ANNUAL REPORT
FOR THE HAMLET OF ARVIAT

YEAR BEING REPORTED: 2014

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence No. **3AM-ARV1015** issued to the **Hamlet of Arviat**.

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 Stations ARV-1, as well as detailed chemical, physical and biological analysis required at ARV-2a, ARV-4, ARV-5 and ARV-6 (for the months of July to September).

Month Reported	Quantity of Water Obtained from all sources (m^3)	Quantity of Sewage Waste Discharged (m^3)
January	7,034.67365	Same
February	6,469.73362	Same
March	7,327.48162	Same
April	6,902.73016	Same
May	7,978.15220	Same
June	7,517.50192	Same
July	7,237.34640	Same
August	6,943.69240	Same
September	7,359.99390	Same
October	7,711.25170	Same
November	7,421.66530	Same
December	7,611.65020	Same
ANNUAL TOTAL	87,515.87307	87,515.87307

Note: No meter exists to measure the sewage discharge volume, therefore water consumption volume is considered as equal volume to the Sewage discharge volume.

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;

- No modifications and/or major maintenance work was carried out in 2014.
- The Hamlet partnered with the Summer Hill program in 2014 to undertake shipping materials from the Metal dump back south. Summerhill trained 6 Arviatmuit how to properly de-pollute a vehicle and prep it for shipping. They completed some 75 vehicles this year. The project shipped out some 8 seacans of material containing vehicle batteries, vehicle tires, scrap metals, and vehicles. This was the first time in Arviat's history that ANY metals or waste material was shipped out of the community. Hamlet will continue this summer with de-polluting more vehicles and a total segregation of the metal dump. Hamlet is working on a proposal to the GN to purchase a metal shredder and eventually ship all metal out of the community.

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

Spills:
- 2014134, 2014-05-01, 404 A&B 5th Street, Heating Fuel, 450L
- 2014141, 2014-05-06, 716th Avenue (old house 393), Heating Fuel, 730L
- 2014193, 2014-06-04, End of town, nearby house #803 1st Avenue, Diesel, 0L
- 2014200, 2014-06-04, Arviat, Jet-A-1, 136L
- 2014207, 2014-06-11, Arctic College Administration Building, P50, 3L
- 2014213, 2014-06-13, 801 1st Avenue, Heating Fuel, 0L
- 2014239, 2014-06-26, 400 8th Avenue, Heating Fuel, 0L
- 2014266, 2014-07-16, At 706-D 9th Avenue, Heating Fuel, 40L
- 2014303, 2014-08-19, 700 9th Street, Heating Fuel, 50L
- 2014319, 2014-09-05, Shop Building 32-352, Heating Fuel, 0L
- 2014331, 2014-09-16, QEC Arviat Plant Site Yard, Lube Oil, 205L
- 2014345, 2014-09-25, 702 1st Avenue. Heating Fuel, 0L
- 2014358, 2014-10-16, 403 9th Ave., Heating Fuel, 60L
- 2014373, 2014-10-14, 403 7th Ave., Heating Fuel, 75L

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

- Abandonment and Restoration will take place during 2015 for the Old Sewage Lagoons, as per the *Old Sewage Lagoons Abandonment and Restoration Plan, Hamlet of Arviat* prepared by Nuna Burnside, December 2010.

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;

- An Amendment/Renewal Application was submitted to the NWB February 27, 2015.
- A waste audit was conducting in 2013. The *Hamlet of Arviat Solid Waste Audit Results* prepared by exp Services Inc., November 2013 was submitted to the NWB with the Amendment/Renewal Application.

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

- Signage for the Monitoring Program Stations will be ordered over the winter for installation summer 2015. Pictures of the signage at Monitoring Program Stations will be included in the 2015 Annual Report.

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

- The *Water Supply Operation and Maintenance (O&M) Plan, Hamlet of Arviat* prepared by Nuna Burnside, May 2009 is currently being updated. The updated O&M Plan will be submitted to the NWB in 2015.
- The *Sewage Treatment Facility Operation and Maintenance (O&M) Plan, Hamlet of Arviat* prepared by Nuna Burnside, January 2009, revised May 2009 is currently being updated. The updated O&M Plan will be submitted to the NWB in 2015.
- The *Solid Waste Management Facility Operation and Maintenance (O&M) Plan, Hamlet of Arviat* prepared by Nuna Burnside, January 2009, revised May 2009 is currently being updated. The updated O&M Plan will be submitted to the NWB in 2015.
- The *Environmental Monitoring Program and Quality Assurance/Quality Control Plan, Hamlet of Arviat* prepared by Nuna Burnside, December 2010 is currently being updated.

The updated QA/QC Plan will be submitted to the NWB in 2015.
- The *Environmental Emergency Contingency Plan, Hamlet of Arviat* prepared by Nuna Burnside, May 2009, revised May 2010 is currently being updated. The updated Plan will be submitted to the NWB in 2015.

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- The 2013 Annual Report submitted to the NWB did not contain the sampling results from the Monitoring Program. A revised version of the 2013 Annual Report containing the sampling results and analysis is found in Appendix F of this report.
- All sampling required under the Monitoring Program will be completed during the 2015 sampling season.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

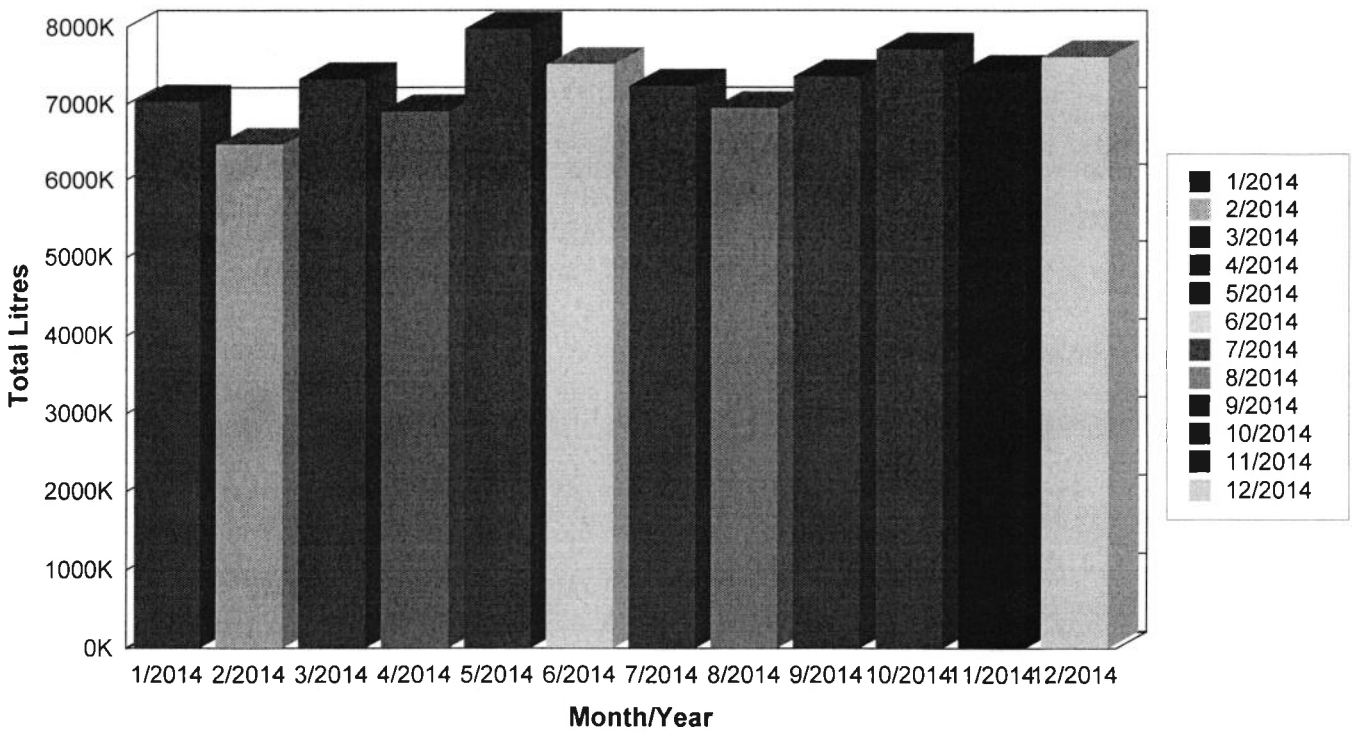
- No AANDC Inspection took place in 2014.
- The Hamlet of Arviat Compliance Plan was submitted to the NWB on February 27, 2015.

Appendix A: Delivery Summary By Month and Year, January 1 to December 31, 2014 – 1 page
Appendix B: Hazardous Materials Spill Database, Arviat 2014 – 1 page
Appendix C: ARV-4 Effluent Quality Limits – 1 page
Appendix D: Monitoring Program Sampling Parameters Summary – 1 page
Appendix E: Certificates of Analysis, July 17, 2014, August 1, 2014, and September 13, 2014 – 36 pages
Appendix F: 2013 Annual Report, revised March 30, 2015 – 26 pages

Appendix A: Delivery Summary By Month and Year, January 1 to December 31, 2014

Delivery Summary By Month and Year

Date Range From:Jan-01-2014 To: Dec-31-2014



Month / Year	Litres Delivered
January 2014	7,034,673.65
February 2014	6,469,733.62
March 2014	7,327,481.62
April 2014	6,902,730.16
May 2014	7,978,152.20
June 2014	7,517,501.92
July 2014	7,237,346.40
August 2014	6,943,692.40
September 2014	7,359,993.90
October 2014	7,711,251.70
November 2014	7,421,665.30
December 2014	7,611,650.20
Grand Total:	**87,515,873.07**

