2015 ANNUAL REPORT
FOR GN-CGS RANKIN INLET

YEAR BEING REPORTED: 2015

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence No. **3AM-GRA1015** issued to **Government of Nunavut, Department of Community and Government Services (GN-CGS)**.

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 (m^3)	Quantity of Sewage Waste Discharged (Estimated, m^3)
January	39,703.52	39,703.52
February	50,020.64	50,020.64
March	83,099.14*	83,099.14
April	64,419.06	64,419.06
May	66,376.98	66,376.98
June	56,892.64	56,892.64
July	47,836.59	47,836.59
August	46,181.49	46,181.49
September	49,707.51	49,707.51
October	45,005.44	45,005.44
November	45,333.83	45,333.83
December	55,443.76	55,443.76
ANNUAL TOTAL	**650,020.60**	**650,020.60**

**The March 2015 water consumption was high due to the large amount of bleeders used to prevent further utlilidor lines from freezing.*

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Below are the results for Monitoring Program Station GRA-6. There was a total water volume of 243,637 m^3 transferred from Char River to Nipissar Lake between June 18 and September 11, 2015.

Month Reported	Water Transferred from Char River to Nipissar Lake (m^3)
June	32,381
July	90,983
August	88,619
September	31,654
SEASONAL TOTAL	**243,637**

Golder Associates is currently completing a toolkit for GN-CGS that will provide the current estimated volume from the staff guage installed in Nipissar Lake after freshet 2015 and seasonal level loggers. This toolkit will be available by June 1, 2016. The below elevation readings were taken from the same benchmark to demonstrate the change in lake elevation over the open water season. The water level in Nipissar Lake increased by 26.99 cm from June 18, 2015 (when pumping from Char River began) to September 25, 2015 (after pumping from Char River had stopped).

Date	Nipissar Lake Elevation (m)	Change in Nipissar Lake Elevation (m)
June 18, 2015	3.146425	-
June 26, 2015	3.115	0.031425
July 7, 2015	3.0940375	0.0523875
July 20, 2015	3.0226	0.123825
July 27, 2015	3.032125	0.1143
August 10, 2015	2.9464	0.200025
August 17, 2015	2.92735	0.219075
September 9, 2015	2.921	0.225425
September 25, 2015	2.87655	0.269875

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 m^3 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.

Month Reported	Solids Removed from the Sewage Treatment Facility (m^3)
January	4
February	4
March	4
April	4
May	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;

- Advanced Subsea Services was contracted by CGS to clean the Williamson Lake Storage Tank November 2015. Divers used a small suction pump to remove sediment

from the raw water tank. Sediment was captured and disposed of at the Rankin Inlet Solid Waste Site.

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

Spills:

- 2015087, 2015-03-10, Johnston Cove Lift Station, Sewage, 100000 L
- 2015121, 2015-03-31, 109-23 Aivilik Street, P50 Diesel, 50 L
- 2015193, 2015-05-13, Unit 572A, Heating Diesel Fuel, 700 L
- 2015194, 2015-05-13, Unit 212-68th Street, Heating Diesel Fuel, 478 L
- 2015205, Rankin Inlet, Heating Diesel Fuel, 1200 L
- 2015214, 2015-05-22, Northern Store Manager's Residence, 100 L
- 2015222, 2015-05-25, Lot 431 #542A, Heating Diesel Fuel, 528 L
- 2015237, 2015-06-04, House 219-6th Street, Home Heating Fuel
- 2015239, 2015-06-04, House 103-22, Diesel, 100 L
- 2015266, 2015-06-22, 113-23 (Red Top), P50, 85 L
- 2015455, 2015-11-06, Gas Station, P-50 Diesel Fuel, 500 L
- 2015462, 2015-11-16, 11-12 Iglu Street, P50 Diesel Heating Fuel, 80 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 2015 and none is anticipated for 2016.

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;

- The *Water Pumping Adaptive Management Plan* was submitted on September 9, 2015.
- The *Updated Water Pumping Adaptive Management Plan* was submitted on February 16, 2016. There have been no further updates to this Plan since. The Plan will be reviewed and updated annually, and submitted with the Annual Report.
- The *Nipissar Lake and Lower Landing Lake Water Balance Assessment* report was submitted on February 16, 2016.

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

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- Licence 3AM-GRA1015 is currently undergoing the renewal process. A Public Hearing was held in Rankin Inlet on March 16-17, 2016.

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

- The *Spill Contingency Plan for Water Supply and Sewage Treatment Facilities Rankin Inlet, Nunavut* was prepared by Stantec, May 2014. This plan was approved by the NWB as per Part F, Item 2 of Amendment No. 1.
- The *Sewage Treatment Facility Operation and Maintenance (O&M) Plan* was updated and submitted September 9, 2016. An updated version addressing ECCC's concern with oil & grease was submitted February 4, 2016.
- The *Environmental Monitoring Program and Quality Assurance/Quality Control Plan* was updated and submitted September 9, 2016.
- All plans will be reviewed and updated, if necessary, and submitted with the 2016 Annual Report.

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- Quarterly Reports were submitted to the NWB in 2015.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

- The AANDC Inspection took place on June 17, 2015. No concerns were noted in the report.

List of Appendixes

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Char River Water Pumped to Nipissar Lake

Water Licence No. 3AM-GRA1015

GRA-6

Date	Time	Flow Meter Reading (m^3)	Daily Volume Pumped (m^3)	Total Volume Pumped (m^3)	Nipissar Lake Elevations (inches)	Nipissar Lake Elevations (m)	Change in Elevation* (inches)	Change in Elevation* (m)
18-Jun-15	11:40 AM	7	-	-				
19-Jun-15	9:05 AM	2651	2644	2644	123.875	3.146425		
20-Jun-15	7:45 AM	5427	2776	5420				
21-Jun-15	8:00 AM	8399	2972	8392				
22-Jun-15	8:30 AM	11367	2968	11360				
23-Jun-15	8:30 AM	14338	2971	14331				
24-Jun-15	8:45 AM	17250	2912	17243				
25-Jun-15	8:30 AM	20100	2850	20093				
26-Jun-15	9:30 AM	22117	2017	22110	122.5	3.115	1.375	0.031425
27-Jun-15	8:30 AM	24785	2668	24778				
28-Jun-15	9:45 AM	27909	3124	27902				
29-Jun-15	8:45 AM	29857	1948	29850				
30-Jun-15	9:30 AM	32388	2531	32381				
01-Jul-15	9:27 AM	35422	3034	35415				
02-Jul-15	8:55 AM	38373	2951	38366				
03-Jul-15	9:14 AM	41440	3067	41433				
04-Jul-15	9:50 AM	44545	3105	44538				
05-Jul-15	9:39 AM	47555	3010	47548				
06-Jul-15	9:03 AM	50498	2943	50491				
07-Jul-15	8:40 AM	53456	2958	53449	121.8125	3.0940375	2.0625	0.0523875
08-Jul-15	7:15 AM	56399	2943	56392				
09-Jul-15	9:30 AM	59430	3031	59423				
10-Jul-15	8:40 AM	62265	2835	62258				
11-Jul-15	8:00 AM	65177	2912	65170				
12-Jul-15	8:30 AM	68242	3065	68235				
13-Jul-15	8:45 AM	71221	2979	71214				
14-Jul-15	9:12 AM	74155	2934	74148				
15-Jul-15	9:30 AM	77054	2899	77047				
16-Jul-15	8:30 AM	79782	2728	79775				
17-Jul-15	8:30 AM	82560	2778	82553				
18-Jul-15	8:50 AM	85443	2883	85436				
19-Jul-15	8:55 AM	88343	2900	88336				
20-Jul-15	8:45 AM	91105	2762	91098	119	3.0226	4.875	0.123825
21-Jul-15	9:15 AM	94100	2995	94093				
22-Jul-15	9:24 AM	97093	2993	97086				
23-Jul-15	8:45 AM	100028	2935	100021				
24-Jul-15	9:15 AM	102463	2435	102456				
25-Jul-15	8:30 AM	105848	3385	105841				
26-Jul-15	8:45 AM	108779	2931	108772				
27-Jul-15	9:13 AM	111764	2985	111757	119.375	3.032125	4.5	0.1143

28-Jul-15								
29-Jul-15	9:30 AM	117609	5845	117602				
30-Jul-15	1:53 PM	121007	3398	121000				
31-Jul-15	9:30 AM	123371	2364	123364				
01-Aug-15	7:45 AM	126016	2645	126009				
02-Aug-15	7:45 AM	128880	2864	128873				
03-Aug-15	7:45 AM	131766	2886	131759				
04-Aug-15	8:30 AM	134796	3030	134789				
05-Aug-15	9:15 AM	137481	2685	137474				
06-Aug-15	10:15 AM	140815	3334	140808				
07-Aug-15								
08-Aug-15	8:15 AM	146307	5492	146300				
09-Aug-15	9:00 AM	149293	2986	149286				
10-Aug-15	9:00 AM	152211	2918	152204	116	2.9464	7.875	0.200025
11-Aug-15	9:11 AM	155111	2900	155104				
12-Aug-15	8:45 AM	157952	2841	157945				
13-Aug-15	8:35 AM	160865	2913	160858				
14-Aug-15	11:15 AM	164003	3138	163996				
15-Aug-15	9:00 AM	166860	2857	166853				
16-Aug-15	8:07 AM	169386	2526	169379				
17-Aug-15	9:30 AM	172412	3026	172405	115.25	2.92735	8.625	0.219075
18-Aug-15	9:00 AM	175233	2821	175226				
19-Aug-15	9:08 AM	178103	2870	178096				
20-Aug-15	2:50 PM	181668	3565	181661				
21-Aug-15	9:00 AM	183875	2207	183868				
22-Aug-15								
23-Aug-15								
24-Aug-15	9:30 AM	192316	8441	192309				
25-Aug-15	8:45 AM	195029	2713	195022				
26-Aug-15	9:15 AM	197817	2788	197810				
27-Aug-15	9:00 AM	200671	2854	200664				
28-Aug-15	9:30 AM	203919	3248	203912				
29-Aug-15	9:20 AM	206359	2440	206352				
30-Aug-15	8:45 AM	209126	2767	209119				
31-Aug-15	8:54 AM	211990	2864	211983				
01-Sep-15	9:05 AM	214821	2831	214814				
02-Sep-15	8:45 AM	217639	2818	217632				
03-Sep-15								
04-Sep-15								
05-Sep-15								
06-Sep-15								
07-Sep-15								
08-Sep-15								
09-Sep-15					115	2.921	8.875	0.225425
10-Sep-15								
11-Sep-15	2:19 PM	243644	26005	243637				
12-Sep-15								
13-Sep-15								
14-Sep-15								
15-Sep-15								
16-Sep-15								

17-Sep-15								
18-Sep-15								
19-Sep-15								
20-Sep-15								
21-Sep-15								
22-Sep-15								
23-Sep-15								
24-Sep-15								
25-Sep-15					113.25	2.87655	10.625	0.269875

*from first reading

Last day of pumping

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): 2015

Spill No.	Date	Ter	Region	Location	Site Description	Commodity	Quantity	Source	Agency
2015087	2015-03-10	NU	KEE	Rankin Inlet	Johnston Cove Lift Station	Sewage	100000 L	SL	INAC
2015121	2015-03-31	NU	KEE	Rankin Inlet	109-23 Aivilik Street Rankin Inlet	P50 Diesel	50 L	ST<	INAC
2015193	2015-05-13	NU	KEE	Rankin Inlet	Rankin Inlet, Unit 572A	Heating Diesel Fuel	700 L	PL	GN
2015194	2015-05-13	NU	KEE	Rankin Inlet	Rankin Inlet Unit 212-68, 68TH Street	Heating Diesel Fuel	478 L	PL	GN
2015205		NU	KEE	Rankin Inlet	Rankin Inlet	Heating Diesel Fuel	1200 L	ST<	GN
2015214	2015-05-22	NU	KEE	Rankin Inlet	Northern Store manager's residence, Rankin Inlet	Heating Oil	100 L	DRUM	GN
2015222	2015-05-25	NU	KEE	Rankin Inlet	Lot 431 #542A	Heating Disel Fuel	528 L	ST<	GN
2015237	2015-06-04	NU	KEE	Rankin Inlet	Rankin Inlet House 219, 67th St	Home Heating Fuel	L	ST<	GN
2015239	2015-06-04	NU	KEE	Rankin Inlet	House 103-22 Rankin Inlet	Diesel	100 L	ST<	GN
2015266	2015-06-22	NU	KEE	Rankin Inlet	113-23 (Red Top)	P50	85 L	PL	GN
2015455	2015-11-06	NU	KEE	Rankin Inlet	Rankin Intel Gas Station	P-50 diesel fuel	500 L	TRU	GN
2015462	2015-11-16	NU	KEE	Rankin Inlet	11-12 Iglu Street	P50 Diesel Heating Fuel	80 L	TRU	GN
2015468	2015-11-20	NU	KEE	Rankin Inlet	Coral Harbour, unit 880	Heating Fuel	20 L	ST<	GN

