40-130	22-DEC-17
Surrogate: Chrysen	e d12		112.0		%		40-130	22-DEC-17
Surrogate: Naphtha	lene d8		105.2		%		40-130	22-DEC-17
Surrogate: Phenant	hrene d10		120.4		%		40-130	22-DEC-17
PH-WP	Water							
Batch R3917	959							
WG2689449-5 DL pH	JP	L2037105-1 6.91	6.91	J	pH units	0.00	0.2	21-DEC-17
WG2689449-2 LC pH	cs		7.38		pH units		7.3-7.5	21-DEC-17
PHENOLS-4AAP-WT	Water							
Batch R3917	747							
WG2688905-2 LC	cs							
Phenols (4AAP)			93.8		%		85-115	21-DEC-17
WG2688905-1 MI Phenols (4AAP)	В		<0.0010		mg/L		0.001	21-DEC-17
SO4-IC-N-WP	Water							
Batch R3917	224							
WG2687136-2 LC								
Sulfate (SO4)			100.5		%		90-110	19-DEC-17
WG2687136-1 MI Sulfate (SO4)	В		<0.30		mg/L		0.3	19-DEC-17
OLIDS-TOTSUS-WP	Water							
Batch R3917	096							
WG2687755-6 LC Total Suspended Sc			100.7		%		85-115	20-DEC-17
WG2687755-5 MI							-	



Workorder: L2037105

Report Date: 02-JAN-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOTSUS-WP	Water							
Batch R3917096 WG2687755-5 MB Total Suspended Solids			<5.0		mg/L		5	20-DEC-17
TC,EC-QT97-WP	Water							
Batch R3916512 WG2687345-2 DUP Total Coliforms		L2037105-1 >2420	>2420		MPN/100mL	0.0	65	19-DEC-17
Escherichia Coli		>2420	>2420		MPN/100mL	0.0	65	19-DEC-17
WG2687345-1 MB Total Coliforms			<1		MPN/100mL		1	19-DEC-17
Escherichia Coli			<1		MPN/100mL		1	19-DEC-17

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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.

Workorder: L2037105 Report Date: 02-JAN-18 Page 9 of 9

Hold Time Exceedances:

	Sample						
ALS Product Description	ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
рН							
	1	18-DEC-17 13:30	21-DEC-17 12:00	0.25	71	hours	EHTR-FM
Aggregate Organics							
Biochemical Oxygen Dema	and (BOD)						
	1	18-DEC-17 13:30	22-DEC-17 07:00	48	90	hours	EHT
Carbonaceous BOD							
	1	18-DEC-17 13:30	22-DEC-17 07:00	48	90	hours	EHT
Legend & Qualifier Definition	ne.						

-egena & Quanner Dennitions.

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 L2037105 were received on 19-DEC-17 12:00.

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 predetermined data quality objectives to provide confidence in the accuracy of associated test results.

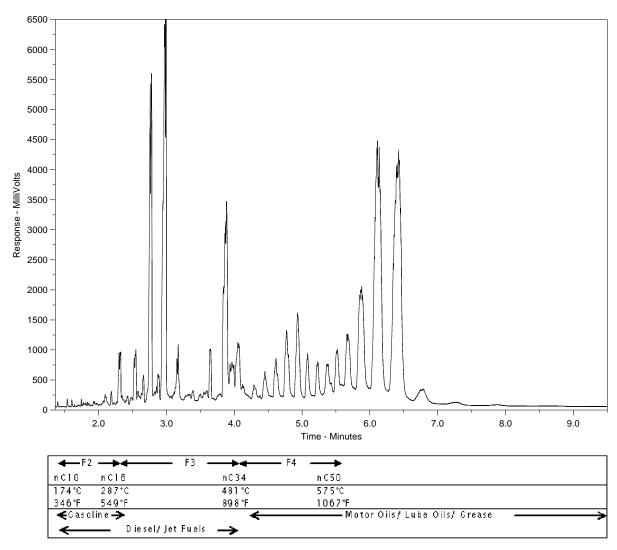
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2037105-1

Client Sample ID: RANKIN INLET WWTP - EFFLUENT



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

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

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

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

ALS) Environmental



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Report To		T.	L2007 100	-00/0		Serv	/ice R	eque	sted	(Rush	for ro	utine a	analys	is sub	ject to	availa	ability)	
Company:	Nunavut CGS - Rankin Inlet (W8133)	Standard	Omer-				Regular	(Stand	dard Tu	ırnarou	nd Tim	es - Bu	ısiness	Days)				
Contact:	SIMON DOIRON	☑ PDF	Excel	Digital	Fax	O F	riority	(2-4 Bu	ısiness	Days)	- 50% :	Surcha	rge - C	ontact	AL5 to	Confirr	n TAT	
Address:	Box 490	Email 1:							o Confi	rm TAT	Γ							
	Rankin Infet , NU, X0C 0G0	Email 2: mlusty@gov.nu.ca				Same Day or Weekend Emergency - Contact ALS to Confirm TAT												
Phone:	867-645-8155 Cell# :	Email 3:				Analysis Request												
Invoice To	Same as Report ?	Client / Pa	roject Informatio	on		Please indicate below Filtered, Preserved or both (F, P, F/P)												
Hardcopy of I	nvoice with Report? Yes No	Job #:	Rankin Inlet WV	VTP- Monthly E	ffluent	<u>. </u>												
Company:		PO / AFE:			· · · · · · · · · · · · · · · · · · ·							l	·	İ	1	.		
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The second second	Vork Order # ouse only)	ALS Contact:	Craig Riddell	Sampled By:	Simon Doiron	F1-F4-WP	PAH,PANH-WP	NUNAVUT-WW-GRP1-WP	-WP	-QT97-WP		-						Number of Containers
⊗Sample ∯ #	Sample Identification (This description will appear on the report)	-	Date Sampled	Time Sampled	Sample Type	BTX,F	PAH,P	NONAV	F-IC-N-WP	TC,EC-								Numbe
	Rankin Inlet WWTP - Effluent		DEC18/17	/3:30	Waste	x	X	x	x	х						\neg		15
			 															
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	**NOTE TO LOGIN - remove metals Reporting Code WP-NUNAVUT-WW-GF	RP1				-												
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Sea Section																		
e Transition Miles		·																
										·								
	Special Instructions / Regulations with water or land	l use (CCM	E-Freshwater A	quatic Life/BC	CSR - Commerc	al/Al	3 Tier	1 - N	latura	l, etc) / Ha	zardo	ous D	etail	S			
	/-GRP1-WP pkg includes 1 L BOD/CBOD, 1 L Routine, 250 ml fals for BTX,F1-F4 and 1 L Amber for PAH's = Total of 15 Bot	tles per san	nple.							50 ml	Ambe	er Oil	& Gr	easè	, 250	ml Ba	acteria	a (9
	Failure to complete all By the use of this form the user acknown									e Exc	cel tal	b.						
	Also provided on another Excel tab are the ALS location																	
	SHIPMENT RELEASE (client use)			ON (lab use only	y) distributed that				IIPM	ENT, \	VERIF	ICAT						
Released by		by	Date: Dec (9)	Time:	Temperature:	Ver	ified b	ıy:	.]	Date	∋:		Time) ;		Obse Yes /	rvatio	
relly;	ADAMS 18/12/17 13:30 PM	1/	Prese (1/11)	12	<i>v</i> ∘c	<u> </u>				L						If Yes	add:	SIF