Appendix B: Hazardous Materials Spill Database, Arviat 2014

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): 2014

Spill No.	Date	Ter	Region	Location	Site Description	Commodity	Quantity	Source	Agency
2014134	2014-05-01	NU	KEE	Arviat	404 A&B 5th Street	Heating Fuel	450 L	PL	GN
2014141	2014-05-06	NU	KEE	Arviat	Arviat, 716th Avenue (old house 393)	Heating Fuel	730 L	ST<	GN
2014193	2014-06-04	NU	KEE	Arviat	Arviat, End of town, nearby house #803 1st Avenue	Diesel	0 L	UK	GN
2014200	2014-06-04	NU	KEE	Arviat	Arviat	Jet-A-1	136 L	DRUM	GN
2014207	2014-06-11	NU	KEE	Arviat	Arctic College Administration Building	P50	3 L	ST<	GN
2014213	2014-06-13	NU	KEE	Arviat	Arviat, 801 1st Avenue	Heating Fuel	0 L	UK	GN
2014239	2014-06-26	NU	KEE	Arviat	Arviat, 400 8th Avenue	Heating Fuel	0 L	ST<	GN
2014266	2014-07-19	NU	KEE	Arviat	Arviat. At 706-D 9th Avenue	Heating Fuel	40 L	ST<	GN
2014303	2014-08-19	NU	KEE	Arviat	700 9th Street	Heating Fuel	50 L	ST<	GN
2014319	2014-09-05	NU	KEE	Arviat	Shop Building 32-352	Heating Fuel	0 L	UK	GN
2014331	2014-09-16	NU	KEE	Arviat	QEC Arviat Plant Site Yard	Lube Oil	205 L	DRUM	GN
2014345	2014-09-25	NU	KEE	Arviat	702 1st Avenue	Heating Fuel	0 L	ST<	GN
2014358	2014-10-06	NU	KEE	Arviat	403 9th Ave	Heating Fuel	60 L	ST<	GN
2014373	2014-10-14	NU	KEE	Arviat	403 7th Ave	Heating Fuel	75 L	ST<	EPS

Total Spills on this Report: 14

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

Appendix C: ARV-4 Effluent Quality Limits

2014 Arviat Monitoring Stations and Sampling Parameters for Water License No. 3AM-ARV1015
Part D, Item 2: ARV-4 Effluent Quality Limits

Parameter	Maximum Concentration of any Grab Sample	ARV-4		
		17-Jul-14	01-Aug-14	12-Sep-14
BOD_5	80 mg/L	28.4 mg/L	50.1 mg/L	69.1 mg/L
Total Suspended Solids	100 mg/L	52.0 mg/L	167 mg/L	156 mg/L
Fecal Coliforms	$1x10^4$ CFU/100 mL	9300 MPN/100 mL	4 MPN/100mL	640 MPN/100 mL
Oil and Grease	no visible sheen	*	<2.0 mg/L	<2.0 mg/L
pH	between 6 and 9	7.51	8.96	6.77

*** Lab did not send Oil and Grease bottles**
Exceeds Effluent Quality Limits

Some ARV-4 sample parameters exceed effluent quality limits set in Part D, Item 2 of the Licence. ARV-4 is sampled from a pond outside of the sewage lagoon berms, not at the end out the wetlands. The location of ARV-4 should be confirmed with an Inspector prior to the 2015 sampling season.

Appendix D: Monitoring Program Sampling Parameters Summary

2014 Arviat Monitoring Stations and Sampling Parameters Summary for Water License No. 3AM-ARV1015

			ARV-2a				ARV-4				ARV-5				ARV-6			
Parameters	**Unit**	**Detection Limit**	**17-Jul-14**	**01-Aug-14**	**12-Sep-14**	**CCME Guideline[1]**	**17-Jul-14**	**01-Aug-14**	**12-Sep-14**	**CCME Guideline[1]**	**17-Jul-14**	**01-Aug-14**	**12-Sep-14**	**CCME Guideline[1]**	**17-Jul-14**	**01-Aug-14**	**12-Sep-14**	**CCME Guideline[1]**
BOD_5	mg/L	6.0	37.4	37.2	41.2	n/g	28.4	50.1	69.1	n/g	<6.0	<6.0	<6.0	n/g	<6.0	29.3	<6.0	n/g
pH	pH units	0.1	7.79	8.05	8.01	6.5-9.0	7.51	8.96	6.77	6.5-9.0	7.04	8.01	7.63	6.5-9.0	7.21	6.82	7.07	6.5-9.0
Total Suspended Solids	mg/L	5.0	78.0	33.0	62.0		52	167	156		6.0	20.0	6.0		34.0	268	102	
Nitrate-Nitrite	mg/L	0.071	<0.35	<0.35	<0.35	n/g	0.868	1.44	0.859	n/g	<0.35	<0.35	<0.071	n/g	<0.071	<0.071	<0.071	n/g
Total Phenols	mg/L	0.0010	0.0055	0.0106	0.700	0.004	0.035	<0.0050	<0.0010	0.004	<0.0010	<0.0010	<0.0010	0.004	<0.0010	0.0193	0.0013	0.004
Sodium	mg/L	0.010	233	302	248	n/g	66.5	73.9	76.2	n/g	246	419	164	n/g	68.7	79.9	64.7	n/g
Magnesium	mg/L	0.10	45.9	59.2	51.3	n/g	8.88	8.85	9.68	n/g	43.3	61	21.8	n/g	14	15.7	13.5	n/g
Total Arsenic	mg/L	0.0020	0.00743	0.00651	0.0061	0.005	0.00627	0.00844	0.00789	0.005	0.00051	0.00087	0.00047	0.005	0.00052	0.00584	0.00081	0.005
Total Copper	mg/L	0.0020	0.0434	0.0184	0.0173	0.002	0.0437	0.044	0.0283	0.002	0.00095	0.00056	0.00120	0.002	0.00098	0.00561	0.00086	0.002
Total Iron	mg/L	1.0	3.26	0.56	<1.0	0.3	3.22	4.56	3.47	0.3	1.16	3.16	0.96	0.3	7.52	147	19.0	0.3
Total Mercury	mg/L	0.000020	0.00020	<0.000020	<0.000020	0.0000026	<0.000020	<0.00020	<0.00020	0.0000026	<0.000020	<0.000020	0.000024	0.0000026	<0.000020	<0.00020	<0.000020	0.0000026
Total Zinc	mg/L	0.020	0.64	0.0464	0.055	n/g	0.0383	0.0402	0.0214	n/g	0.417	0.0034	0.0035	n/g	0.0656	0.302	0.0227	n/g
Fecal Coliforms	MPN/100mL	3/100	24000	150	23	n/g	9300	4	640	n/g	9	43	<3	n/g	3	23	<3	n/g
Conductivity	umhos/cm	20	2530	2990	2330	n/g	868	570	750	n/g	1730	2700	1100	n/g	655	749	669	n/g
Ammonia Nitrogen	mg/L	0.10	12	12.1	5.6	1.54	39.9	9.4	12.5	0.172	0.085	<0.010	<0.010	1.54	<0.010	0.289	0.075	15.3
Oil and Grease	mg/L	2.0	*	5.7	<2.0	n/g	*	<2.0	<2.0	n/g	*	<2.0	<2.0	8	*	<2.0	<2.0	n/g
Sulphate	mg/L	0.50	419	466	490	n/g	5.15	2.18	4.98	n/g	30.5	16	8.42	n/g	8.83	0.5	<0.50	n/g
Potassium	mg/L	0.20	56.2	68.8	55.0	n/g	25.3	28.1	23.4	n/g	9.79	16.7	6.04	n/g	6.91	7.3	5.52	n/g
Calcium	mg/L	1.0	323	356	298	n/g	20.7	17	16.6	n/g	78	53.4	26.9	n/g	43.9	44.9	37.6	n/g
Total Cadmium	mg/L	0.000220	0.000336	0.000074	<0.00010	0.00013	0.000070	0.000079	0.000088	0.00013	0.000074	<0.000010	<0.000010	0.00013	0.000019	0.000032	0.000010	0.00013
Total Chromium	mg/L	0.010	0.0045	0.0022	<0.010	0.0001	0.0013	0.0015	0.0013	0.0001	0.0016	<0.0010	<0.0010	0.0001	0.317	0.0098	<0.0010	0.0001
Total Lead	mg/L	0.00090	0.0111	0.00278	0.00217	0.00235	0.00162	0.00181	0.00159	0.00235	0.000504	0.000139	<0.000090	0.007	0.000407	0.00172	0.000115	0.00653
Total Nickel	mg/L	0.020	0.0131	0.011	<0.020	0.07982	0.0084	0.009	0.0074	0.0079	<0.0020	<0.0020	<0.0020	0.15	<0.0020	0.0043	<0.0020	0.146

[1]Canadian Environmental Quality Guidelines - Water Quality Guidelines for the Protection of Aquatic Life
n/g - no guideline
*** Lab did not send Oil and Grease bottles**

Exceeds Guidelines for Protection of Aquatic Life

Appendix E: Certificates of Analysis, July 17, 2014, August 1, 2014, and September 13, 2014

Hamlet of Arviat
ATTN: ED MURPHY
PO Box 150
Arviat NU X0C 0E0

Date Received: 17-JUL-14
Report Date: 29-JUL-14 14:26 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1488411

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

Judy Dalmaijer
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1488411-1 ARV-2							
Sampled By: CLIENT on 15-JUL-14 @ 13:40							
Matrix: EFFLUENT							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
Toluene	<0.0010		0.0010	mg/L		25-JUL-14	R2898207
Ethyl benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
o-Xylene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
m+p-Xylenes	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
F1 (C6-C10)	<0.10		0.10	mg/L		25-JUL-14	R2898207
Surrogate: 4-Bromofluorobenzene (SS)	98.8		70-130	%		25-JUL-14	R2898207
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		29-JUL-14	
F2-Naphth	<0.50		0.50	mg/L		29-JUL-14	
F3-PAH	0.52		0.50	mg/L		29-JUL-14	
Total Hydrocarbons (C6-C50)	<0.87		0.87	mg/L		29-JUL-14	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		28-JUL-14	
Miscellaneous Parameters							
Total Organic Carbon	70.9	SP	1.0	mg/L	25-JUL-14	25-JUL-14	R2899422
F2-F4 PHC method							
F2 (C10-C16)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F3 (C16-C34)	0.52		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F4 (C34-C50)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
Surrogate: 2-Bromobenzotrifluoride	93.5		65-135	%	25-JUL-14	26-JUL-14	R2900047
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000037		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthylene	0.000042		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Acridine	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Chrysene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluoranthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluorene	0.000022		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Naphthalene	0.000053		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Phenanthrene	<0.000050		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Quinoline	0.000032		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acenaphthene d10	82.3		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acridine d9	87.8		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Chrysene d12	78.6		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Naphthalene d8	92.9		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Phenanthrene d10	80.8		40-130	%	25-JUL-14	25-JUL-14	R2899723
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	656		20	mg/L		22-JUL-14	R2894373