Total Spills on this Report: 13

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

Region:
BAF - Baffin
DEH - Deh Cho
INU - Inuvik
KEE - Keewatin
KIT - Kitikmeot
NSL - North Slave
SAH - Sahtu
SSL - South Slave

Source:
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
TP - Tailings Pond
TRU - Truck
UK - Unkown
WELL - Wet Wells, Flaring
Boom

Agency:
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

Summary of Water Chemistry Analysis 2015

Parameters	Units	Detection Limit	24-Jun-14		07-Oct-14		24-Jun-15			Guidelines for Canadian Drinking Water Quality
			Nipissar Lake GRA-1	Char River GRA-6	Char River GRA-6	Lower Landing Lake GRA-7	Nipissar Lake GRA-1	Char River GRA-6	Lower Landing Lake GRA-7	
Miscellaneous Parameters										
Ammonia, Total (as N)	mg/L	0.010	<0.010	<0.010	<0.010	0.037	0.087	<0.010	0.12	None required
Biochemical Oxygen Demand	mg/L	6.0			<6.0	<6.0	2.9	<2.0	<2.0	
Phosphorus (P)-Total	mg/L	0.010	0.02	0.013	<0.010	<0.010	0.014	<0.010	0.01	
Total Kjeldahl Nitrogen	mg/L	0.20			0.27	0.27				
Fecal Coliforms	MPN/100mL	3	<3	<3	<3	<3	<3	<3	<3	
Total Suspended Solids	mg/L	5	8	<5.0			<5.0	<5.0	<5.0	
Alkalinity										
Alkalinity, Total (as CaCO3)	mg/L	20	41	20	25.0	23	29.6	15.6	13.5	
Bicarbonate (HCO3)	mg/L	24	50	25	30.0	28	36.1	19	16.5	
Carbonate (CO3)	mg/L	12	<12	<12	<12	<12	<0.60	<0.60	<0.60	
Hydroxide (OH)	mg/L	6.8	<6.8	<6.8	<6.8	<6.8	<0.34	<0.34	<0.34	
Chloride by Ion Chromatography										
Chloride	mg/L	0.50	30.5	15.7	22.4	24.2	20.7	13.2	11.4	AO: ≤ 250 mg/L
Conductivity										
Conductivity	umhos/cm	20	210	104.0	150	151	19	88.7	77.1	
Hardness Calculated										
Hardness (as CaCO3)	mg/L	0.30	54.9	24.3	35.7	32.1	40.8	23	19.6	None required
Nitrate as N by Ion Chromatography										
Nitrate-N	mg/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020	<0.020	
Nitrate+Nitrite										
Nitrate and Nitrite as N	mg/L	0.071	<0.071	<0.071	<0.071	<0.071	<0.070	<0.070	<0.070	10 mg/L as nitrate-nitrogen
Nitrite as N by Ion Chromatography										
Nitrite-N	mg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	
Sulfate by Ion Chromatography										
Sulfate	mg/L	0.50	11	4.75	8.99	7.89	10.9	4.42	3.99	AO: ≤ 500 mg/L
TDS Calculated										
TDS (Calculated)	mg/L	5.0	105	50.3	73.8	73.8				AO: < 500 mg/L
Total Metals by ICP-MS										
Aluminum (Al)-Total	mg/L	0.02	0.075	<0.020	<0.020	0.020	0.0491	0.015	0.014	OG: <0.1 mg/L (conventional); <0.2 mg/L (other treatment types)
Antimony (Sb)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010				MAC: 0.006 mg/L
Arsenic (As)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.00048	0.00023	0.00021	MAC: 0.010 mg/L
Barium (Ba)-Total	mg/L	0.0005	0.01444	0.0102	0.0149	0.0134				MAC: 1.0 mg/L
Beryllium (Be)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010				
Bismuth (Bi)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050				
Boron (B)-Total	mg/L	0.03	0.037	<0.030	<0.030	<0.030				MAC: 5 mg/L
Cadmuim (Cd)-Total	mg/L	0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.000010	<0.000010	<0.000010	MAC: 0.005 mg/L
Calcium (Ca)-Total	mg/L	0.2	16.6	7.3	10.2	8.62	11.8	6.71	5.68	None required
Cesium (Cs)- Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050				
Chromium (Cr)-Total	mg/L	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	MAC: 0.05 mg/L
Cobalt (Co)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	
Copper (Cu)-Total	mg/L	0.002	<0.0020	<0.0020	<0.0020	<0.0020	0.00085	0.00075	0.00068	AO: ≤ 1.0 mg/L
Iron (Fe)-Total	mg/L	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	AO: ≤ 0.3 mg/L
Lead (Pb)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.000090	<0.000090	<0.000090	MAC: 0.010 mg/L
Lithium (Li)-Total	mg/L	0.002	<0.0020	<0.0020	<0.0020	<0.0020				
Magnesium (Mg)-Total	mg/L	0.05	3.24	1.47	2.49	2.58	2.72	1.52	1.32	None required
Manganese (Mn)-Total	mg/L	0.001	0.006	0.0043	0.0054	0.0039	0.031	0.00304	0.00312	AO: ≤ 0.05 mg/L
Molybdenum (Mo)-Total	mg/L	0.0005	0.00067	<0.00050	<0.00050	0.00055				
Nickel (Ni)- Total	mg/L	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
Phosphorus (P)-Total	mg/L	0.5	<0.50	<0.50	<0.50	<0.50	0.014	<0.010	0.01	
Potassium (K)-Total	mg/L	0.1	1.86	1.03	1.60	1.59	1.57	1.17	1.02	
Rubidium (Rb)-Total	mg/L	0.0005	0.00164	0.00144	0.00203	0.00195				
Selenium (Se)-Total	mg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050				MAC: 0.01 mg/L
Silicon (Si)-Total	mg/L	0.3	<0.30	<0.30	<0.30	<0.30				
Silver(Ag)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010				None required

Sodium(Na)-Total	mg/L	0.05	16.6	7.98	13.4	15.2	13.1	7.86	6.71	AO: ≤ 200 mg/L
Strontium(Sr)-Total	mg/L	0.0005	0.0826	0.0426	0.0547	0.0514				
Tellurium(Te)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010				
Thallium(Tl)-Total	mg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050				
Thorium(Th)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010				
Tin(Sn)-Total	mg/L	0.0006	<0.00060	<0.00060	<0.00060	<0.00060				
Titanium(Ti)-Total	mg/L	0.001	0.0029	<0.0010	<0.0010	<0.0010				
Tungsten(W)-Total	mg/L	0.002	<0.0020	<0.0020	<0.0020	<0.0020				
Uranium(U)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050				MAC: 0.02 mg/L
Vanadium(V)-Total	mg/L	0.002	<0.0020	<0.0020	<0.0020	<0.0020				
Zinc(Zn)-Total	mg/L	0.02	<0.020	<0.020	<0.020	<0.020	<0.0020	<0.0020	<0.0020	AO: ≤ 5.0 mg/L
Zirconium(Zr)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010				
pH										
pH	pH Units	0.1	7.77	7.46	7.63	7.62	7.63	7.43	7.35	6.5-8.5

MAC - Maximum acceptable concentrations (health based)

AO - Aesthetic objectives (based on aesthetic considerations)

OG - Operational guidance values (based on operational considerations)

Summary of Hydrocarbon Contamination Analysis 2015

Parameters	Units	Detection Limit	07-Oct-14			24-Jun-15			Guidelines for Canadian Drinking Water Quality
			Nipissar Lake GRA-1	Char River GRA-6	Lower Landing Lake GRA-7	Nipissar Lake GRA-1	Char River GRA-6	Lower Landing Lake GRA-7	
BTX plus F1 by GCMS									
Benzene	mg/L	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	MAC: 0.005 mg/L
Toluene	mg/L	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	AO: ≤ 0.024 mg/L [1]
Ethylbenzene	mg/L	0.00050	<0.00050	<0.00050	<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	<0.00050	<0.00050	<0.00050	
m+p-Xylenes	mg/L	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00071	<0.00050	
F1 (C6-C10)	mg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
CCME Total Hydrocarbons									
F1-BTEX	mg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
F2-Naphth	mg/L	0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	
F3-PAH	mg/L	0.25	<.025	<.025	<0.25	<0.25	<0.25	<0.25	
Total Hydrocarbons (C6-C50)	mg/L	0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	
F2-F4 PHC Method									
F2 (C10-C16)	mg/L	0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	
F3 (C16-C34)	mg/L	0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	
F4 (C34-C50)	mg/L	0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	
Sum of Xylene Isomer Concentrations									
Xylenes (Total)	mg/L	0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	AO: ≤ 0.3 mg/L [3]
Polyaromatic Hydrocarbons (PAHs)									
1-Methyl Napthalene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
2-Methyl Naphthalene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Acenaphthene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Acenaphthylene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Anthracene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	
Acridine	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000010	<0.000020	
Benzo(a)anthracene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Benzo(a)pyrene	mg/L	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	MAC: 0.00001 mg/L
Benzo(b&j)fluoranthene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Benzo(g,h,i)perylene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Benzo(k)fluoranthene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Chrysene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.0000020	<0.000020	
Dibenzo(a,h)anthracene	mg/L	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Fluoranthene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Fluorene	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Indeno(1,2,3-cd)pyrene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010	
Naphthalene	mg/L	0.000050	0.000061	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Phenanthrene	mg/L	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Pyrene	mg/L	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Quinoline	mg/L	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
B(a)P Total Potency Equivalent	mg/L	0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	

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

[2] 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

GN-CGS Rankin Inlet Monitoring Stations and Sampling Parameters for Licence No. 3AM-GRA1015

			GRA-3				
Parameters	**Unit**	**Detection Limit**	**30-Mar-15**	**34-Jun-15**	**15-Oct-15**	**14-Dec-15**	**CCME Guideline[1]**
BOD_5	mg/L	20.0	32.1	520	95	83	N/G
Fecal Coliforms	MPN/100mL	3	>110000	>110000	>110000	>110000	N/G
pH	pH units	0.10	7.93	5.61	7.14	6.87	7.0-8.7
Conductivity	umhos/cm	1.0	736	861	595	531	N/G
Total Suspended Solids	mg/L	5.0	85.0	11300.0	73.0	42.0	N/G
Ammonia Nitrogen	mg/L	1.0	736	9.4	12.2	24.2	N/G
Nitrate-Nitrite	mg/L	0.070	<0.070	<0.070	<0.070	<0.070	N/G
Oil and Grease	mg/L	2.0	19.9	896	23	19.0	N/G
Total Phenols	mg/L	0.050	0.0095	0.027	0.093	0.094	N/G
Sulphate	mg/L	0.30	36	17.4	29.6	26.7	N/G
Sodium	mg/L	0.030	56.2	35.2	37.8	33.5	N/G
Potassium	mg/L	0.020	10.9	16.9	10.7	7.59	N/G
Magnesium	mg/L	0.010	10.3	16.3	6.02	5.39	N/G
Calcium	mg/L	0.10	39	106.0	26.9	23.0	N/G
Total Arsenic	mg/L	0.00020	0.00123	<0.020	0.001	0.00085	0.0125
Total Cadmium	mg/L	0.000010	0.000108	0.0023	0.0002	0.000066	0.00012
Total Copper	mg/L	0.00020	0.147	2.81	0.15	0.1410	0.004
Total Chromium	mg/L	0.0010	<0.0010	<0.10	<0.0010	<0.0010	0.0015
Total Iron	mg/L	0.010	0.44	<10	0.30	0.160	N/G
Total Lead	mg/L	0.000090	0.000789	0.0785	0.00108	0.00085	N/G
Total Mercury	mg/L	0.00002	<0.00020	<0.00040	<0.00020	<0.000020	0.000016
Total Nickel	mg/L	0.0020	0.0027	<0.20	0.0026	<0.0020	N/G
Total Zinc	mg/L	0.0020	0.0960	3.2600	0.0807	0.0727	N/G
Total Hydrocarbons (C6-C50)	mg/L	0.44				14.80	N/G
F1 (C6-C10)	mg/L	0.10				<0.10	N/G
F2 (C10-C16)	mg/L	0.25				0.46	N/G
F3 (C16-C34)	mg/L	0.25				9.63	N/G
F4 (C34-C50)	mg/L	0.25				4.73	N/G
Benzene	mg/L	0.00050				<0.00050	0.11
Toluene	mg/L	0.0010				0.0014	0.215
Ethyl Benzene	mg/L	0.00050				<0.00050	0.025
Xylene	mg/L	0.00050				<0.00050	N/G

[1]Canadian Environmental Quality Guidelines - Water Quality Guidelines for the Protection of Aquatic Life, Marine

N/G - No Guideline

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

Date Received: 31-MAR-15
Report Date: 09-APR-15 08:37 (MT)
Version: FINAL

Client Phone: 867-645-8176

Certificate of Analysis

Lab Work Order #: L1593431

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

Craig Riddell
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1593431-1 NIPISSOR TREATED							
Sampled By: Megan on 30-MAR-15 @ 09:45							
Matrix: Water							
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	98		20	mg/L		01-APR-15	R3168958
Bicarbonate (HCO3)	120		24	mg/L		01-APR-15	R3168958
Carbonate (CO3)	<12		12	mg/L		01-APR-15	R3168958
Hydroxide (OH)	<6.8		6.8	mg/L		01-APR-15	R3168958
Ammonia by colour							
Ammonia, Total (as N)	0.235		0.010	mg/L		31-MAR-15	R3167471
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<2.0		2.0	mg/L		01-APR-15	R3170457
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		01-APR-15	R3170457
Chloride in Water by IC							
Chloride (Cl)	78.1		0.50	mg/L		31-MAR-15	R3168118
Conductivity							
Conductivity	538		20	umhos/cm		01-APR-15	R3168958
Fecal Coliform							
Fecal Coliforms	<3		3	MPN/100mL		31-MAR-15	R3169652
Hardness Calculated							
Hardness (as CaCO3)	134		0.30	mg/L		08-APR-15	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	07-APR-15	07-APR-15	R3170316
Nitrate in Water by IC							
Nitrate (as N)	0.021		0.020	mg/L		31-MAR-15	R3168118
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-APR-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-MAR-15	R3168118
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	05-APR-15	05-APR-15	R3170822
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L		02-APR-15	R3168450
Phosphorus, Total							
Phosphorus (P)-Total	0.018		0.010	mg/L		02-APR-15	R3168377
Sulfate in Water by IC							
Sulfate (SO4)	30.6		0.30	mg/L		31-MAR-15	R3168118
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	07-APR-15	07-APR-15	R3170214
Arsenic (As)-Total	0.00110		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Cadmium (Cd)-Total	0.000063		0.000010	mg/L	07-APR-15	07-APR-15	R3170214
Calcium (Ca)-Total	38.2		0.10	mg/L	07-APR-15	07-APR-15	R3170214
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	07-APR-15	07-APR-15	R3170214
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Copper (Cu)-Total	0.134		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Iron (Fe)-Total	<0.10		0.10	mg/L	07-APR-15	07-APR-15	R3170214
Lead (Pb)-Total	0.000185		0.000090	mg/L	07-APR-15	07-APR-15	R3170214
Magnesium (Mg)-Total	9.31		0.010	mg/L	07-APR-15	07-APR-15	R3170214
Manganese (Mn)-Total	0.0337		0.00030	mg/L	07-APR-15	07-APR-15	R3170214
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	07-APR-15	07-APR-15	R3170214
Potassium (K)-Total	5.12		0.020	mg/L	07-APR-15	07-APR-15	R3170214
Sodium (Na)-Total	46.9		0.030	mg/L	07-APR-15	07-APR-15	R3170214
Zinc (Zn)-Total	0.0120		0.0020	mg/L	07-APR-15	07-APR-15	R3170214

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1593431-1 NIPISSOR TREATED							
Sampled By: Megan on 30-MAR-15 @ 09:45							
Matrix: Water							
Total Organic Carbon							
Total Organic Carbon	10.9		1.0	mg/L		02-APR-15	R3168725
Total Suspended Solids							
Total Suspended Solids	<5.0		5.0	mg/L		02-APR-15	R3169435
pH							
pH	8.26		0.10	pH units		01-APR-15	R3168958
L1593431-2 NIPISSOR RAW							
Sampled By: Megan on 30-MAR-15 @ 09:35							
Matrix: Water							
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	66		20	mg/L		01-APR-15	R3168958
Bicarbonate (HCO3)	81		24	mg/L		01-APR-15	R3168958
Carbonate (CO3)	<12		12	mg/L		01-APR-15	R3168958
Hydroxide (OH)	<6.8		6.8	mg/L		01-APR-15	R3168958
Ammonia by colour							
Ammonia, Total (as N)	0.299		0.010	mg/L		31-MAR-15	R3167471
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<2.0		2.0	mg/L		01-APR-15	R3170457
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		01-APR-15	R3170457
Chloride in Water by IC							
Chloride (Cl)	54.4		0.50	mg/L		31-MAR-15	R3168118
Conductivity							
Conductivity	372		20	umhos/cm		01-APR-15	R3168958
Fecal Coliform							
Fecal Coliforms	<3		3	MPN/100mL		31-MAR-15	R3169652
Hardness Calculated							
Hardness (as CaCO3)	132		0.30	mg/L		08-APR-15	
Mercury Total							
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	07-APR-15	07-APR-15	R3170316
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		31-MAR-15	R3168118
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-APR-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-MAR-15	R3168118
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	05-APR-15	05-APR-15	R3170822
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L		02-APR-15	R3168450
Phosphorus, Total							
Phosphorus (P)-Total	0.018		0.010	mg/L		02-APR-15	R3168377
Sulfate in Water by IC							
Sulfate (SO4)	20.1		0.30	mg/L		31-MAR-15	R3168118
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	07-APR-15	07-APR-15	R3170214
Arsenic (As)-Total	0.00110		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	07-APR-15	07-APR-15	R3170214
Calcium (Ca)-Total	37.7		0.10	mg/L	07-APR-15	07-APR-15	R3170214
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	07-APR-15	07-APR-15	R3170214
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	07-APR-15	07-APR-15	R3170214

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1593431-2 NIPISSOR RAW							
Sampled By: Megan on 30-MAR-15 @ 09:35							
Matrix: Water							
Total Metals by ICP-MS							
Copper (Cu)-Total	0.0161		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Iron (Fe)-Total	1.94		0.10	mg/L	07-APR-15	07-APR-15	R3170214
Lead (Pb)-Total	0.0113		0.000090	mg/L	07-APR-15	07-APR-15	R3170214
Magnesium (Mg)-Total	9.16		0.010	mg/L	07-APR-15	07-APR-15	R3170214
Manganese (Mn)-Total	0.0362		0.00030	mg/L	07-APR-15	07-APR-15	R3170214
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	07-APR-15	07-APR-15	R3170214
Potassium (K)-Total	5.11		0.020	mg/L	07-APR-15	07-APR-15	R3170214
Sodium (Na)-Total	45.7		0.030	mg/L	07-APR-15	07-APR-15	R3170214
Zinc (Zn)-Total	0.0063		0.0020	mg/L	07-APR-15	07-APR-15	R3170214
Total Organic Carbon							
Total Organic Carbon	10.3		1.0	mg/L		02-APR-15	R3168725
Total Suspended Solids							
Total Suspended Solids	13.0		5.0	mg/L		02-APR-15	R3169435
pH							
pH	8.12		0.10	pH units		01-APR-15	R3168958
L1593431-3 GRA-3							
Sampled By: Megan on 30-MAR-15 @ 10:10							
Matrix: Wastewater							
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	165		20	mg/L		01-APR-15	R3168958
Bicarbonate (HCO3)	201		24	mg/L		01-APR-15	R3168958
Carbonate (CO3)	<12		12	mg/L		01-APR-15	R3168958
Hydroxide (OH)	<6.8		6.8	mg/L		01-APR-15	R3168958
Ammonia by colour							
Ammonia, Total (as N)	9.4	DLA	1.0	mg/L		01-APR-15	R3168126
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	37.6		6.0	mg/L		01-APR-15	R3170457
Carbonaceous BOD							
BOD Carbonaceous	32.1		6.0	mg/L		01-APR-15	R3170457
Chloride in Water by IC							
Chloride (Cl)	88.2		0.50	mg/L		31-MAR-15	R3168118
Conductivity							
Conductivity	736		20	umhos/cm		01-APR-15	R3168958
Fecal Coliform							
Fecal Coliforms	>110000		3	MPN/100mL		31-MAR-15	R3169652
Hardness Calculated							
Hardness (as CaCO3)	140		0.30	mg/L		08-APR-15	
Mercury Total							
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	07-APR-15	07-APR-15	R3170316
Nitrate in Water by IC							
Nitrate (as N)	0.049		0.020	mg/L		31-MAR-15	R3168118
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-APR-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-MAR-15	R3168118
Oil and Grease, Total							
Oil and Grease, Total	19.9		2.0	mg/L	05-APR-15	05-APR-15	R3170822
Phenol (4AAP)							
Phenols (4AAP)	0.0095		0.0010	mg/L		02-APR-15	R3168450
Phosphorus, Total							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1593431-3 GRA-3							
Sampled By: Megan on 30-MAR-15 @ 10:10							
Matrix: Wastewater							
Phosphorus, Total							
Phosphorus (P)-Total	3.36		0.010	mg/L		02-APR-15	R3168377
Sulfate in Water by IC							
Sulfate (SO4)	36.0		0.30	mg/L		31-MAR-15	R3168118
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.162		0.0050	mg/L	07-APR-15	07-APR-15	R3170214
Arsenic (As)-Total	0.00123		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Cadmium (Cd)-Total	0.000108		0.000010	mg/L	07-APR-15	07-APR-15	R3170214
Calcium (Ca)-Total	39.0		0.10	mg/L	07-APR-15	07-APR-15	R3170214
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	07-APR-15	07-APR-15	R3170214
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Copper (Cu)-Total	0.147		0.00020	mg/L	07-APR-15	07-APR-15	R3170214
Iron (Fe)-Total	0.44		0.10	mg/L	07-APR-15	07-APR-15	R3170214
Lead (Pb)-Total	0.000789		0.000090	mg/L	07-APR-15	07-APR-15	R3170214
Magnesium (Mg)-Total	10.3		0.010	mg/L	07-APR-15	07-APR-15	R3170214
Manganese (Mn)-Total	0.0440		0.00030	mg/L	07-APR-15	07-APR-15	R3170214
Nickel (Ni)-Total	0.0027		0.0020	mg/L	07-APR-15	07-APR-15	R3170214
Potassium (K)-Total	10.9		0.020	mg/L	07-APR-15	07-APR-15	R3170214
Sodium (Na)-Total	56.2		0.030	mg/L	07-APR-15	07-APR-15	R3170214
Zinc (Zn)-Total	0.0960		0.0020	mg/L	07-APR-15	07-APR-15	R3170214
Total Organic Carbon							
Total Organic Carbon	55.7		1.0	mg/L		02-APR-15	R3168725
Total Suspended Solids							
Total Suspended Solids	85.0		5.0	mg/L		02-APR-15	R3169435
pH							
pH	7.93		0.10	pH units		01-APR-15	R3168958

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
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-TOT-WP	Water	Alkalinity	APHA 2320B

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

BOD-CBOD-WP	Water	Carbonaceous BOD	APHA 5210 B-5 day Incub.-O2 electrode

A sample of water is incubated for 5 days at 20 degrees Celcius. Comparison of dissolved oxygen content at beginning and end of incubation provides a measure of Biochemical oxygen demand. If carbonaceous BOD is requested, TCMP is added to the sample to chemically inhibit nitrogenous oxygen demand. If soluble BOD is requested, the sample is filtered prior to analysis.

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

The sample is incubated for 5 days at 20 degrees Celcius. Comparison of dissolved oxygen content at the beginning and end of incubation provides a measure of biochemical oxygen demand. If carbonaceous BOD is requested, TCMP is added to the sample to chemically inhibit nitrogenous oxygen demand. If soluble BOD is requested, the sample is filtered prior to analysis. Surface waters have a DL of 1 mg/L. Effluents are diluted according to their history and will have a sample DL of 6 mg/L or greater, depending on the dilutions used.

C-TOT-ORG-WP	Water	Total Organic Carbon	APHA 5310 B-INSTRUMENTAL-WP

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

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.

ETL-HARDNESS-TOT-WP	Water	Hardness Calculated	HARDNESS CALCULATED
FC-MPN-WP	Water	Fecal Coliform	APHA 9221E

The Most Probable Number (MPN) method is based on the Multiple Tube Fermentation technique. The results of examination of replicate tubes and dilutions of a sample are reported after confirmations specific to total coliform, fecal coliform and E. coli are performed. Results are reported in MPN/100 mL for water and MPN/gram for food and solid samples.

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)

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.			
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.			
OGG-TOT-WT	Water	Oil and Grease, Total	APHA 5520 B
Sample is extracted with hexane, extract is then evaporated and the residue is weighed to determine total oil and grease.			
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.