* 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
L1488411-1 ARV-2							
Sampled By: CLIENT on 15-JUL-14 @ 13:40							
Matrix: EFFLUENT							
Alkalinity							
Bicarbonate (HCO3)	800		24	mg/L		22-JUL-14	R2894373
Carbonate (CO3)	<12		12	mg/L		22-JUL-14	R2894373
Hydroxide (OH)	<6.8		6.8	mg/L		22-JUL-14	R2894373
Ammonia by colour							
Ammonia, Total (as N)	12.0	DLA	1.0	mg/L		23-JUL-14	R2896468
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	37.4		6.0	mg/L		18-JUL-14	R2896021
Carbonaceous BOD							
BOD Carbonaceous	34.1		6.0	mg/L		18-JUL-14	R2896021
Chloride by Ion Chromatography							
Chloride	291		2.5	mg/L		18-JUL-14	R2893806
Conductivity							
Conductivity	2530		20	umhos/cm		22-JUL-14	R2894373
Fecal Coliform							
Fecal Coliforms	24000		3	MPN/100mL		21-JUL-14	R2895096
Hardness Calculated							
Hardness (as CaCO3)	997		0.30	mg/L		29-JUL-14	
Mercury Total							
Mercury (Hg)-Total	0.000027		0.000020	mg/L	22-JUL-14	22-JUL-14	R2894549
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		18-JUL-14	R2893806
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		22-JUL-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		18-JUL-14	R2893806
Phenol (4AAP)							
Phenols (4AAP)	0.0055		0.0010	mg/L	23-JUL-14	23-JUL-14	R2895900
Phosphorus, Total							
Phosphorus (P)-Total	2.21		0.010	mg/L		22-JUL-14	R2894431
Sulfate by Ion Chromatography							
Sulfate	419		2.5	mg/L		18-JUL-14	R2893806
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.305		0.0050	mg/L	28-JUL-14	28-JUL-14	R2900449
Arsenic (As)-Total	0.00743		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Cadmium (Cd)-Total	0.000336		0.000010	mg/L	28-JUL-14	28-JUL-14	R2900449
Calcium (Ca)-Total	323	DLA	10	mg/L	28-JUL-14	28-JUL-14	R2900449
Chromium (Cr)-Total	0.0045		0.0010	mg/L	28-JUL-14	28-JUL-14	R2900449
Cobalt (Co)-Total	0.00396		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Copper (Cu)-Total	0.0434		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Iron (Fe)-Total	3.26		0.10	mg/L	28-JUL-14	28-JUL-14	R2900449
Lead (Pb)-Total	0.0111		0.000090	mg/L	28-JUL-14	28-JUL-14	R2900449
Magnesium (Mg)-Total	45.9		0.010	mg/L	28-JUL-14	28-JUL-14	R2900449
Manganese (Mn)-Total	1.69	DLA	0.030	mg/L	28-JUL-14	28-JUL-14	R2900449
Nickel (Ni)-Total	0.0131		0.0020	mg/L	28-JUL-14	28-JUL-14	R2900449
Potassium (K)-Total	56.2	DLA	2.0	mg/L	28-JUL-14	28-JUL-14	R2900449
Sodium (Na)-Total	233	DLA	3.0	mg/L	28-JUL-14	28-JUL-14	R2900449
Zinc (Zn)-Total	0.64	DLA	0.20	mg/L	28-JUL-14	28-JUL-14	R2900449
Total Suspended Solids							
Total Suspended Solids	78.0		5.0	mg/L		21-JUL-14	R2893826
pH							
pH	7.79		0.10	pH units		22-JUL-14	R2894373

* 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
L1488411-2 ARV-4							
Sampled By: CLIENT on 15-JUL-14 @ 13:25							
Matrix: EFFLUENT							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
Toluene	<0.0010		0.0010	mg/L		25-JUL-14	R2898207
Ethyl benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
o-Xylene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
m+p-Xylenes	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
F1 (C6-C10)	<0.10		0.10	mg/L		25-JUL-14	R2898207
Surrogate: 4-Bromofluorobenzene (SS)	108.3		70-130	%		25-JUL-14	R2898207
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		29-JUL-14	
F2-Naphth	<0.50		0.50	mg/L		29-JUL-14	
F3-PAH	4.09		0.50	mg/L		29-JUL-14	
Total Hydrocarbons (C6-C50)	5.53		0.87	mg/L		29-JUL-14	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		28-JUL-14	
Miscellaneous Parameters							
Total Organic Carbon	64.6		1.0	mg/L	25-JUL-14	25-JUL-14	R2899422
F2-F4 PHC method							
F2 (C10-C16)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F3 (C16-C34)	4.09		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F4 (C34-C50)	1.44		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
Surrogate: 2-Bromobenzotrifluoride	92.9		65-135	%	25-JUL-14	26-JUL-14	R2900047
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthylene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Acridine	0.000039		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Chrysene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluoranthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluorene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Naphthalene	<0.000050		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Phenanthrene	<0.000050		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Quinoline	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acenaphthene d10	85.4		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acridine d9	93.3		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Chrysene d12	76.7		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Naphthalene d8	76.8		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Phenanthrene d10	86.4		40-130	%	25-JUL-14	25-JUL-14	R2899723
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	272		20	mg/L		22-JUL-14	R2894373

* 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
L1488411-2 ARV-4							
Sampled By: CLIENT on 15-JUL-14 @ 13:25							
Matrix: EFFLUENT							
Alkalinity							
Bicarbonate (HCO3)	332		24	mg/L		22-JUL-14	R2894373
Carbonate (CO3)	<12		12	mg/L		22-JUL-14	R2894373
Hydroxide (OH)	<6.8		6.8	mg/L		22-JUL-14	R2894373
Ammonia by colour							
Ammonia, Total (as N)	39.9	DLA	1.0	mg/L		24-JUL-14	R2897228
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	28.4		6.0	mg/L		18-JUL-14	R2896021
Carbonaceous BOD							
BOD Carbonaceous	17.0		6.0	mg/L		18-JUL-14	R2896021
Chloride by Ion Chromatography							
Chloride	83.5		0.50	mg/L		18-JUL-14	R2893806
Conductivity							
Conductivity	868		20	umhos/cm		22-JUL-14	R2894373
Fecal Coliform							
Fecal Coliforms	9300		3	MPN/100mL		21-JUL-14	R2895096
Hardness Calculated							
Hardness (as CaCO3)	88.2		0.30	mg/L		29-JUL-14	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	22-JUL-14	22-JUL-14	R2894549
Nitrate as N by Ion Chromatography							
Nitrate-N	0.502		0.050	mg/L		18-JUL-14	R2893806
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.868		0.071	mg/L		22-JUL-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.367		0.050	mg/L		18-JUL-14	R2893806
Phenol (4AAP)							
Phenols (4AAP)	0.0350		0.0010	mg/L	22-JUL-14	22-JUL-14	R2894428
Phosphorus, Total							
Phosphorus (P)-Total	9.55	DLA	0.050	mg/L		22-JUL-14	R2894431
Sulfate by Ion Chromatography							
Sulfate	5.15		0.50	mg/L		18-JUL-14	R2893806
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.169		0.0050	mg/L	28-JUL-14	28-JUL-14	R2900449
Arsenic (As)-Total	0.00627		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Cadmium (Cd)-Total	0.000070		0.000010	mg/L	28-JUL-14	28-JUL-14	R2900449
Calcium (Ca)-Total	20.7		0.10	mg/L	28-JUL-14	28-JUL-14	R2900449
Chromium (Cr)-Total	0.0013		0.0010	mg/L	28-JUL-14	28-JUL-14	R2900449
Cobalt (Co)-Total	0.00234		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Copper (Cu)-Total	0.0437		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Iron (Fe)-Total	3.22		0.10	mg/L	28-JUL-14	28-JUL-14	R2900449
Lead (Pb)-Total	0.00162		0.000090	mg/L	28-JUL-14	28-JUL-14	R2900449
Magnesium (Mg)-Total	8.88		0.010	mg/L	28-JUL-14	28-JUL-14	R2900449
Manganese (Mn)-Total	0.245		0.00030	mg/L	28-JUL-14	28-JUL-14	R2900449
Nickel (Ni)-Total	0.0084		0.0020	mg/L	28-JUL-14	28-JUL-14	R2900449
Potassium (K)-Total	25.3		0.020	mg/L	28-JUL-14	28-JUL-14	R2900449
Sodium (Na)-Total	66.5	DLA	3.0	mg/L	28-JUL-14	28-JUL-14	R2900449
Zinc (Zn)-Total	0.0383		0.0020	mg/L	28-JUL-14	28-JUL-14	R2900449
Total Suspended Solids							
Total Suspended Solids	52.0		5.0	mg/L		21-JUL-14	R2893826
pH							
pH	7.51		0.10	pH units		22-JUL-14	R2894373

* 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
L1488411-3 ARV-5							
Sampled By: CLIENT on 15-JUL-14 @ 13:55							
Matrix: EFFLUENT							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
Toluene	<0.0010		0.0010	mg/L		25-JUL-14	R2898207
Ethyl benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
o-Xylene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
m+p-Xylenes	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
F1 (C6-C10)	<0.10		0.10	mg/L		25-JUL-14	R2898207
Surrogate: 4-Bromofluorobenzene (SS)	104.8		70-130	%		25-JUL-14	R2898207
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		29-JUL-14	
F2-Naphth	<0.50		0.50	mg/L		29-JUL-14	
F3-PAH	<0.50		0.50	mg/L		29-JUL-14	
Total Hydrocarbons (C6-C50)	<0.87		0.87	mg/L		29-JUL-14	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		28-JUL-14	
Miscellaneous Parameters							
Total Organic Carbon	<10	DLM	10	mg/L	25-JUL-14	25-JUL-14	R2899422
F2-F4 PHC method							
F2 (C10-C16)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F3 (C16-C34)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F4 (C34-C50)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
Surrogate: 2-Bromobenzotrifluoride	98.2		65-135	%	25-JUL-14	26-JUL-14	R2900047
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthylene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Acridine	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Chrysene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluoranthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluorene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Naphthalene	<0.000050		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Phenanthrene	<0.000050		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Quinoline	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acenaphthene d10	78.1		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acridine d9	89.6		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Chrysene d12	75.6		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Naphthalene d8	75.3		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Phenanthrene d10	84.8		40-130	%	25-JUL-14	25-JUL-14	R2899723
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	41		20	mg/L		22-JUL-14	R2894373

* 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
L1488411-3 ARV-5							
Sampled By: CLIENT on 15-JUL-14 @ 13:55							
Matrix: EFFLUENT							
Alkalinity							
Bicarbonate (HCO3)	50		24	mg/L		22-JUL-14	R2894373
Carbonate (CO3)	<12		12	mg/L		22-JUL-14	R2894373
Hydroxide (OH)	<6.8		6.8	mg/L		22-JUL-14	R2894373
Ammonia by colour							
Ammonia, Total (as N)	0.085		0.010	mg/L		21-JUL-14	R2893720
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<6.0		6.0	mg/L		18-JUL-14	R2896021
Carbonaceous BOD							
BOD Carbonaceous	<6.0		6.0	mg/L		18-JUL-14	R2896021
Chloride by Ion Chromatography							
Chloride	513		2.5	mg/L		18-JUL-14	R2893806
Conductivity							
Conductivity	1730		20	umhos/cm		22-JUL-14	R2894373
Fecal Coliform							
Fecal Coliforms	9		3	MPN/100mL		21-JUL-14	R2895096
Hardness Calculated							
Hardness (as CaCO3)	373		0.30	mg/L		29-JUL-14	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	22-JUL-14	22-JUL-14	R2894549
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		18-JUL-14	R2893806
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		22-JUL-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		18-JUL-14	R2893806
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L	22-JUL-14	22-JUL-14	R2894428
Phosphorus, Total							
Phosphorus (P)-Total	0.028		0.010	mg/L		22-JUL-14	R2894431
Sulfate by Ion Chromatography							
Sulfate	30.5		2.5	mg/L		18-JUL-14	R2893806
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.282		0.0050	mg/L	28-JUL-14	28-JUL-14	R2900449
Arsenic (As)-Total	0.00051		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Cadmium (Cd)-Total	0.000074		0.000010	mg/L	28-JUL-14	28-JUL-14	R2900449
Calcium (Ca)-Total	78	DLA	10	mg/L	28-JUL-14	28-JUL-14	R2900449
Chromium (Cr)-Total	0.0016		0.0010	mg/L	28-JUL-14	28-JUL-14	R2900449
Cobalt (Co)-Total	0.00021		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Copper (Cu)-Total	0.00095		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Iron (Fe)-Total	1.16		0.10	mg/L	28-JUL-14	28-JUL-14	R2900449
Lead (Pb)-Total	0.000504		0.000090	mg/L	28-JUL-14	28-JUL-14	R2900449
Magnesium (Mg)-Total	43.3		0.010	mg/L	28-JUL-14	28-JUL-14	R2900449
Manganese (Mn)-Total	0.188		0.00030	mg/L	28-JUL-14	28-JUL-14	R2900449
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	28-JUL-14	28-JUL-14	R2900449
Potassium (K)-Total	9.79		0.020	mg/L	28-JUL-14	28-JUL-14	R2900449
Sodium (Na)-Total	246	DLA	3.0	mg/L	28-JUL-14	28-JUL-14	R2900449
Zinc (Zn)-Total	0.417		0.0020	mg/L	28-JUL-14	28-JUL-14	R2900449
Total Suspended Solids							
Total Suspended Solids	6.0		5.0	mg/L		21-JUL-14	R2893826
pH							
pH	7.04		0.10	pH units		22-JUL-14	R2894373

* 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
L1488411-4 ARV-6							
Sampled By: CLIENT on 15-JUL-14 @ 14:09							
Matrix: EFFLUENT							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
Toluene	<0.0010		0.0010	mg/L		25-JUL-14	R2898207
Ethyl benzene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
o-Xylene	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
m+p-Xylenes	<0.00050		0.00050	mg/L		25-JUL-14	R2898207
F1 (C6-C10)	<0.10		0.10	mg/L		25-JUL-14	R2898207
Surrogate: 4-Bromofluorobenzene (SS)	121.9		70-130	%		25-JUL-14	R2898207
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		29-JUL-14	
F2-Naphth	<0.50		0.50	mg/L		29-JUL-14	
F3-PAH	0.67		0.50	mg/L		29-JUL-14	
Total Hydrocarbons (C6-C50)	<0.87		0.87	mg/L		29-JUL-14	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.0015		0.0015	mg/L		28-JUL-14	
Miscellaneous Parameters							
Total Organic Carbon	<10	DLM	10	mg/L	25-JUL-14	25-JUL-14	R2899422
F2-F4 PHC method							
F2 (C10-C16)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F3 (C16-C34)	0.67		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
F4 (C34-C50)	<0.50		0.50	mg/L	25-JUL-14	26-JUL-14	R2900047
Surrogate: 2-Bromobenzotrifluoride	88.3		65-135	%	25-JUL-14	26-JUL-14	R2900047
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
2-Methyl Naphthalene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Acenaphthylene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Acridine	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)anthracene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Chrysene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluoranthene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Fluorene	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Naphthalene	<0.000050		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Phenanthrene	<0.000050		0.000050	mg/L	25-JUL-14	25-JUL-14	R2899723
Pyrene	<0.000010		0.000010	mg/L	25-JUL-14	25-JUL-14	R2899723
Quinoline	<0.000020		0.000020	mg/L	25-JUL-14	25-JUL-14	R2899723
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acenaphthene d10	78.0		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Acridine d9	101.8		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Chrysene d12	84.1		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Naphthalene d8	70.1		40-130	%	25-JUL-14	25-JUL-14	R2899723
Surrogate: Phenanthrene d10	94.3		40-130	%	25-JUL-14	25-JUL-14	R2899723
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	74		20	mg/L		22-JUL-14	R2894373

* 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
L1488411-4 ARV-6							
Sampled By: CLIENT on 15-JUL-14 @ 14:09							
Matrix: EFFLUENT							
Alkalinity							
Bicarbonate (HCO3)	90		24	mg/L		22-JUL-14	R2894373
Carbonate (CO3)	<12		12	mg/L		22-JUL-14	R2894373
Hydroxide (OH)	<6.8		6.8	mg/L		22-JUL-14	R2894373
Ammonia by colour							
Ammonia, Total (as N)	<0.010		0.010	mg/L		21-JUL-14	R2893720
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<6.0		6.0	mg/L		18-JUL-14	R2896021
Carbonaceous BOD							
BOD Carbonaceous	<6.0		6.0	mg/L		18-JUL-14	R2896021
Chloride by Ion Chromatography							
Chloride	149		0.50	mg/L		18-JUL-14	R2893806
Conductivity							
Conductivity	655		20	umhos/cm		22-JUL-14	R2894373
Fecal Coliform							
Fecal Coliforms	3		3	MPN/100mL		21-JUL-14	R2895096
Hardness Calculated							
Hardness (as CaCO3)	167		0.30	mg/L		29-JUL-14	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	22-JUL-14	22-JUL-14	R2894549
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		18-JUL-14	R2893806
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		22-JUL-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		18-JUL-14	R2893806
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L	22-JUL-14	22-JUL-14	R2894428
Phosphorus, Total							
Phosphorus (P)-Total	0.069		0.010	mg/L		22-JUL-14	R2894431
Sulfate by Ion Chromatography							
Sulfate	8.83		0.50	mg/L		18-JUL-14	R2893806
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.237		0.0050	mg/L	28-JUL-14	28-JUL-14	R2900449
Arsenic (As)-Total	0.00052		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Cadmium (Cd)-Total	0.000019		0.000010	mg/L	28-JUL-14	28-JUL-14	R2900449
Calcium (Ca)-Total	43.9		0.10	mg/L	28-JUL-14	28-JUL-14	R2900449
Chromium (Cr)-Total	0.317		0.0010	mg/L	28-JUL-14	28-JUL-14	R2900449
Cobalt (Co)-Total	0.00149		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Copper (Cu)-Total	0.00098		0.00020	mg/L	28-JUL-14	28-JUL-14	R2900449
Iron (Fe)-Total	7.52		0.10	mg/L	28-JUL-14	28-JUL-14	R2900449
Lead (Pb)-Total	0.000407		0.000090	mg/L	28-JUL-14	28-JUL-14	R2900449
Magnesium (Mg)-Total	14.0		0.010	mg/L	28-JUL-14	28-JUL-14	R2900449
Manganese (Mn)-Total	2.14	DLA	0.030	mg/L	28-JUL-14	28-JUL-14	R2900449
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	28-JUL-14	28-JUL-14	R2900449
Potassium (K)-Total	6.91		0.020	mg/L	28-JUL-14	28-JUL-14	R2900449
Sodium (Na)-Total	68.7	DLA	3.0	mg/L	28-JUL-14	28-JUL-14	R2900449
Zinc (Zn)-Total	0.0656		0.0020	mg/L	28-JUL-14	28-JUL-14	R2900449
Total Suspended Solids							
Total Suspended Solids	34.0		5.0	mg/L		21-JUL-14	R2893826
pH							
pH	7.21		0.10	pH units		22-JUL-14	R2894373

* 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.
SP	Sample was Preserved at the laboratory

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.

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.

CL-IC-WP	Water	Chloride by Ion Chromatography	EPA 300.1 (Modified)

Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.

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 DEC-2000 - PUB# 1310-L

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

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

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

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

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

F2-F4-WS-WP	Water	F2-F4 PHC method	EPA 3510/8000

This is the determination of the Petroleum Hydrocarbon fractions in water (F2, F3 and F4). A water sample volume of 200 mL in a 250 mL glass amber bottle is shaken with 10 mL hexane for two hours on a wrist action shaker, and then sonicated for 5 minutes. After extraction, the solvent layer is drawn off and analyzed against C10, C16 and C34 standards on a gas chromatograph equipped with a flame ionization detector.