ALS Environment

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # L1593431

Page 1 of 1

L1593431-COFC

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company: GN-CGS		☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact: Megan Lusty		☐ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address: P.O. Box 490	Email 1: mlusty@gov.nu.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Rankin Inlet, NU X0C0G0	Email 2:			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone: 867-645-8176 Fax: 867-645-8196	Email 3:			Analysis Request
Invoice To Same as Report ? ☑ Yes ☐ No	Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report? ☑ Yes ☐ No	Job #:			
Company:	PO / AFE:			
Contact:	LSD:			
Address:				
Phone: Fax:	Quote #:			
Lab Work Order # (lab use only): [redacted]	ALS Contact: Craig Riddel	Sampler: Megan		

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine	BOD	Bacteria	Total Metals	Total Phenols	Total Nutrients	Oil + Grease x2	Number of Containers
[redacted]	Nipissar Treated	30-03-15	9:45	water	✓	✓	P	P	P	P	P	8
[redacted]	Nipissar Raw	30-03-15	9:35	water	✓	✓	P	P	P	P	P	8
[redacted]	GRA-3	30-03-15	10:10	wastewater	✓	✓	P	P	P	P	P	8
[redacted]												
[redacted]												
[redacted]												
[redacted]												
[redacted]												
[redacted]												
[redacted]												
[redacted]												

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

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Megan Lusty	30-03-15	10:15	[signature]	31mar15	9705	7 °C				

GENF 20.00 Front

Nunavut - Community & Government Services - Rankin Inlet
ATTN: BLAINE CHISLETT
PO Box 490
Rankin Inlet NU X0C 0G0

Date Received: 25-JUN-15
Report Date: 17-JUL-15 11:45 (MT)
Version: FINAL

Client Phone: 867-645-8172

Certificate of Analysis

Lab Work Order #: L1633161

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

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-1 GRA-6							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:00							
Matrix: WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		08-JUL-15	R3221017
Toluene	<0.0010		0.0010	mg/L		08-JUL-15	R3221017
Ethyl benzene	<0.00050		0.00050	mg/L		08-JUL-15	R3221017
o-Xylene	<0.00050		0.00050	mg/L		08-JUL-15	R3221017
m+p-Xylenes	0.00071		0.00050	mg/L		08-JUL-15	R3221017
F1 (C6-C10)	<0.10		0.10	mg/L		08-JUL-15	R3221017
Surrogate: 4-Bromofluorobenzene (SS)	90.2		70-130	%		08-JUL-15	R3221017
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		08-JUL-15	
F2-Naphth	<0.25		0.25	mg/L		08-JUL-15	
F3-PAH	<0.25		0.25	mg/L		08-JUL-15	
Total Hydrocarbons (C6-C50)	<0.44		0.44	mg/L		08-JUL-15	
F2-F4 PHC method							
F2 (C10-C16)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
F3 (C16-C34)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
F4 (C34-C50)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
Surrogate: 2-Bromobenzotrifluoride	98.8		60-140	%	02-JUL-15	02-JUL-15	R3219951
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		08-JUL-15	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Acenaphthene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Acenaphthylene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Anthracene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Acridine	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(a)anthracene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Chrysene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Fluoranthene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Fluorene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Naphthalene	<0.000050		0.000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Phenanthrene	<0.000050		0.000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Pyrene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Quinoline	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	07-JUL-15	07-JUL-15	R3221586
Surrogate: Acenaphthene d10	92.1		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Acridine d9	105.0		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Chrysene d12	96.1		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Naphthalene d8	81.2		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Phenanthrene d10	95.1		40-130	%	07-JUL-15	07-JUL-15	R3221586
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	19.0		1.2	mg/L		13-JUL-15	
Alkalinity, Carbonate							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-1 GRA-6							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:00							
Matrix: WATER							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		13-JUL-15	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		13-JUL-15	
Ammonia by colour							
Ammonia, Total (as N)	<0.010		0.010	mg/L		30-JUN-15	R3218142
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<2.0		2.0	mg/L		26-JUN-15	R3222093
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		26-JUN-15	R3222093
Chloride in Water by IC							
Chloride (Cl)	13.2		0.50	mg/L		26-JUN-15	R3218414
Conductivity							
Conductivity	88.7		1.0	umhos/cm		09-JUL-15	R3224268
Fecal Coliform							
Fecal Coliforms	<3	MBHT	3	MPN/100mL		25-JUN-15	R3218195
Hardness Calculated							
Hardness (as CaCO3)	23.0		0.30	mg/L		07-JUL-15	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	06-JUL-15	06-JUL-15	R3221292
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		26-JUN-15	R3218414
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-JUL-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		26-JUN-15	R3218414
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	03-JUL-15	03-JUL-15	R3220114
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L		07-JUL-15	R3221471
Phosphorus, Total							
Phosphorus (P)-Total	<0.010		0.010	mg/L		01-JUL-15	R3218033
Sulfate in Water by IC							
Sulfate (SO4)	4.42		0.30	mg/L		26-JUN-15	R3218414
Total Alkalinity as CaCO3							
Alkalinity, Total (as CaCO3)	15.6		1.0	mg/L		09-JUL-15	R3224268
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0154		0.0050	mg/L	06-JUL-15	06-JUL-15	R3220699
Arsenic (As)-Total	0.00023		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	06-JUL-15	06-JUL-15	R3220699
Calcium (Ca)-Total	6.71		0.10	mg/L	06-JUL-15	06-JUL-15	R3220699
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	06-JUL-15	06-JUL-15	R3220699
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Copper (Cu)-Total	0.00075		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Iron (Fe)-Total	<0.10		0.10	mg/L	06-JUL-15	06-JUL-15	R3220699
Lead (Pb)-Total	<0.000090		0.000090	mg/L	06-JUL-15	06-JUL-15	R3220699
Magnesium (Mg)-Total	1.52		0.010	mg/L	06-JUL-15	06-JUL-15	R3220699
Manganese (Mn)-Total	0.00304		0.00030	mg/L	06-JUL-15	06-JUL-15	R3220699
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	06-JUL-15	06-JUL-15	R3220699
Potassium (K)-Total	1.17		0.020	mg/L	06-JUL-15	06-JUL-15	R3220699
Sodium (Na)-Total	7.86		0.030	mg/L	06-JUL-15	06-JUL-15	R3220699
Zinc (Zn)-Total	<0.0020		0.0020	mg/L	06-JUL-15	06-JUL-15	R3220699
Total Organic Carbon							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-1 GRA-6							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:00							
Matrix: WATER							
Total Organic Carbon							
Total Organic Carbon	4.6		1.0	mg/L		17-JUL-15	R3227602
Total Suspended Solids							
Total Suspended Solids	<5.0		5.0	mg/L		30-JUN-15	R3218516
pH							
pH	7.43		0.10	pH units		09-JUL-15	R3224268
L1633161-2 GRA-7							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:30							
Matrix: WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
Toluene	<0.0010		0.0010	mg/L		06-JUL-15	R3221017
Ethyl benzene	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
o-Xylene	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
m+p-Xylenes	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
F1 (C6-C10)	<0.10		0.10	mg/L		06-JUL-15	R3221017
Surrogate: 4-Bromofluorobenzene (SS)	88.6		70-130	%		06-JUL-15	R3221017
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		08-JUL-15	
F2-Naphth	<0.25		0.25	mg/L		08-JUL-15	
F3-PAH	<0.25		0.25	mg/L		08-JUL-15	
Total Hydrocarbons (C6-C50)	<0.44		0.44	mg/L		08-JUL-15	
F2-F4 PHC method							
F2 (C10-C16)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
F3 (C16-C34)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
F4 (C34-C50)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
Surrogate: 2-Bromobenzotrifluoride	101.1		60-140	%	02-JUL-15	02-JUL-15	R3219951
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		07-JUL-15	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Acenaphthene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Acenaphthylene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Anthracene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Acridine	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(a)anthracene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Chrysene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Fluoranthene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Fluorene	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Naphthalene	<0.000050		0.000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Phenanthrene	<0.000050		0.000050	mg/L	07-JUL-15	07-JUL-15	R3221586
Pyrene	<0.000010		0.000010	mg/L	07-JUL-15	07-JUL-15	R3221586
Quinoline	<0.000020		0.000020	mg/L	07-JUL-15	07-JUL-15	R3221586