FC-MPN-WP	Water	Fecal Coliform	APHA 9221E

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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-WP	Water	Nitrite as N by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
NO3-IC-WP	Water	Nitrate as N by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA SW 846/8270-GC/MS
Water is spiked with a surrogate spike mix and extracted using solvent extraction techniques. Analysis is performed by GC/MS in the selected ion monitoring (SIM) mode.			
PH-WP	Water	pH	APHA 4500H
The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.			
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.			
SO4-IC-WP	Water	Sulfate by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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.			
TOC-WT	Water	Total Organic Carbon	APHA 5310B
Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.			
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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
WT		ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA	

Chain of Custody Numbers:

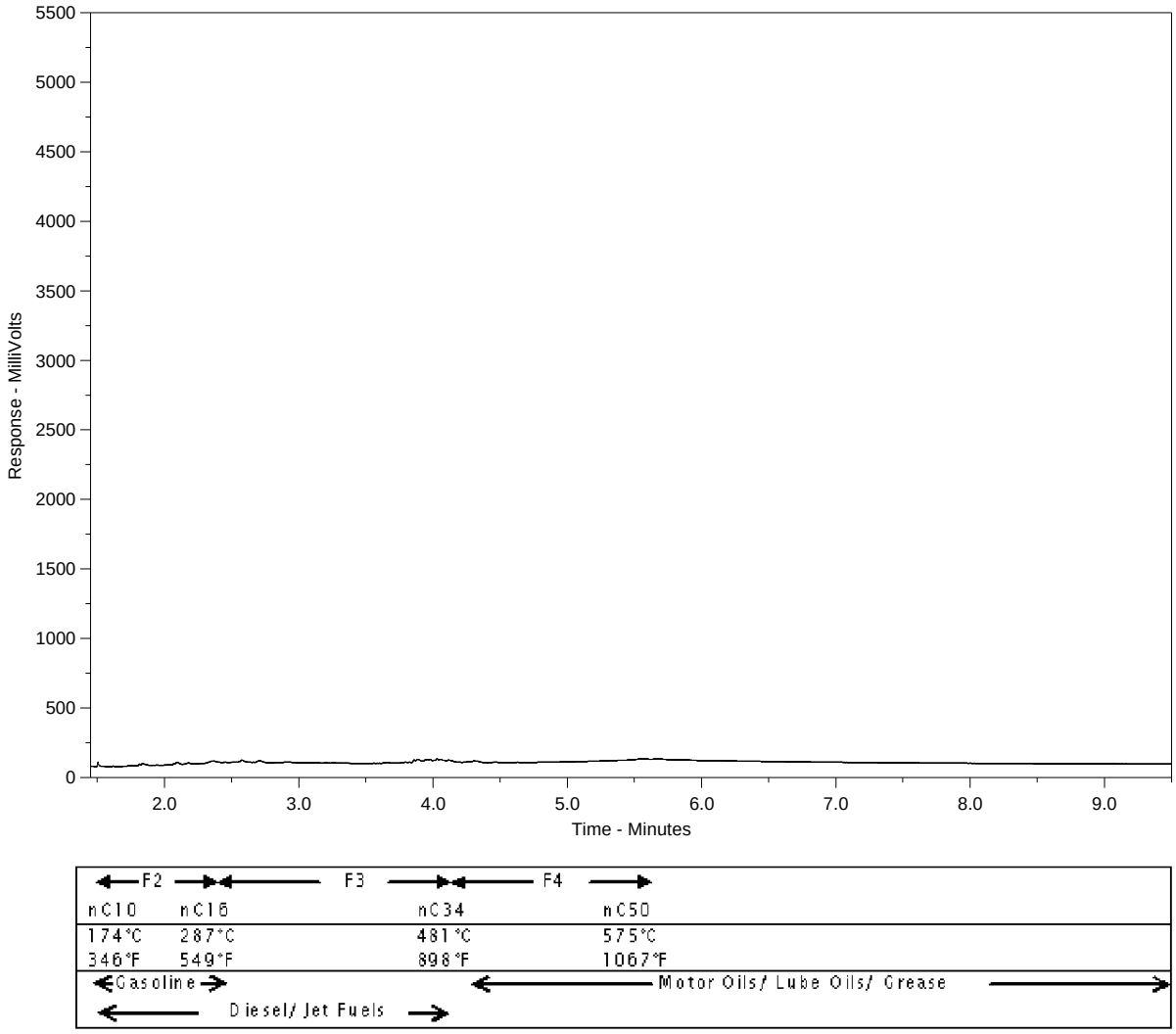
GLOSSARY OF REPORT TERMS

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

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1488411-1
Client Sample ID: ARV-2



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

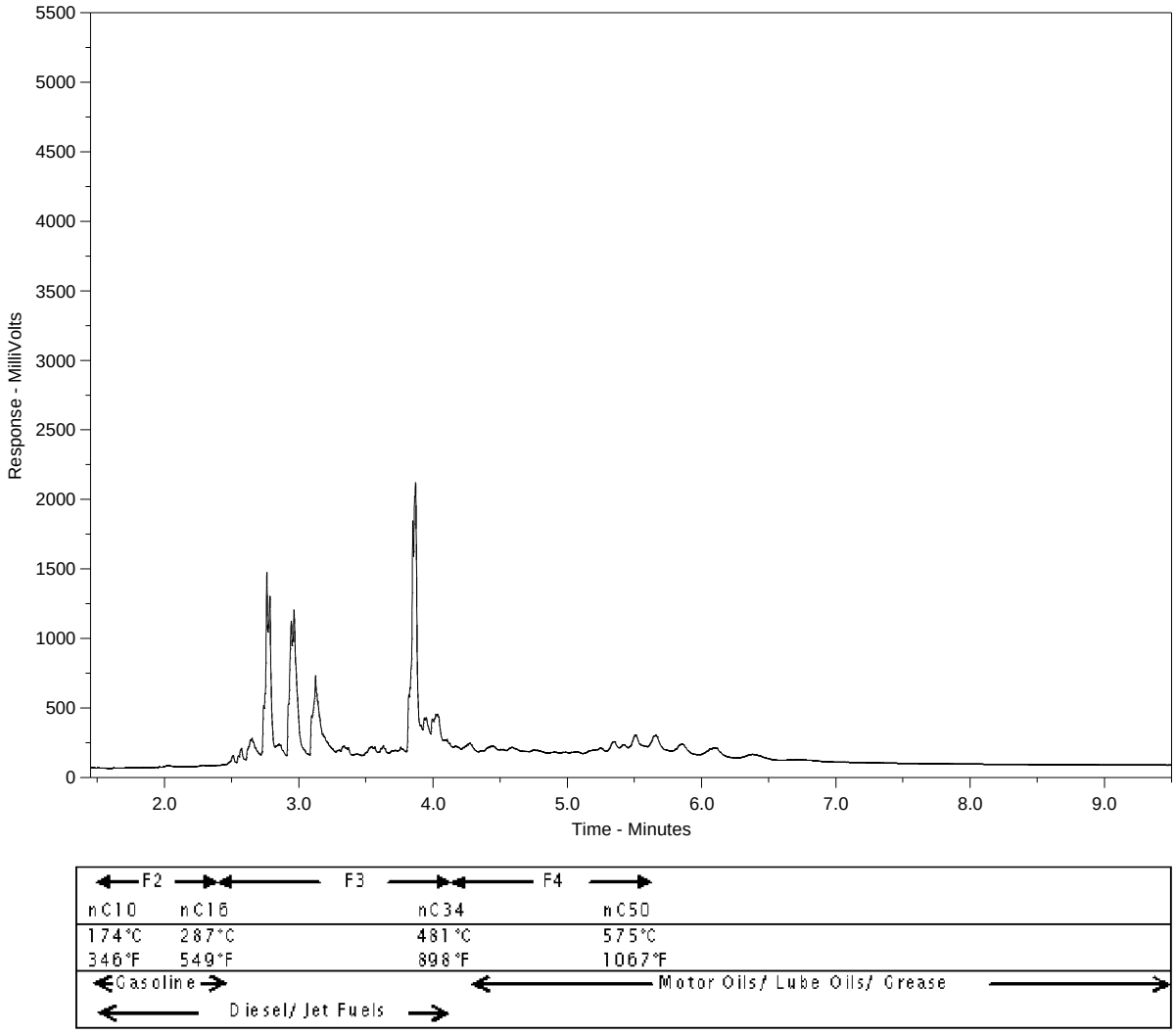
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1488411-2
Client Sample ID: ARV-4



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

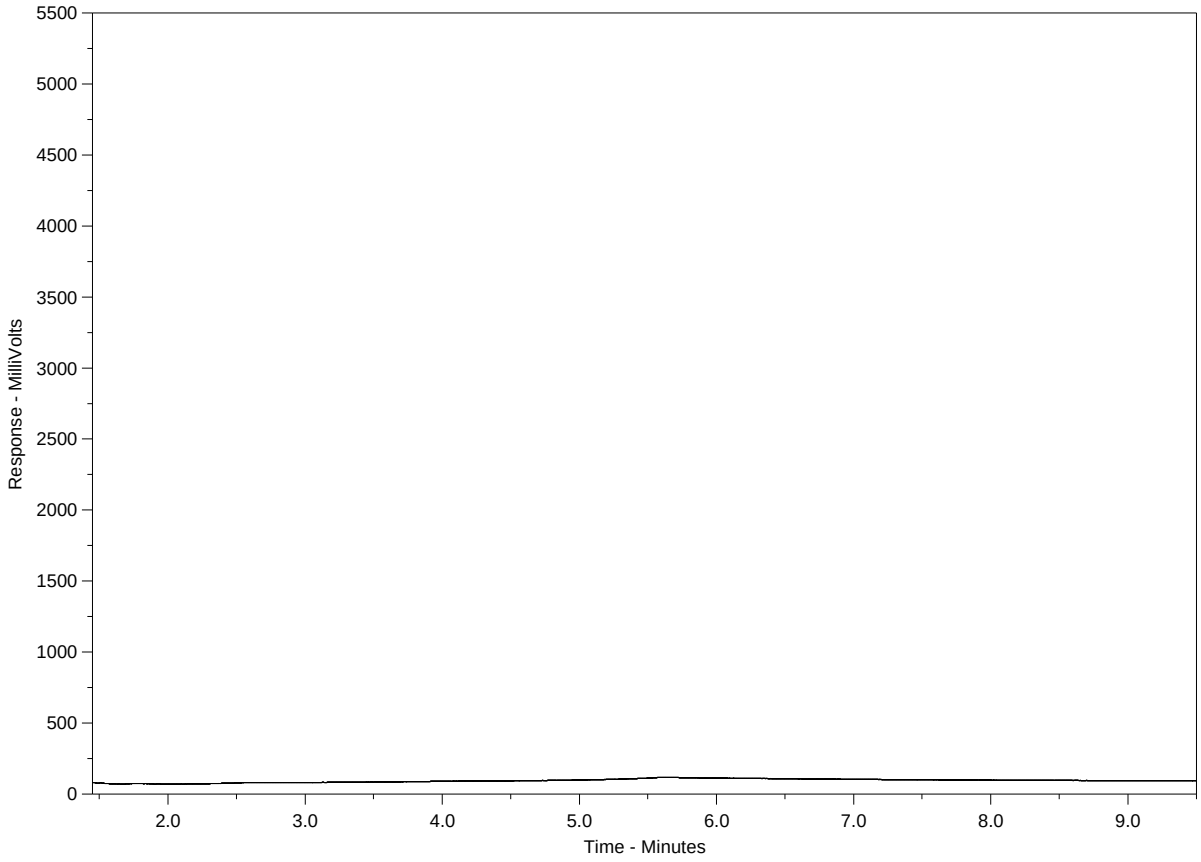
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

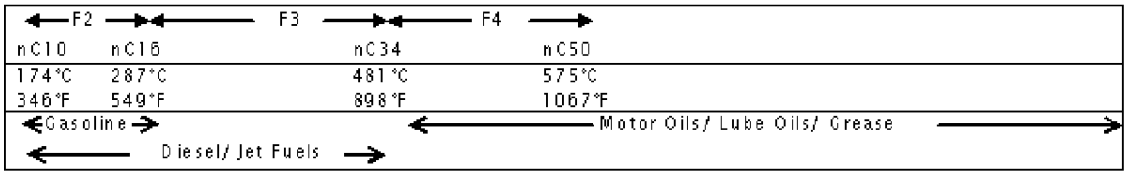
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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: L1488411-3
Client Sample ID: ARV-5





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

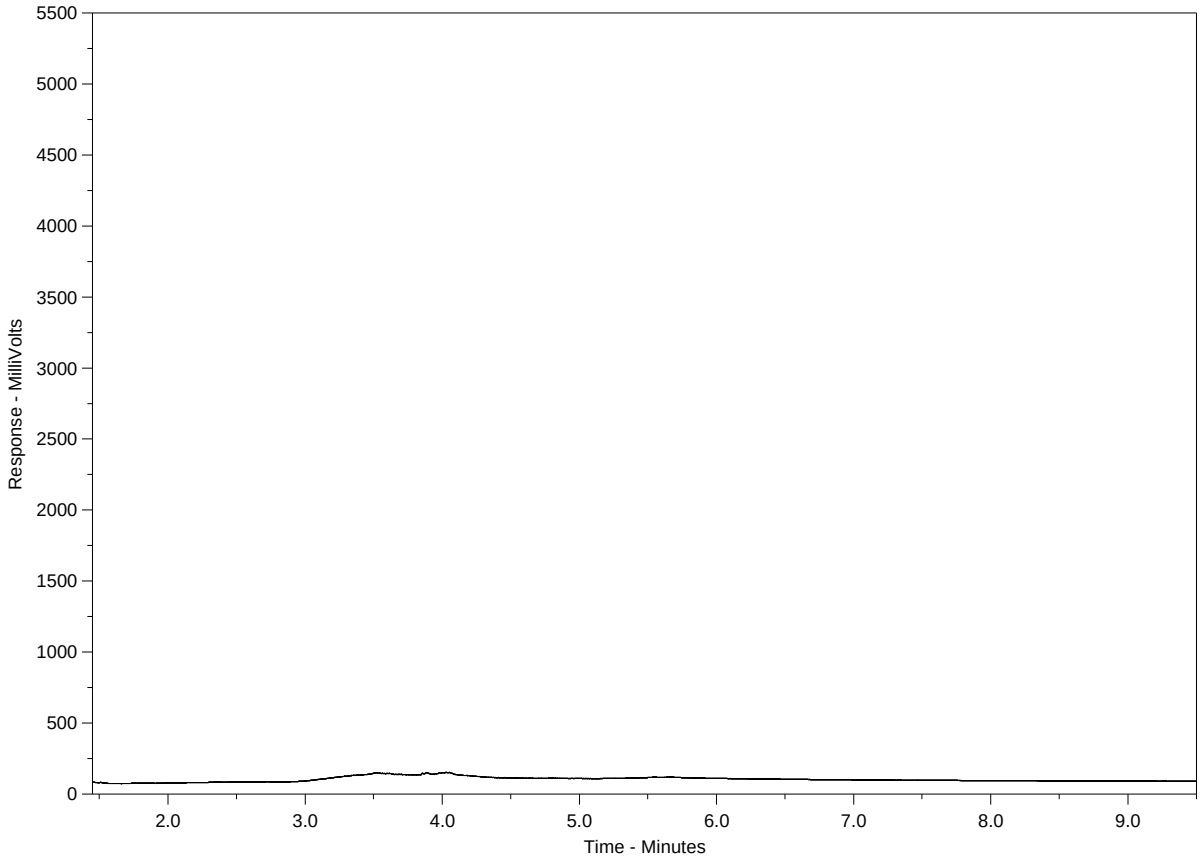
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

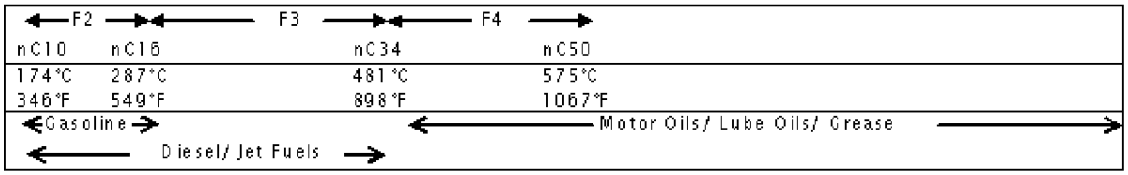
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

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: L1488411-4
Client Sample ID: ARV-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.

ALS Environmental

L1488411-COFC

COC # _____

Page ___ of ___

Report To		Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	HAMLET OF ARVIAT (W10578)	☒ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	ED MURPHY	☒ PDF	☐ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 150	Email 1:	arviatsao@qiniq.com			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	ARVIAT, NUNAVUT, XOC 0E0	Email 2:				○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-857-2841 Fax:	Email 3:				
Invoice To	Same as Report ? ☒ Yes ☐ No	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☒ No	Job #:	HAMLET OF ARVIAT WWTP			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:				
Contact:		LSD:				
Address:						
Phone:	Fax:	Quote #:	Q30948			
Lab Work Order # (lab use only)		ALS Contact:		Sampler:		

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BOD-WP	TSS	EC-WP	PH-WP	SO4-IC-WP	ANIONS-N2N3-IC-WP	NH3-0COL-WP	FECAL COLIFORM (FC-MP)	MET-T-L-MS-WP	HG-T-CVAF-WP	OGG-TOT-WT	PHENOLS-4AAP-WT	Number of Containers
	ARV-2	June '14	140 pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-4	June 14	125pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-5	June '14	155 pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-6	June 14	209pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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
			PD	17/7/14	12:00	15 °C				

GENF 18.01 Front

ALS Environmental

L1488411-COFC

COC # _____

Page 1 of 1

Report To			
Company:	HAMLET OF ARVIAT (W10578)		
Contact:	ED MURPHY		
Address:	PO Box 150		
	ARVIAT, NUNAVUT, X0C 0E0		
Phone:	867-857-2841	Fax:	
Invoice To	Same as Report ? ☒ Yes ☐ No		
Hardcopy of Invoice with Report?	☐ Yes ☒ No		
Company:			
Contact:			
Address:			
Phone:		Fax:	
Lab Work Order # (lab use only)			

Other

☒ PDF ☐ Excel ☐ Digital ☐ Fax

Email 1: arviatsao@qiniq.com

Email 2:

Email 3:

Client / Project Information

Job #: HAMLET OF ARVIAT WWTP

PO / AFE:

LSD:

Quote #: Q30948

ALS Contact: Sampler:

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	BOD-WP	TSS	EC-WP	PH-WP	SO4-IC-WP	ANIONS, NO2,NO3-IC-WP	NH3-0COL-WP	FECAL COLIFORM (FC-MPN)	MET-T-L-MS-WP	HG-T-CVAF-WP	OGG-TOT-WT	PHENOLS-4AAP-WT	Number of Containers
	ARV-2	15-07-14	140	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-4	15-07-14	125	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-5	15-07-14	155	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-6	15-07-14	209	EFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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
			PD	17/7/14	12:00	14 °C				

Hamlet of Arviat
ATTN: STEVE ENGLAND
PO Box 150
Arviat NU X0C 0E0

Date Received: 01-AUG-14
Report Date: 12-AUG-14 16:31 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1496287

Project P.O. #: NOT SUBMITTED
Job Reference: ARVIAT MONITORING PROGRAM
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
L1496287-1 ARV-2							
Sampled By: LAURA on 14-JUL-14 @ 15:30							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Fecal Coliforms	150		3	MPN/100mL		06-AUG-14	R2913349
Total Organic Carbon	101		1.0	mg/L	08-AUG-14	08-AUG-14	R2914016
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	828		20	mg/L		07-AUG-14	R2912364
Bicarbonate (HCO3)	1010		24	mg/L		07-AUG-14	R2912364
Carbonate (CO3)	<12		12	mg/L		07-AUG-14	R2912364
Hydroxide (OH)	<6.8		6.8	mg/L		07-AUG-14	R2912364
Ammonia by colour							
Ammonia, Total (as N)	12.1	DLA	1.0	mg/L		06-AUG-14	R2910380
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	37.2		6.0	mg/L		01-AUG-14	R2910068
Carbonaceous BOD							
BOD Carbonaceous	18.5		6.0	mg/L		01-AUG-14	R2910068
Chloride by Ion Chromatography							
Chloride	397		2.5	mg/L		02-AUG-14	R2908651
Conductivity							
Conductivity	2990		20	umhos/cm		07-AUG-14	R2912364
Hardness Calculated							
Hardness (as CaCO3)	1130		0.30	mg/L		12-AUG-14	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	06-AUG-14	06-AUG-14	R2910188
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		02-AUG-14	R2908651
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		06-AUG-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		02-AUG-14	R2908651
Oil and Grease, Total							
Oil and Grease, Total	5.7		2.0	mg/L	06-AUG-14	06-AUG-14	R2911943
Phenol (4AAP)							
Phenols (4AAP)	0.0106		0.0010	mg/L	11-AUG-14	11-AUG-14	R2914115
Phosphorus, Total							
Phosphorus (P)-Total	1.89		0.010	mg/L		11-AUG-14	R2914269
Sulfate by Ion Chromatography							
Sulfate	466		2.5	mg/L		02-AUG-14	R2908651
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0351		0.0050	mg/L	11-AUG-14	11-AUG-14	R2914909
Arsenic (As)-Total	0.00651		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Cadmium (Cd)-Total	0.000074		0.000010	mg/L	11-AUG-14	11-AUG-14	R2914909
Calcium (Ca)-Total	356		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909
Chromium (Cr)-Total	0.0022		0.0010	mg/L	11-AUG-14	11-AUG-14	R2914909
Cobalt (Co)-Total	0.00193		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Copper (Cu)-Total	0.0184		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Iron (Fe)-Total	0.56		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909
Lead (Pb)-Total	0.00278		0.000090	mg/L	11-AUG-14	11-AUG-14	R2914909
Magnesium (Mg)-Total	59.2		0.010	mg/L	11-AUG-14	11-AUG-14	R2914909
Manganese (Mn)-Total	2.15		0.00030	mg/L	11-AUG-14	11-AUG-14	R2914909
Nickel (Ni)-Total	0.0110		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909
Potassium (K)-Total	68.8		0.020	mg/L	11-AUG-14	11-AUG-14	R2914909
Sodium (Na)-Total	302		0.030	mg/L	11-AUG-14	11-AUG-14	R2914909
Zinc (Zn)-Total	0.0464		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909