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-2 GRA-7							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:30							
Matrix: WATER							
Polyaromatic Hydrocarbons (PAHs)							
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	07-JUL-15	07-JUL-15	R3221586
Surrogate: Acenaphthene d10	85.2		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Acridine d9	99.3		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Chrysene d12	92.1		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Naphthalene d8	77.2		40-130	%	07-JUL-15	07-JUL-15	R3221586
Surrogate: Phenanthrene d10	88.2		40-130	%	07-JUL-15	07-JUL-15	R3221586
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	16.5		1.2	mg/L		13-JUL-15	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		13-JUL-15	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		13-JUL-15	
Ammonia by colour							
Ammonia, Total (as N)	0.12	DLA	0.10	mg/L		30-JUN-15	R3218142
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<2.0		2.0	mg/L		26-JUN-15	R3222093
Carbonaceous BOD							
BOD Carbonaceous	<2.0		2.0	mg/L		26-JUN-15	R3222093
Chloride in Water by IC							
Chloride (Cl)	11.4		0.50	mg/L		26-JUN-15	R3218414
Conductivity							
Conductivity	77.1		1.0	umhos/cm		09-JUL-15	R3224268
Fecal Coliform							
Fecal Coliforms	<3	MBHT	3	MPN/100mL		25-JUN-15	R3218195
Hardness Calculated							
Hardness (as CaCO3)	19.6		0.30	mg/L		07-JUL-15	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	06-JUL-15	06-JUL-15	R3221292
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		26-JUN-15	R3218414
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-JUL-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		26-JUN-15	R3218414
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	03-JUL-15	03-JUL-15	R3219907
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L		07-JUL-15	R3221471
Phosphorus, Total							
Phosphorus (P)-Total	0.010		0.010	mg/L		01-JUL-15	R3218033
Sulfate in Water by IC							
Sulfate (SO4)	3.99		0.30	mg/L		26-JUN-15	R3218414
Total Alkalinity as CaCO3							
Alkalinity, Total (as CaCO3)	13.5		1.0	mg/L		09-JUL-15	R3224268
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0139		0.0050	mg/L	06-JUL-15	06-JUL-15	R3220699
Arsenic (As)-Total	0.00021		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	06-JUL-15	06-JUL-15	R3220699
Calcium (Ca)-Total	5.68		0.10	mg/L	06-JUL-15	06-JUL-15	R3220699
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	06-JUL-15	06-JUL-15	R3220699
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-2 GRA-7							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:30							
Matrix: WATER							
Total Metals by ICP-MS							
Copper (Cu)-Total	0.00068		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Iron (Fe)-Total	<0.10		0.10	mg/L	06-JUL-15	06-JUL-15	R3220699
Lead (Pb)-Total	<0.000090		0.000090	mg/L	06-JUL-15	06-JUL-15	R3220699
Magnesium (Mg)-Total	1.32		0.010	mg/L	06-JUL-15	06-JUL-15	R3220699
Manganese (Mn)-Total	0.00312		0.00030	mg/L	06-JUL-15	06-JUL-15	R3220699
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	06-JUL-15	06-JUL-15	R3220699
Potassium (K)-Total	1.02		0.020	mg/L	06-JUL-15	06-JUL-15	R3220699
Sodium (Na)-Total	6.71		0.030	mg/L	06-JUL-15	06-JUL-15	R3220699
Zinc (Zn)-Total	<0.0020		0.0020	mg/L	06-JUL-15	06-JUL-15	R3220699
Total Organic Carbon							
Total Organic Carbon	4.1		1.0	mg/L		17-JUL-15	R3227602
Total Suspended Solids							
Total Suspended Solids	<5.0		5.0	mg/L		30-JUN-15	R3218516
pH							
pH	7.35		0.10	pH units		09-JUL-15	R3224268
L1633161-3 GRA-1							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:55							
Matrix: WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
Toluene	<0.0010		0.0010	mg/L		06-JUL-15	R3221017
Ethyl benzene	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
o-Xylene	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
m+p-Xylenes	<0.00050		0.00050	mg/L		06-JUL-15	R3221017
F1 (C6-C10)	<0.10		0.10	mg/L		06-JUL-15	R3221017
Surrogate: 4-Bromofluorobenzene (SS)	90.4		70-130	%		06-JUL-15	R3221017
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		07-JUL-15	
Total Hydrocarbons (C6-C50)	<0.44		0.44	mg/L		07-JUL-15	
F2-F4 PHC method							
F2 (C10-C16)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
F3 (C16-C34)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
F4 (C34-C50)	<0.25		0.25	mg/L	02-JUL-15	02-JUL-15	R3219951
Surrogate: 2-Bromobenzotrifluoride	98.9		60-140	%	02-JUL-15	02-JUL-15	R3219951
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		07-JUL-15	
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	36.1		1.2	mg/L		13-JUL-15	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		13-JUL-15	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		13-JUL-15	
Ammonia by colour							
Ammonia, Total (as N)	0.087		0.010	mg/L		30-JUN-15	R3218142
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	2.9		1.0	mg/L		26-JUN-15	R3222093
Carbonaceous BOD							
BOD Carbonaceous	2.5		1.0	mg/L		26-JUN-15	R3222093
Chloride in Water by IC							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-3 GRA-1							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 09:55							
Matrix: WATER							
Chloride in Water by IC							
Chloride (Cl)	20.7		0.50	mg/L		26-JUN-15	R3218414
Conductivity							
Conductivity	149		1.0	umhos/cm		09-JUL-15	R3224268
Fecal Coliform							
Fecal Coliforms	<3	MBHT	3	MPN/100mL		25-JUN-15	R3218195
Hardness Calculated							
Hardness (as CaCO3)	40.8		0.30	mg/L		07-JUL-15	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	06-JUL-15	06-JUL-15	R3221292
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		26-JUN-15	R3218414
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-JUL-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		26-JUN-15	R3218414
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	03-JUL-15	03-JUL-15	R3219907
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L		07-JUL-15	R3221471
Phosphorus, Total							
Phosphorus (P)-Total	0.014		0.010	mg/L		01-JUL-15	R3218033
Sulfate in Water by IC							
Sulfate (SO4)	10.9		0.30	mg/L		26-JUN-15	R3218414
Total Alkalinity as CaCO3							
Alkalinity, Total (as CaCO3)	29.6		1.0	mg/L		09-JUL-15	R3224268
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0491		0.0050	mg/L	06-JUL-15	06-JUL-15	R3220699
Arsenic (As)-Total	0.00048		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	06-JUL-15	06-JUL-15	R3220699
Calcium (Ca)-Total	11.8		0.10	mg/L	06-JUL-15	06-JUL-15	R3220699
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	06-JUL-15	06-JUL-15	R3220699
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Copper (Cu)-Total	0.00085		0.00020	mg/L	06-JUL-15	06-JUL-15	R3220699
Iron (Fe)-Total	<0.10		0.10	mg/L	06-JUL-15	06-JUL-15	R3220699
Lead (Pb)-Total	<0.000090		0.000090	mg/L	06-JUL-15	06-JUL-15	R3220699
Magnesium (Mg)-Total	2.72		0.010	mg/L	06-JUL-15	06-JUL-15	R3220699
Manganese (Mn)-Total	0.0310		0.00030	mg/L	06-JUL-15	06-JUL-15	R3220699
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	06-JUL-15	06-JUL-15	R3220699
Potassium (K)-Total	1.57		0.020	mg/L	06-JUL-15	06-JUL-15	R3220699
Sodium (Na)-Total	13.1		0.030	mg/L	06-JUL-15	06-JUL-15	R3220699
Zinc (Zn)-Total	<0.0020		0.0020	mg/L	06-JUL-15	06-JUL-15	R3220699
Total Organic Carbon							
Total Organic Carbon	4.1		1.0	mg/L		17-JUL-15	R3227602
Total Suspended Solids							
Total Suspended Solids	<5.0		5.0	mg/L		30-JUN-15	R3218516
pH							
pH	7.63		0.10	pH units		09-JUL-15	R3224268
L1633161-4 GRA-3							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 10:20							
Matrix: WASTEWATER							
Nunavut WW Group 1							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-4 GRA-3							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 10:20							
Matrix: WASTEWATER							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	412		1.2	mg/L		13-JUL-15	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		13-JUL-15	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		13-JUL-15	
Ammonia by colour							
Ammonia, Total (as N)	9.4	DLA	1.0	mg/L		02-JUL-15	R3218855
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	520	DLA	300	mg/L		26-JUN-15	R3222093
Carbonaceous BOD							
BOD Carbonaceous	390	DLA	300	mg/L		26-JUN-15	R3222093
Chloride in Water by IC							
Chloride (Cl)	45.6		0.50	mg/L		26-JUN-15	R3218414
Conductivity							
Conductivity	861		1.0	umhos/cm		09-JUL-15	R3224268
Fecal Coliform							
Fecal Coliforms	>110000	MBHT	3	MPN/100mL		25-JUN-15	R3218195
Hardness Calculated							
Hardness (as CaCO3)	332		0.30	mg/L		07-JUL-15	
Mercury Total							
Mercury (Hg)-Total	<0.00040	DLM	0.00040	mg/L	06-JUL-15	06-JUL-15	R3221292
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		26-JUN-15	R3218414
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		02-JUL-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		26-JUN-15	R3218414
Oil and Grease, Total							
Oil and Grease, Total	896	DLM	8.0	mg/L	03-JUL-15	03-JUL-15	R3219907
Phenol (4AAP)							
Phenols (4AAP)	0.027	DLA	0.010	mg/L		07-JUL-15	R3221471
Phosphorus, Total							
Phosphorus (P)-Total	20.0	DLA	0.20	mg/L		01-JUL-15	R3218033
Sulfate in Water by IC							
Sulfate (SO4)	17.4		0.30	mg/L		26-JUN-15	R3218414
Total Alkalinity as CaCO3							
Alkalinity, Total (as CaCO3)	337		1.0	mg/L		09-JUL-15	R3224268
Total Metals by ICP-MS							
Aluminum (Al)-Total	8.83	DLM	0.50	mg/L	06-JUL-15	06-JUL-15	R3220699
Arsenic (As)-Total	<0.020	DLM	0.020	mg/L	06-JUL-15	06-JUL-15	R3220699
Cadmium (Cd)-Total	0.0023	DLM	0.0010	mg/L	06-JUL-15	06-JUL-15	R3220699
Calcium (Ca)-Total	106	DLM	10	mg/L	06-JUL-15	06-JUL-15	R3220699
Chromium (Cr)-Total	<0.10	DLM	0.10	mg/L	06-JUL-15	06-JUL-15	R3220699
Cobalt (Co)-Total	<0.020	DLM	0.020	mg/L	06-JUL-15	06-JUL-15	R3220699
Copper (Cu)-Total	2.81	DLM	0.020	mg/L	06-JUL-15	06-JUL-15	R3220699
Iron (Fe)-Total	<10	DLM	10	mg/L	06-JUL-15	06-JUL-15	R3220699
Lead (Pb)-Total	0.0785	DLM	0.0090	mg/L	06-JUL-15	06-JUL-15	R3220699
Magnesium (Mg)-Total	16.3	DLM	1.0	mg/L	06-JUL-15	06-JUL-15	R3220699
Manganese (Mn)-Total	0.363	DLM	0.030	mg/L	06-JUL-15	06-JUL-15	R3220699
Nickel (Ni)-Total	<0.20	DLM	0.20	mg/L	06-JUL-15	06-JUL-15	R3220699
Potassium (K)-Total	16.9	DLM	2.0	mg/L	06-JUL-15	06-JUL-15	R3220699
Sodium (Na)-Total	35.2	DLM	3.0	mg/L	06-JUL-15	06-JUL-15	R3220699

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1633161-4 GRA-3							
Sampled By: MEGAN LUSTY on 24-JUN-15 @ 10:20							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Zinc (Zn)-Total	3.26	DLM	0.20	mg/L	06-JUL-15	06-JUL-15	R3220699
Total Organic Carbon							
Total Organic Carbon	387		1.0	mg/L		17-JUL-15	R3227602
Total Suspended Solids							
Total Suspended Solids	11300		5.0	mg/L		30-JUN-15	R3218516
pH							
pH	5.61		0.10	pH units		09-JUL-15	R3224268

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
MBHT	The APHA 30 hour hold time was exceeded for microbiological testing. Samples processed within 48 hours from time of sampling may be valid in some cases (refer to Health Canada guidance).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

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

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

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

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

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

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

ALK-TITR-WP	Water	Total Alkalinity 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-TOT-ORG-WP	Water	Total Organic Carbon	APHA 5310 B-INSTRUMENTAL-WP

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

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.

ETL-HARDNESS-TOT-WP	Water	Hardness Calculated	HARDNESS CALCULATED
F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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

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

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

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

F2-F4-FID-WP	Water	F2-F4 PHC method	CWS (CCME)

Petroleum Hydrocarbons (F2-F4) in Water Method is adapted from US EPA Method 3511: Organic Compounds in Water by Micro-extraction" (Nov 2002) with instrumental analysis as per the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method" (CCMS, Dec 2000) Water samples (in their entirety) are extracted using hexane prior to capillary column gas chromatography with flame ionization detection (GC/FID).

FC-MPN-WP	Water	Fecal Coliform	APHA 9221E

The Most Probable Number (MPN) method is based on the Multiple Tube Fermentation technique. The results of examination of replicate tubes and dilutions of a sample are reported after confirmations specific to total coliform, fecal coliform and E. coli are performed. Results are reported in MPN/100 mL for water and MPN/gram for food and solid samples.

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.

OGG-TOT-WT	Water	Oil and Grease, Total	APHA 5520 B

Sample is extracted with hexane, extract is then evaporated and the residue is weighed to determine total oil and grease.

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 Information

Test Method References:

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

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

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

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

Chain of Custody Numbers:

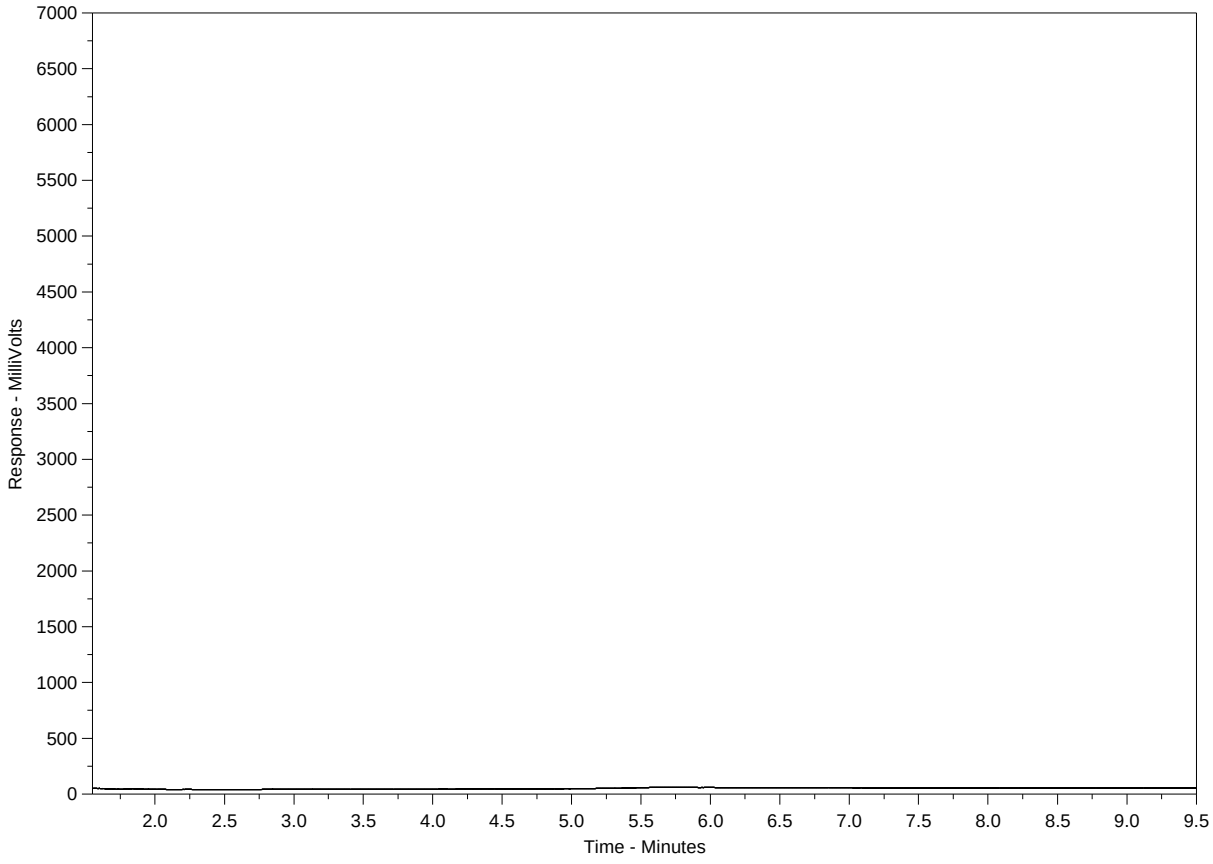
GLOSSARY OF REPORT TERMS

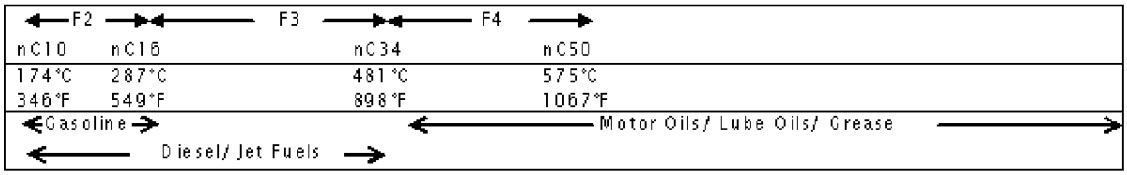
Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates 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: L1633161-1
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.