* 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
L1496287-1 ARV-2							
Sampled By: LAURA on 14-JUL-14 @ 15:30							
Matrix: EFFLUENT							
Total Suspended Solids							
Total Suspended Solids	33.0		5.0	mg/L		06-AUG-14	R2910855
pH							
pH	8.05		0.10	pH units		07-AUG-14	R2912364
L1496287-2 ARV-4							
Sampled By: LAURA on 14-JUL-14 @ 15:45							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Fecal Coliforms	4		3	MPN/100mL		06-AUG-14	R2913349
Total Organic Carbon	115		1.0	mg/L	08-AUG-14	08-AUG-14	R2914016
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	138		20	mg/L		07-AUG-14	R2912364
Bicarbonate (HCO3)	130		24	mg/L		07-AUG-14	R2912364
Carbonate (CO3)	18		12	mg/L		07-AUG-14	R2912364
Hydroxide (OH)	<6.8		6.8	mg/L		07-AUG-14	R2912364
Ammonia by colour							
Ammonia, Total (as N)	9.4	DLA	1.0	mg/L		05-AUG-14	R2908889
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	50.1		6.0	mg/L		01-AUG-14	R2910068
Carbonaceous BOD							
BOD Carbonaceous	42.2		6.0	mg/L		01-AUG-14	R2910068
Chloride by Ion Chromatography							
Chloride	93.4		0.50	mg/L		02-AUG-14	R2908651
Conductivity							
Conductivity	570		20	umhos/cm		07-AUG-14	R2912364
Hardness Calculated							
Hardness (as CaCO3)	78.9		0.30	mg/L		12-AUG-14	
Mercury Total							
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	06-AUG-14	06-AUG-14	R2910188
Nitrate as N by Ion Chromatography							
Nitrate-N	0.712		0.050	mg/L		02-AUG-14	R2908651
Nitrate+Nitrite							
Nitrate and Nitrite as N	1.44		0.071	mg/L		06-AUG-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.729		0.050	mg/L		02-AUG-14	R2908651
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	06-AUG-14	06-AUG-14	R2911943
Phenol (4AAP)							
Phenols (4AAP)	<0.0050	DLM	0.0050	mg/L	11-AUG-14	11-AUG-14	R2914115
Phosphorus, Total							
Phosphorus (P)-Total	12.1	DLA	0.050	mg/L		11-AUG-14	R2914269
Sulfate by Ion Chromatography							
Sulfate	2.18		0.50	mg/L		02-AUG-14	R2908651
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.269		0.0050	mg/L	11-AUG-14	11-AUG-14	R2914909
Arsenic (As)-Total	0.00844		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Cadmium (Cd)-Total	0.000079		0.000010	mg/L	11-AUG-14	11-AUG-14	R2914909
Calcium (Ca)-Total	17.0		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909
Chromium (Cr)-Total	0.0015		0.0010	mg/L	11-AUG-14	11-AUG-14	R2914909
Cobalt (Co)-Total	0.00224		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Copper (Cu)-Total	0.0440		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Iron (Fe)-Total	4.56		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909

* 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
L1496287-2 ARV-4							
Sampled By: LAURA on 14-JUL-14 @ 15:45							
Matrix: EFFLUENT							
Total Metals by ICP-MS							
Lead (Pb)-Total	0.00181		0.000090	mg/L	11-AUG-14	11-AUG-14	R2914909
Magnesium (Mg)-Total	8.85		0.010	mg/L	11-AUG-14	11-AUG-14	R2914909
Manganese (Mn)-Total	0.279		0.00030	mg/L	11-AUG-14	11-AUG-14	R2914909
Nickel (Ni)-Total	0.0090		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909
Potassium (K)-Total	28.1		0.020	mg/L	11-AUG-14	11-AUG-14	R2914909
Sodium (Na)-Total	73.9		0.030	mg/L	11-AUG-14	11-AUG-14	R2914909
Zinc (Zn)-Total	0.0402		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909
Total Suspended Solids							
Total Suspended Solids	167		5.0	mg/L		06-AUG-14	R2910855
pH							
pH	8.96		0.10	pH units		07-AUG-14	R2912364
L1496287-3 ARV-5							
Sampled By: LAURA on 14-JUL-14 @ 16:00							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Fecal Coliforms	43		3	MPN/100mL		06-AUG-14	R2913349
Total Organic Carbon	15.7		1.0	mg/L	08-AUG-14	08-AUG-14	R2914016
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	96		20	mg/L		07-AUG-14	R2912364
Bicarbonate (HCO3)	117		24	mg/L		07-AUG-14	R2912364
Carbonate (CO3)	<12		12	mg/L		07-AUG-14	R2912364
Hydroxide (OH)	<6.8		6.8	mg/L		07-AUG-14	R2912364
Ammonia by colour							
Ammonia, Total (as N)	<0.010		0.010	mg/L		05-AUG-14	R2908889
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<6.0		6.0	mg/L		01-AUG-14	R2910068
Carbonaceous BOD							
BOD Carbonaceous	<6.0		6.0	mg/L		01-AUG-14	R2910068
Chloride by Ion Chromatography							
Chloride	804		2.5	mg/L		02-AUG-14	R2908651
Conductivity							
Conductivity	2700		20	umhos/cm		07-AUG-14	R2912364
Hardness Calculated							
Hardness (as CaCO3)	385		0.30	mg/L		12-AUG-14	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	06-AUG-14	06-AUG-14	R2910188
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		02-AUG-14	R2908651
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		06-AUG-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		02-AUG-14	R2908651
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	06-AUG-14	06-AUG-14	R2911943
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L	11-AUG-14	11-AUG-14	R2914115
Phosphorus, Total							
Phosphorus (P)-Total	0.106		0.010	mg/L		11-AUG-14	R2914269
Sulfate by Ion Chromatography							
Sulfate	16.0		2.5	mg/L		02-AUG-14	R2908651
Total Metals by ICP-MS							

* 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
L1496287-3 ARV-5							
Sampled By: LAURA on 14-JUL-14 @ 16:00							
Matrix: EFFLUENT							
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.206		0.0050	mg/L	11-AUG-14	11-AUG-14	R2914909
Arsenic (As)-Total	0.00087		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	11-AUG-14	11-AUG-14	R2914909
Calcium (Ca)-Total	53.4		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	11-AUG-14	11-AUG-14	R2914909
Cobalt (Co)-Total	0.00027		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Copper (Cu)-Total	0.00056		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Iron (Fe)-Total	3.16		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909
Lead (Pb)-Total	0.000139		0.000090	mg/L	11-AUG-14	11-AUG-14	R2914909
Magnesium (Mg)-Total	61.0		0.010	mg/L	11-AUG-14	11-AUG-14	R2914909
Manganese (Mn)-Total	0.0691		0.00030	mg/L	11-AUG-14	11-AUG-14	R2914909
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909
Potassium (K)-Total	16.7		0.020	mg/L	11-AUG-14	11-AUG-14	R2914909
Sodium (Na)-Total	419		0.030	mg/L	11-AUG-14	11-AUG-14	R2914909
Zinc (Zn)-Total	0.0034		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909
Total Suspended Solids							
Total Suspended Solids	20.0		5.0	mg/L		06-AUG-14	R2910855
pH							
pH	8.01		0.10	pH units		07-AUG-14	R2912364
L1496287-4 ARV-6							
Sampled By: LAURA on 14-JUL-14 @ 15:20							
Matrix: EFFLUENT							
Miscellaneous Parameters							
Fecal Coliforms	23		3	MPN/100mL		06-AUG-14	R2913349
Total Organic Carbon	21.0		1.0	mg/L	08-AUG-14	08-AUG-14	R2914016
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	96		20	mg/L		07-AUG-14	R2912364
Bicarbonate (HCO3)	118		24	mg/L		07-AUG-14	R2912364
Carbonate (CO3)	<12		12	mg/L		07-AUG-14	R2912364
Hydroxide (OH)	<6.8		6.8	mg/L		07-AUG-14	R2912364
Ammonia by colour							
Ammonia, Total (as N)	0.289		0.010	mg/L		05-AUG-14	R2908889
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	29.3		6.0	mg/L		01-AUG-14	R2910068
Carbonaceous BOD							
BOD Carbonaceous	16.1		6.0	mg/L		01-AUG-14	R2910068
Chloride by Ion Chromatography							
Chloride	169		0.50	mg/L		02-AUG-14	R2908651
Conductivity							
Conductivity	749		20	umhos/cm		07-AUG-14	R2912364
Hardness Calculated							
Hardness (as CaCO3)	176		0.30	mg/L		12-AUG-14	
Mercury Total							
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	06-AUG-14	06-AUG-14	R2910188
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		02-AUG-14	R2908651
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		06-AUG-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		02-AUG-14	R2908651

* 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
L1496287-4 ARV-6							
Sampled By: LAURA on 14-JUL-14 @ 15:20							
Matrix: EFFLUENT							
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	06-AUG-14	06-AUG-14	R2911943
Phenol (4AAP)							
Phenols (4AAP)	0.0193		0.0010	mg/L	11-AUG-14	11-AUG-14	R2914115
Phosphorus, Total							
Phosphorus (P)-Total	0.661		0.010	mg/L		11-AUG-14	R2914269
Sulfate by Ion Chromatography							
Sulfate	0.50		0.50	mg/L		02-AUG-14	R2908651
Total Metals by ICP-MS							
Aluminum (Al)-Total	1.34		0.0050	mg/L	11-AUG-14	11-AUG-14	R2914909
Arsenic (As)-Total	0.00584		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Cadmium (Cd)-Total	0.000032		0.000010	mg/L	11-AUG-14	11-AUG-14	R2914909
Calcium (Ca)-Total	44.9		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909
Chromium (Cr)-Total	0.0098		0.0010	mg/L	11-AUG-14	11-AUG-14	R2914909
Cobalt (Co)-Total	0.00391		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Copper (Cu)-Total	0.00561		0.00020	mg/L	11-AUG-14	11-AUG-14	R2914909
Iron (Fe)-Total	147		0.10	mg/L	11-AUG-14	11-AUG-14	R2914909
Lead (Pb)-Total	0.00172		0.000090	mg/L	11-AUG-14	11-AUG-14	R2914909
Magnesium (Mg)-Total	15.7		0.010	mg/L	11-AUG-14	11-AUG-14	R2914909
Manganese (Mn)-Total	2.98		0.00030	mg/L	11-AUG-14	11-AUG-14	R2914909
Nickel (Ni)-Total	0.0043		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909
Potassium (K)-Total	7.30		0.020	mg/L	11-AUG-14	11-AUG-14	R2914909
Sodium (Na)-Total	79.9		0.030	mg/L	11-AUG-14	11-AUG-14	R2914909
Zinc (Zn)-Total	0.302		0.0020	mg/L	11-AUG-14	11-AUG-14	R2914909
Total Suspended Solids							
Total Suspended Solids	268		5.0	mg/L		06-AUG-14	R2910855
pH							
pH	6.82		0.10	pH units		07-AUG-14	R2912364

* 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.
SP	Sample was Preserved at the laboratory

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.			
CL-IC-WP	Water	Chloride by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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-WP	Water	Nitrite as N by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
NO3-IC-WP	Water	Nitrate as N by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
		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-WP	Water	Sulfate by Ion Chromatography	EPA 300.1 (Modified)
		Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.	
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.	
TOC-WT	Water	Total Organic Carbon	APHA 5310B
		Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.	