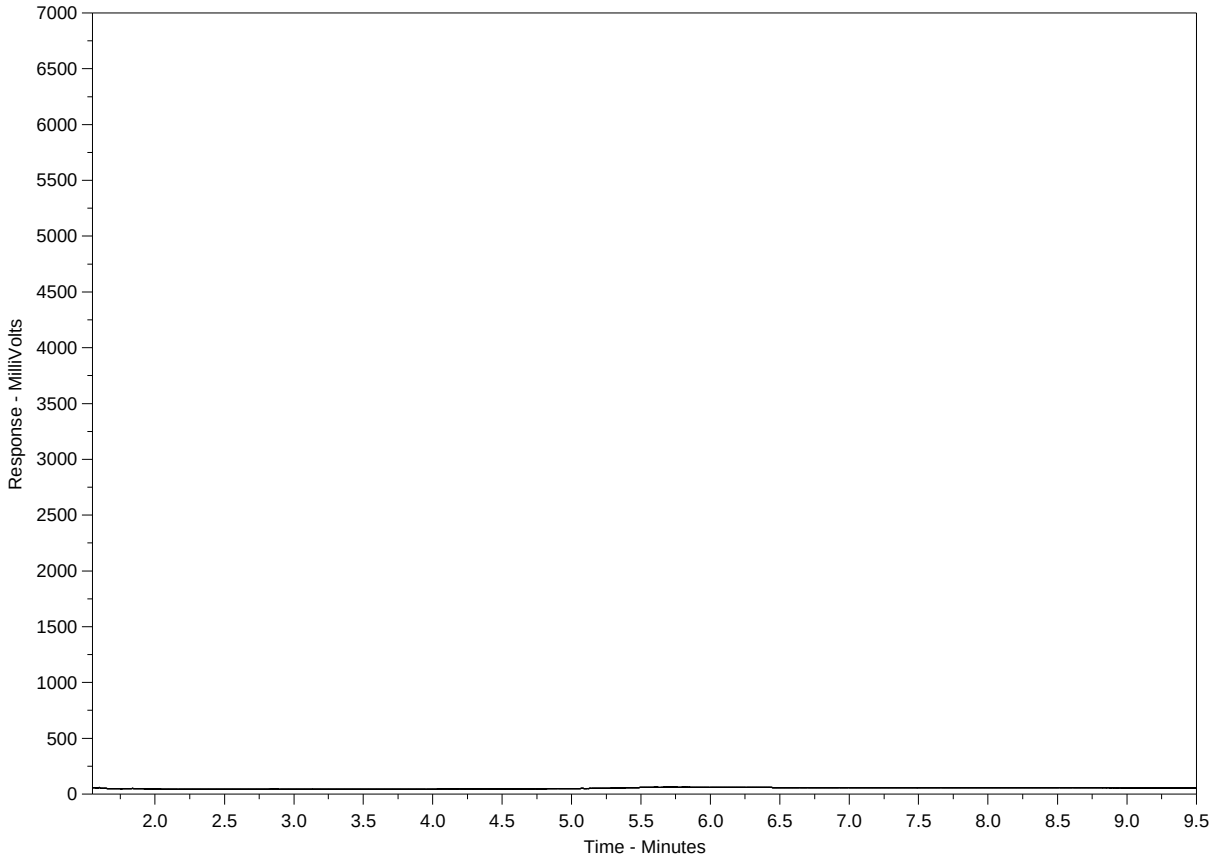
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

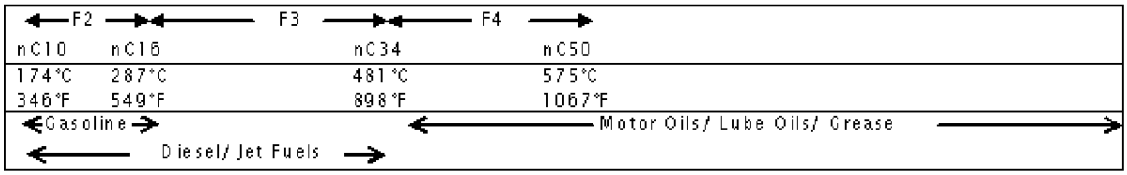
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1633161-2
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.

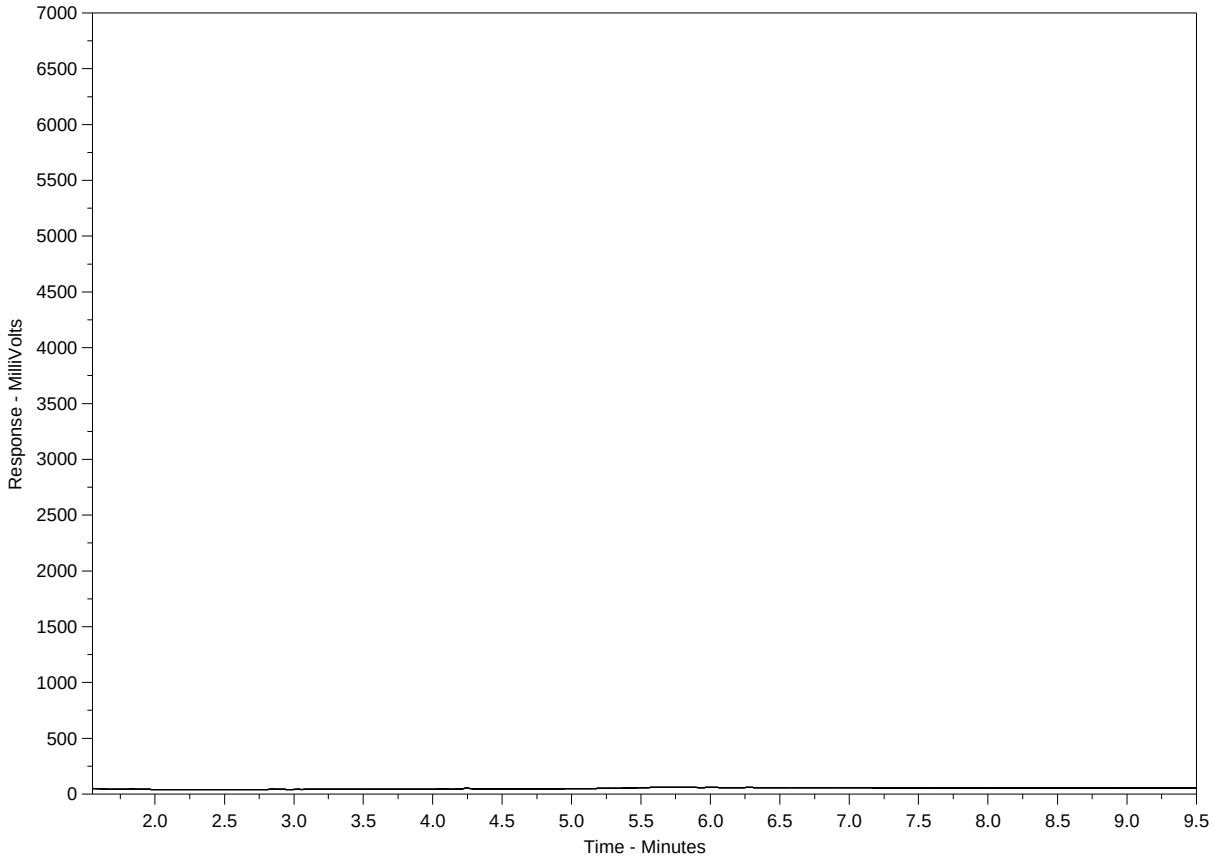
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

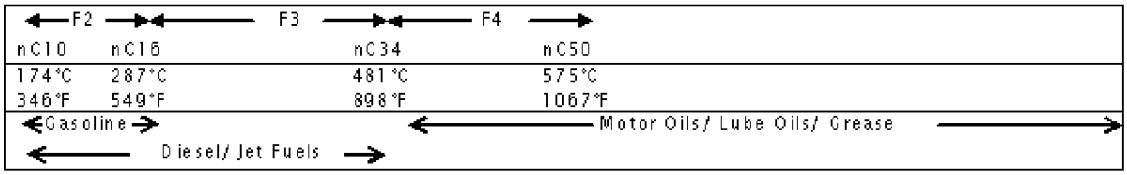
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1633161-3
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.

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.

2 Coolers

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1633161-COFC

COC Number: 14 - 454492

Page 1 of 1

Copy

Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)	
Company:	Government of Nunavut - CGS Rankin Inlet	Select Report Format:	☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)	R ☑	Regular (Standard TAT if received by 3pm)
Contact:	Blaise Chisholm / Megan Lusty	Quality Control (QC) Report with Report	☐ Yes ☐ No	P ☐	Priority (2-4 business days if received by 3pm)
Address:	P.O. Box 490 Rankin Inlet, NU X0C0G0	☐ Criteria on Report - provide details below if box checked		E ☐	Emergency (1-2 business days if received by 3pm)
		Select Distribution:	☐ EMAIL ☐ MAIL ☐ FAX	E2 ☐	Same day or weekend emergency if received by 10am -- contact ALS for surcharge.
Phone:	867-645-8176	Email 1 or Fax		Specify Date Required for E2,E or P:	
		Email 2			

Invoice To	Same as Report To ☑ Yes ☐ No	Invoice Distribution	
	Copy of Invoice with Report ☐ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	W8133	Approver ID:	Cost Center:
Job #:		GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Craig Riddell

Sampler: Megan Lusty

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine	BOD	Phenols	Total Metals	Total Nutrients	Oil & Grease x2	Bacteria	Total Metals	BTX, F1 x3	F2-F4 x2	PAH			Number of Containers
	GRA-6	24-06-15	9:00AM	Water	✓	✓	P	P	P	P	P	P	P	P	P			15
	GRA-7	24-06-15	9:30AM	Water	✓	✓	P	P	P	P	P	P	P	P	P			15
	GRA-1	24-06-15	9:55AM	Water	✓	✓	P	P	P	P	P	P	P	P	P			15
	GRA-3	24-06-15	10:20AM	Wastewater	✓	✓	P	P	P	P	P	P						9

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	NUNAVUT - WW - GRP1 - WP
Are samples for human drinking water use? ☐ Yes ☑ No	BTX, F1-F4
	PAH

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No ☐	
Ice packs	Yes ☐	No ☐	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
14					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	24-06-15	10:40 AM		25 JUN 15	17:20			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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.

Nunavut - Community & Government Services - Rankin Inlet
ATTN: JOE STRICKLAND - FACILITY MGR
P.O. Box 490
Rankin Inlet NU X0C 0G0

Date Received: 16-OCT-15
Report Date: 30-OCT-15 13:22 (MT)
Version: FINAL

Client Phone: 867-645-8158

Certificate of Analysis

Lab Work Order #: L1688882

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

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1688882-1 GRA-3							
Sampled By: MEGAN LUSTY on 15-OCT-15 @ 13:30							
Matrix: WW							
Miscellaneous Parameters							
Total Organic Carbon	33.6		0.50	mg/L		29-OCT-15	R3299953
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	183		1.2	mg/L		26-OCT-15	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		26-OCT-15	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		26-OCT-15	
Ammonia by colour							
Ammonia, Total (as N)	12.2		1.0	mg/L		19-OCT-15	R3292551
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	95	DLA	20	mg/L		16-OCT-15	R3294631
Carbonaceous BOD							
BOD Carbonaceous	88	DLA	20	mg/L		16-OCT-15	R3294631
Chloride in Water by IC							
Chloride (Cl)	64.1		0.50	mg/L		16-OCT-15	R3293339
Conductivity							
Conductivity	595		1.0	umhos/cm		23-OCT-15	R3295937
Fecal Coliform							
Fecal Coliforms	>110000		3	MPN/100mL		16-OCT-15	R3296087
Hardness Calculated							
Hardness (as CaCO3)	92.0		0.30	mg/L		24-OCT-15	
Mercury Total							
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	21-OCT-15	21-OCT-15	R3293967
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		16-OCT-15	R3293339
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		21-OCT-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		16-OCT-15	R3293339
Oil and Grease, Total							
Oil and Grease, Total	23.1		2.0	mg/L	22-OCT-15	22-OCT-15	R3295688
Phenol (4AAP)							
Phenols (4AAP)	0.093	DLM	0.050	mg/L		26-OCT-15	R3297439
Note: DLM: diluted due to unknown interferences.							
Phosphorus, Total							
Phosphorus (P)-Total	3.81		0.050	mg/L		23-OCT-15	R3295338
Sulfate in Water by IC							
Sulfate (SO4)	29.6		0.30	mg/L		16-OCT-15	R3293339
Total Alkalinity as CaCO3							
Alkalinity, Total (as CaCO3)	150		1.0	mg/L		23-OCT-15	R3295937
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.207		0.0050	mg/L	23-OCT-15	23-OCT-15	R3295775
Arsenic (As)-Total	0.00096		0.00020	mg/L	23-OCT-15	23-OCT-15	R3295775
Cadmium (Cd)-Total	0.000161		0.000010	mg/L	23-OCT-15	23-OCT-15	R3295775
Calcium (Ca)-Total	26.9		0.10	mg/L	23-OCT-15	23-OCT-15	R3295775
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	23-OCT-15	23-OCT-15	R3295775
Cobalt (Co)-Total	0.00035		0.00020	mg/L	23-OCT-15	23-OCT-15	R3295775
Copper (Cu)-Total	0.145		0.00020	mg/L	23-OCT-15	23-OCT-15	R3295775
Iron (Fe)-Total	0.30		0.10	mg/L	23-OCT-15	23-OCT-15	R3295775
Lead (Pb)-Total	0.00108		0.000090	mg/L	23-OCT-15	23-OCT-15	R3295775

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1688882-1 GRA-3							
Sampled By: MEGAN LUSTY on 15-OCT-15 @ 13:30							
Matrix: WW							
Total Metals by ICP-MS							
Magnesium (Mg)-Total	6.02		0.010	mg/L	23-OCT-15	23-OCT-15	R3295775
Manganese (Mn)-Total	0.0423		0.00030	mg/L	23-OCT-15	23-OCT-15	R3295775
Nickel (Ni)-Total	0.0026		0.0020	mg/L	23-OCT-15	23-OCT-15	R3295775
Potassium (K)-Total	10.7		0.020	mg/L	23-OCT-15	23-OCT-15	R3295775
Sodium (Na)-Total	37.8		0.030	mg/L	23-OCT-15	23-OCT-15	R3295775
Zinc (Zn)-Total	0.0807		0.0020	mg/L	23-OCT-15	23-OCT-15	R3295775
Total Suspended Solids							
Total Suspended Solids	73.0		5.0	mg/L		22-OCT-15	R3295363
pH							
pH	7.14		0.10	pH units		23-OCT-15	R3295937

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

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

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

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

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

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

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

ALK-TITR-WP	Water	Total Alkalinity 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.

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

Analysis is by high temperature combustion using procedures adapted from APHA method 5310 "Total Organic Carbon" NPOC Method.

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.

ETL-HARDNESS-TOT-WP	Water	Hardness Calculated	HARDNESS CALCULATED
FC-MPN-WP	Water	Fecal Coliform	APHA 9221E

The Most Probable Number (MPN) method is based on the Multiple Tube Fermentation technique. The results of examination of replicate tubes and dilutions of a sample are reported after confirmations specific to total coliform, fecal coliform and E. coli are performed. Results are reported in MPN/100 mL for water and MPN/gram for food and solid samples.

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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.			
OGG-TOT-WT	Water	Oil and Grease, Total	APHA 5520 B
Sample is extracted with hexane, extract is then evaporated and the residue is weighed to determine total oil and grease.			
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

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 (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1688882-COFC

COC Number: 14 - 453318

Page 1 of 1

Report To		Report Format /		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	GN - CGS Rankin Inlet	Select Report Format:	☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3pm)
Contact:	Joe Strickland / Megan Lusty	Quality Control (QC) Report with Report	☐ Yes ☐ No	P ☐ Priority (2-4 business days if received by 3pm)
Address:	P.O. Box 490 Rankin Inlet, NU X0C0G0	☐ Criteria on Report - provide details below if box checked		E ☐ Emergency (1-2 business days if received by 3pm)
		Select Distribution:	☐ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency if received by 10am – contact ALS for surcharge.
Phone:	867 - 645 - 8176	Email 1 or Fax	jstrickland@gov.nu.ca	Specify Date Required for E2,E or P:
		Email 2	mlusty@gov.nu.ca	

Invoice To		Invoice Distribution	
	Same as Report To ☐ Yes ☐ No	Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☐ Yes ☐ No		
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	W8133	Approver ID:	Cost Center:
Job #:		GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)	ALS Contact:	Sampler:
	Craig Riddell	Megan Lusty

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine	BOD	Total Metals	Total Nutrients	Phenols	Bacteria	Oil + Grease X2	Total Mercury	Number of Containers
	GRA-3	15-10-15	13:30	wastewater	✓	P	P	P	P	P	P	P	9

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	NUNAVUT-WW-GRP1-WP
Are samples for human drinking water use? ☐ Yes ☑ No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐		SIF Observations	Yes ☐	No ☐	
Ice packs	Yes ☐	No ☐	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated	☐					

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	15-10-15	1:30pm	OB	10/16/15	11:00			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0328e v08 Front/03 October 2013

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°C

Nunavut - Community & Government Services - Rankin Inlet
ATTN: JOE STRICKLAND - FACILITY MGR
P.O. Box 490
Rankin Inlet NU X0C 0G0

Date Received: 15-DEC-15
Report Date: 24-DEC-15 11:28 (MT)
Version: FINAL

Client Phone: 867-645-8158

Certificate of Analysis

Lab Work Order #: L1714628

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

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1714628-1 GRA-3							
Sampled By: MEGAN/LES on 14-DEC-15 @ 11:00							
Matrix: WASTE WATER							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		21-DEC-15	R3343780
Toluene	0.0014		0.0010	mg/L		21-DEC-15	R3343780
Ethyl benzene	<0.00050		0.00050	mg/L		21-DEC-15	R3343780
o-Xylene	<0.00050		0.00050	mg/L		21-DEC-15	R3343780
m+p-Xylenes	<0.00050		0.00050	mg/L		21-DEC-15	R3343780
F1 (C6-C10)	<0.10		0.10	mg/L		21-DEC-15	R3343780
Surrogate: 4-Bromofluorobenzene (SS)	97.7		70-130	%		21-DEC-15	R3343780
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		23-DEC-15	
F2-Naphth	0.46		0.25	mg/L		23-DEC-15	
F3-PAH	9.63		0.25	mg/L		23-DEC-15	
Total Hydrocarbons (C6-C50)	14.8		0.44	mg/L		23-DEC-15	
F2-F4 PHC method							
F2 (C10-C16)	0.46		0.25	mg/L	16-DEC-15	16-DEC-15	R3337365
F3 (C16-C34)	9.63		0.25	mg/L	16-DEC-15	16-DEC-15	R3337365
F4 (C34-C50)	4.73		0.25	mg/L	16-DEC-15	16-DEC-15	R3337365
Surrogate: 2-Bromobenzotrifluoride	95.1		60-140	%	16-DEC-15	16-DEC-15	R3337365
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		22-DEC-15	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
2-Methyl Naphthalene	0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
Acenaphthene	<0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
Acenaphthylene	<0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
Anthracene	<0.000010		0.000010	mg/L	21-DEC-15	23-DEC-15	R3346160
Acridine	<0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
Benzo(a)anthracene	<0.000010		0.000010	mg/L	21-DEC-15	23-DEC-15	R3346160
Benzo(a)pyrene	<0.00010	DLM	0.00010	mg/L	21-DEC-15	23-DEC-15	R3346160
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	21-DEC-15	23-DEC-15	R3346160
Benzo(g,h,i)perylene	<0.00020	DLM	0.00020	mg/L	21-DEC-15	23-DEC-15	R3346160
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	21-DEC-15	23-DEC-15	R3346160
Chrysene	<0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
Dibenzo(a,h)anthracene	<0.000050	DLM	0.000050	mg/L	21-DEC-15	23-DEC-15	R3346160
Fluoranthene	<0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
Fluorene	<0.000020		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
Indeno(1,2,3-cd)pyrene	<0.00010	DLM	0.00010	mg/L	21-DEC-15	23-DEC-15	R3346160
Naphthalene	<0.000050		0.000050	mg/L	21-DEC-15	23-DEC-15	R3346160
Phenanthrene	<0.000050		0.000050	mg/L	21-DEC-15	23-DEC-15	R3346160
Pyrene	<0.000010		0.000010	mg/L	21-DEC-15	23-DEC-15	R3346160
Quinoline	0.000038		0.000020	mg/L	21-DEC-15	23-DEC-15	R3346160
B(a)P Total Potency Equivalent	<0.000083		0.000083	mg/L	21-DEC-15	23-DEC-15	R3346160
Surrogate: Acenaphthene d10	83.6		40-130	%	21-DEC-15	23-DEC-15	R3346160
Surrogate: Acridine d9	94.2		40-130	%	21-DEC-15	23-DEC-15	R3346160
Surrogate: Chrysene d12	75.7		40-130	%	21-DEC-15	23-DEC-15	R3346160
Surrogate: Naphthalene d8	118.8		40-130	%	21-DEC-15	23-DEC-15	R3346160
Surrogate: Phenanthrene d10	84.8		40-130	%	21-DEC-15	23-DEC-15	R3346160
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	159		1.2	mg/L		24-DEC-15	
Alkalinity, Carbonate							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1714628-1 GRA-3							
Sampled By: MEGAN/LES on 14-DEC-15 @ 11:00							
Matrix: WASTE WATER							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		24-DEC-15	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		24-DEC-15	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	131		1.0	mg/L		24-DEC-15	R3347320
Ammonia by colour							
Ammonia, Total (as N)	24.2		1.0	mg/L		16-DEC-15	R3338795
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	83	DLA	20	mg/L		16-DEC-15	R3344255
Carbonaceous BOD							
BOD Carbonaceous	71	DLA	20	mg/L		16-DEC-15	R3344255
Chloride in Water by IC							
Chloride (Cl)	57.2		0.50	mg/L		15-DEC-15	R3338953
Conductivity							
Conductivity	531		1.0	umhos/cm		20-DEC-15	R3343133
Fecal Coliform							
Fecal Coliforms	>110000		3	MPN/100mL		15-DEC-15	R3342022
Hardness Calculated							
Hardness (as CaCO3)	79.7		0.30	mg/L		18-DEC-15	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	18-DEC-15	18-DEC-15	R3346393
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		15-DEC-15	R3338953
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		18-DEC-15	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-DEC-15	R3338953
Oil and Grease, Total							
Oil and Grease, Total	19.0		2.0	mg/L	18-DEC-15	18-DEC-15	R3341835
Phenol (4AAP)							
Phenols (4AAP)	0.094	DLHC	0.050	mg/L		21-DEC-15	R3343994
Phosphorus, Total							
Phosphorus (P)-Total	3.44		0.10	mg/L		18-DEC-15	R3339479
Sulfate in Water by IC							
Sulfate (SO4)	26.7		0.30	mg/L		15-DEC-15	R3338953
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.161		0.0050	mg/L	16-DEC-15	17-DEC-15	R3339274
Arsenic (As)-Total	0.00085		0.00020	mg/L	16-DEC-15	17-DEC-15	R3339274
Cadmium (Cd)-Total	0.000066		0.000010	mg/L	16-DEC-15	17-DEC-15	R3339274
Calcium (Ca)-Total	23.0		0.10	mg/L	16-DEC-15	17-DEC-15	R3339274
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	16-DEC-15	17-DEC-15	R3339274
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	16-DEC-15	17-DEC-15	R3339274
Copper (Cu)-Total	0.141		0.00020	mg/L	16-DEC-15	17-DEC-15	R3339274
Iron (Fe)-Total	0.160		0.010	mg/L	16-DEC-15	17-DEC-15	R3339274
Lead (Pb)-Total	0.000854		0.000090	mg/L	16-DEC-15	17-DEC-15	R3339274
Magnesium (Mg)-Total	5.39		0.010	mg/L	16-DEC-15	17-DEC-15	R3339274
Manganese (Mn)-Total	0.0256		0.00030	mg/L	16-DEC-15	17-DEC-15	R3339274
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	16-DEC-15	17-DEC-15	R3339274
Potassium (K)-Total	7.59		0.020	mg/L	16-DEC-15	17-DEC-15	R3339274
Sodium (Na)-Total	33.5		0.030	mg/L	16-DEC-15	17-DEC-15	R3339274
Zinc (Zn)-Total	0.0727		0.0020	mg/L	16-DEC-15	17-DEC-15	R3339274
Total Organic Carbon by Combustion							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1714628-1 GRA-3							
Sampled By: MEGAN/LES on 14-DEC-15 @ 11:00							
Matrix: WASTE WATER							
Total Organic Carbon by Combustion							
Total Organic Carbon	72.6		2.5	mg/L		17-DEC-15	R3339694
Total Suspended Solids							
Total Suspended Solids	42.0		5.0	mg/L		16-DEC-15	R3337628
pH							
pH	6.87		0.10	pH units		20-DEC-15	R3343133

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

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

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

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

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

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

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

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

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

BOD-CBOD-WP	Water	Carbonaceous BOD	APHA 5210 B

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

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

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

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

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

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

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

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

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

EC-WP	Water	Conductivity	APHA 2510B

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

ETL-HARDNESS-TOT-WP	Water	Hardness Calculated	HARDNESS CALCULATED
F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

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

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

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

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

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

F2-F4-FID-WP	Water	F2-F4 PHC method	CWS (CCME)

Petroleum Hydrocarbons (F2-F4) in Water Method is adapted from US EPA Method 3511: Organic Compounds in Water by Micro-extraction" (Nov 2002) with instrumental analysis as per the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method" (CCMS, Dec 2000) Water samples (in their entirety) are extracted using hexane prior to capillary column gas chromatography with flame ionization detection (GC/FID).

FC-MPN-WP	Water	Fecal Coliform	APHA 9221E

The Most Probable Number (MPN) method is based on the Multiple Tube Fermentation technique. The results of examination of replicate tubes and dilutions of a sample are reported after confirmations specific to total coliform, fecal coliform and E. coli are performed. Results are reported in MPN/100 mL for water and MPN/gram for food and solid samples.

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.

OGG-TOT-WT	Water	Oil and Grease, Total	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

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

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

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

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

PH-WP	Water	pH	APHA 4500H

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

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

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

Reference Information

Test Method References:

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

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

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

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

Chain of Custody Numbers:

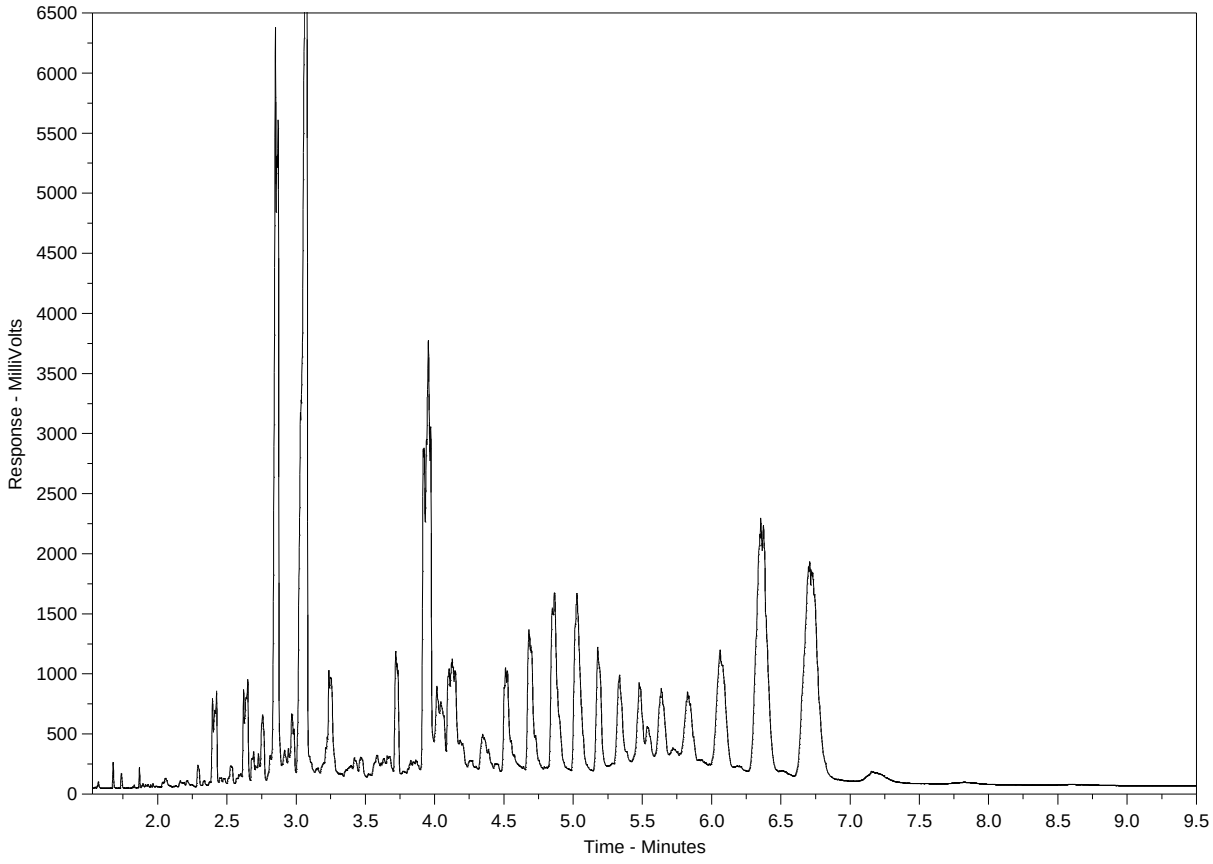
GLOSSARY OF REPORT TERMS

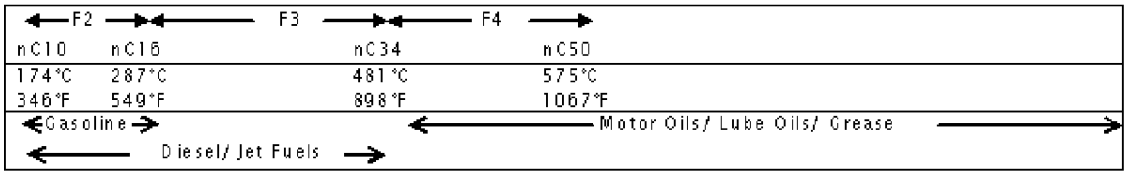
Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates 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: L1714628-1
Client Sample ID: GRA-3





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.

COC #: ______

Page 1 of 1

L1714628-COFC

ALS Environmental

Report To	
Company:	GN-CGS Rankin Inlet
Contact:	Joe Strickland
Address:	P.O. Box 490, Rankin Inlet, NU, X0C 0G0
Phone:	867-645-8154 Fax: 867-645-8197
Invoice To	Same as Report ? ☑ Yes ☐ No
Hardcopy of Invoice with Report?	☑ Yes ☐ No
Company:	W8133
Contact:	
Address:	
Phone:	Fax:
Lab Work Order # (lab use only)	

Report Format / Distribution	
☑ PDF ☐ Excel ☐ Digital ☐ Fax	
Email 1:	jstrickland@gov.nu.ca
Email 2:	mlusty@gov.nu.ca
Email 3:	
Client / Project Information	
Job #:	
PO / AFE:	
LSD:	
Quote #:	
ALS Contact:	Craig Riddell
Sampler:	Megan/Les

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
- ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

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

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Routine	BOD	Total Metals	Total Nutrients	Phenols	Bacteria	Oil & Grease (x2)	Total Mercury	BTEX, F1 (x3)	F2-F4 (x2)	PAH		Number of Containers
	GRA-3	14-12-15	1100AM	Waste water	✓	✓	P	P	P	P	P	P	P	P	P		15

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

NUNAVUT-WW-GRP1-WP & Hydrocarbons

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
[signature]	14-12-15	11:15 AM	[signature]	15-12-15	12:20	9 °C				

Aboriginal Affairs and Northern Development Canada | Affaires autochtones et Développement du Nord Canada

ENVIRONMENTAL INSPECTION FORM

☒ Original
☐ Follow-Up Report

Licensee	Licensee Representative
Government of Nunavut, Community and Government Services	Megan Lusty, Municipal Planning E.I.T. Rob Hogan , Plant Operations Engineer
Licence No. / Expiry	**Representative's Title**
3AM-GRA1015 (Rankin Inlet)	Municipal Planning Engineer-in-Training
Land / Other Authorizations	**Land / Other Authorizations**
Date of Inspection	**Inspector**
17/6/2015	Atuat Shouldice

Activities Inspected

☐ Camp ☐ Drilling ☐ Mining ☐ Construction ☐ Reclamation ☒ Fuel Storage
☐ Roads/Hauling ☒ Other: Water Discharge ☐ Other:Water Supply/ Waste discharge

Conditions: **A - Acceptable** **C - Concern** **U - Unacceptable** **NA – Not Applicable** **NI – Not Inspected**

Water Use	Condition	Comment	Site Conditions	Condition	Comment	Haz/Mat Management	Condition	Comment
Intake/Screen	A		Water Management Structures	A		Storage	NI	
Flow Measure. Device	A		Culverts / Bridges	NA		Spills	NI	
Source:	A		Drainage	NA		Spill Plan	NI	
Water Use:	A		Erosion / Sediment	A				
Recirculation (y /n)	Y		Mitigation Measures	A		**Administrative**		
			Reclamation Activities	N/A		Records	A	
			Materials Storage	A		Reports	A	
Waste Disposal			Signage	A		Plans	A	
Waste Water	A					Notifications	A	
Solid Waste	A		**Monitoring**			**Other**		
Hazardous Waste	A		Sample Collection / Analysis	NI				

**The number in the comments field will correspond with specific comments provided below.*

Samples taken by Inspector:	Location(s): Rankin Inlet, Char River, Nipisar Lake.
☐ Yes ☒ No	

SECTION 1 ☒ **Comments** ☐ **Non-Compliance with Act or Licence** ☐ **Action Required**

Inspectors Statement

An Inspection was conducted on June 17th 2015 in the Hamlet of Rankin Inlet of Government of Nunavut, Community and Government Services licence 3AM-GRA1015. Megan Lusty (Municipal Planning E.I.T.) and Rob Hogan (Plant Operations Engineer) accompanied Inspector Atuat Shouldice to the various sites permitted under licence 3AM-GRA1015.

An introduction site meeting took place on June 17TH 2015 to discuss inspection format, site activities and a site inspection followed.

SECTION 2 ☒ **Comments** ☐ **Non-Compliance with Act or Licence** ☒ **Action Required**

Char River Pump station

Observations

Pumping station was not active during time of inspection and CGS was waiting on a flow meter to track water usage before they start pumping.

1. Water Intake
   a. No concerns. Screen on hose was 1/4in mesh
2. Water pump
   a. No concerns. Water pump was located in a sea can at Char River to prevent from vandalism.
3. Refueling Water pump
   a. No concerns. The fuel tank for the water pump is located in the sea can and will be refueled by a pick-up truck equipped with a double walled tidy tank. No fuel is being stored on site.
4. Water discharge to Nipisar
   a. No concerns. At the end of the discharge hose, a concrete board was fastened to the ground to diffuse water to stop erosion and sediments from running in to Nipisar Lake

Canada

Nipisar Pump Station

Water is recirculated from Williamson Lake pump station back to Nipisar pump station in a closed loop to prevent freezing. The recirculated water does not re-enter the lake but stays in a loop between pump stations.

Observations

1. Intake hose
   a. No concerns. Intake pipes located off the bottom of lake. The intake hose was equipped with ¼in mesh screens.
2. Water log sheets/O&M manuals/spill plan.
   a. No concerns. All logs were up to date and manuals were available for inspectors review.
3. Fuel on site
   a. No concerns. The fuel tank for the pump house is located in a secondary containment berm beside the pump station. No signs of erosion were visible in the berm.
4. Sampling/Sites signage
   a. No Concerns. Sampling sites were identified

Sewage Plant

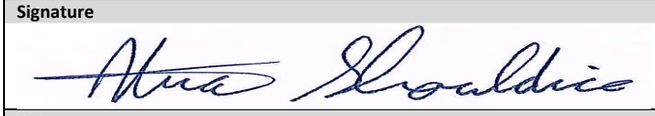
Solids are collected every Thursday and average approximately one cubic meter a week. The solids are disposed of into a trench in a designed “sewage screenings” area at the Hamlet of Rankin Inlet Municipal Dump as authorized with the written agreement with the Hamlet of Rankin Inlet water licence.

Observations

1. Out flow hose
   a. No concerns noted. Recent repairs were made to the discharge pipe and diffuser to better displace the sewage effluent and allow for better distribution in to the environment.
2. Water log sheets/O&M manuals/spill plan.
   a. No concerns. All logs were up to date and manuals were available for inspectors review.
3. Fuel on site
   a. No concerns. No fuel or spills were observed during the inspection.
4. Sampling/Site signage
   a. No Concerns. All required signage was posted

SECTION 3	☒ Comments	☐ Non-Compliance with Act or Licence	☐ Action Required

No concerns with sites identified in this inspection report, all information and logs were available during inspection.

Inspector’s Name	Inspector’s Name
Atuat Shouldice	
Signature	**Signature**
	
Date	**Date**
June 17th 2015	

Office Use Only: Follow-up report to be issued by Inspector	☐ Yes	☒ No