** 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.

10- 312592

L1496287-COFC

ALS Environmental

Page 1 of 1

Report To		Report Format / Distribution		Service Request: (Rush subject to availability - Contact ALS to confirm TAT)
Company:	Hamlet of Arviat	Standard: ✓	Other (specify):	✓ Regular (Standard Turnaround Times - Business Days)
Contact:	Steve England	Select: PDF ✓	Excel Digital Fax	Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
Address:	Box 150	Email 1:	arviatsao@qiniq.com	Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
	Arviat, NU X0C-0E0	Email 2:	mlusty@gov.nu.ca	Same Day or Weekend Emergency - Contact ALS to confirm TAT
Phone:	867-857-2841 Fax: 867-857-2519			

Invoice To	Same as Report ? (circle) Yes or No (if No, provide details)	Client / Project Information	
	Copy of Invoice with Report? (circle) Yes or No	Job #:	Arviat Monitoring Program
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact:	Sampler: Laura

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	500 mL BOD	1 L Routine	150 mL Metals + Pres	40 mL Glass Mercury Vial + Pres	250 mL Amber Nutrients + Pres	250 mL Amber Phenols + Pres	125 mL Sterile Bacteria Bottle	500 mL Glass Oil + Grease					Number of Containers
	ARV-2	14-07-31	3:30pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓					8
	ARV-4	14-07-31	3:45pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓					8
	ARV-5	14-07-31	4:00pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓					8
	ARV-6	14-07-31	3:20pm	EFF	✓	✓	✓	✓	✓	✓	✓	✓					8

Special Instructions / Regulation 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 specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	31-07-14	4:15pm	JC	08/01/14	10:50	9 °C				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

GENF 18.01 Front

Hamlet of Arviat
ATTN: STEVE ENGLAND
PO Box 150
Arviat NU X0C 0E0

Date Received: 13-SEP-14
Report Date: 30-SEP-14 16:08 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1517374

Project P.O. #: NOT SUBMITTED
Job Reference: ARVIAT - NUNAVUT
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
L1517374-1 ARV-2							
Sampled By: Laura on 12-SEP-14 @ 14:16							
Matrix: Waste Water							
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	515		20	mg/L		19-SEP-14	R2955482
Bicarbonate (HCO3)	628		24	mg/L		19-SEP-14	R2955482
Carbonate (CO3)	<12		12	mg/L		19-SEP-14	R2955482
Hydroxide (OH)	<6.8		6.8	mg/L		19-SEP-14	R2955482
Ammonia by colour							
Ammonia, Total (as N)	5.6	DLA	1.0	mg/L		15-SEP-14	R2948574
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	41.2		6.0	mg/L		13-SEP-14	R2951712
Carbonaceous BOD							
BOD Carbonaceous	20.0		6.0	mg/L		13-SEP-14	R2951712
Chloride by Ion Chromatography							
Chloride	301		2.5	mg/L		13-SEP-14	R2948685
Conductivity							
Conductivity	2330		20	umhos/cm		19-SEP-14	R2955482
Fecal Coliform							
Fecal Coliforms	23		3	MPN/100mL		17-SEP-14	R2951258
Hardness Calculated							
Hardness (as CaCO3)	954		0.30	mg/L		17-SEP-14	
Mercury Total							
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	15-SEP-14	15-SEP-14	R2948512
Nitrate as N by Ion Chromatography							
Nitrate-N	0.31		0.25	mg/L		13-SEP-14	R2948685
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		16-SEP-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		13-SEP-14	R2948685
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	17-SEP-14	17-SEP-14	R2951949
Phenol (4AAP)							
Phenols (4AAP)	<0.01	DLM	0.010	mg/L	22-SEP-14	22-SEP-14	R2954753
Phosphorus, Total							
Phosphorus (P)-Total	0.700		0.010	mg/L		16-SEP-14	R2949838
Sulfate by Ion Chromatography							
Sulfate	490		2.5	mg/L		13-SEP-14	R2948685
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.050	DLM	0.050	mg/L	16-SEP-14	16-SEP-14	R2949523
Arsenic (As)-Total	0.0061	DLM	0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Cadmium (Cd)-Total	<0.00010	DLM	0.00010	mg/L	16-SEP-14	16-SEP-14	R2949523
Calcium (Ca)-Total	298	DLM	1.0	mg/L	16-SEP-14	16-SEP-14	R2949523
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	16-SEP-14	16-SEP-14	R2949523
Cobalt (Co)-Total	<0.0020	DLM	0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Copper (Cu)-Total	0.0173	DLM	0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Iron (Fe)-Total	<1.0	DLM	1.0	mg/L	16-SEP-14	16-SEP-14	R2949523
Lead (Pb)-Total	0.00217	DLM	0.00090	mg/L	16-SEP-14	16-SEP-14	R2949523
Magnesium (Mg)-Total	51.3	DLM	0.10	mg/L	16-SEP-14	16-SEP-14	R2949523
Manganese (Mn)-Total	0.724	DLM	0.0030	mg/L	16-SEP-14	16-SEP-14	R2949523
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	16-SEP-14	16-SEP-14	R2949523
Potassium (K)-Total	55.0	DLM	0.20	mg/L	16-SEP-14	16-SEP-14	R2949523
Sodium (Na)-Total	248	DLM	0.30	mg/L	16-SEP-14	16-SEP-14	R2949523
Zinc (Zn)-Total	0.055	DLM	0.020	mg/L	16-SEP-14	16-SEP-14	R2949523

* 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
L1517374-1 ARV-2							
Sampled By: Laura on 12-SEP-14 @ 14:16							
Matrix: Waste Water							
Total Organic Carbon							
Total Organic Carbon	45.9		1.0	mg/L		24-SEP-14	R2961647
Total Suspended Solids							
Total Suspended Solids	62.0		5.0	mg/L		16-SEP-14	R2950637
pH							
pH	8.01		0.10	pH units		19-SEP-14	R2955482
L1517374-2 ARV-4							
Sampled By: Laura on 12-SEP-14 @ 14:04							
Matrix: Waste Water							
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	67		20	mg/L		19-SEP-14	R2955482
Bicarbonate (HCO3)	82		24	mg/L		19-SEP-14	R2955482
Carbonate (CO3)	<12		12	mg/L		19-SEP-14	R2955482
Hydroxide (OH)	<6.8		6.8	mg/L		19-SEP-14	R2955482
Ammonia by colour							
Ammonia, Total (as N)	12.5	DLA	1.0	mg/L		15-SEP-14	R2948574
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	69.1		6.0	mg/L		13-SEP-14	R2951712
Carbonaceous BOD							
BOD Carbonaceous	40.2		6.0	mg/L		13-SEP-14	R2951712
Chloride by Ion Chromatography							
Chloride	183		0.50	mg/L		13-SEP-14	R2948685
Conductivity							
Conductivity	750		20	umhos/cm		19-SEP-14	R2955482
Fecal Coliform							
Fecal Coliforms	640		3	MPN/100mL		17-SEP-14	R2951258
Hardness Calculated							
Hardness (as CaCO3)	81.2		0.30	mg/L		17-SEP-14	
Mercury Total							
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	15-SEP-14	15-SEP-14	R2948512
Nitrate as N by Ion Chromatography							
Nitrate-N	0.563		0.050	mg/L		13-SEP-14	R2948685
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.859		0.071	mg/L		16-SEP-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.296		0.050	mg/L		13-SEP-14	R2948685
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	17-SEP-14	17-SEP-14	R2951949
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L	22-SEP-14	22-SEP-14	R2954753
Phosphorus, Total							
Phosphorus (P)-Total	6.00	DLA	0.050	mg/L		16-SEP-14	R2949838
Sulfate by Ion Chromatography							
Sulfate	4.98		0.50	mg/L		13-SEP-14	R2948685
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.211		0.0050	mg/L	16-SEP-14	16-SEP-14	R2949523
Arsenic (As)-Total	0.00789		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Cadmium (Cd)-Total	0.000088		0.000010	mg/L	16-SEP-14	16-SEP-14	R2949523
Calcium (Ca)-Total	16.6		0.10	mg/L	16-SEP-14	16-SEP-14	R2949523
Chromium (Cr)-Total	0.0013		0.0010	mg/L	16-SEP-14	16-SEP-14	R2949523
Cobalt (Co)-Total	0.00204		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523

* 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
L1517374-2 ARV-4							
Sampled By: Laura on 12-SEP-14 @ 14:04							
Matrix: Waste Water							
Total Metals by ICP-MS							
Copper (Cu)-Total	0.0283		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Iron (Fe)-Total	3.47		0.10	mg/L	16-SEP-14	16-SEP-14	R2949523
Lead (Pb)-Total	0.00159		0.000090	mg/L	16-SEP-14	16-SEP-14	R2949523
Magnesium (Mg)-Total	9.68		0.010	mg/L	16-SEP-14	16-SEP-14	R2949523
Manganese (Mn)-Total	0.279		0.00030	mg/L	16-SEP-14	16-SEP-14	R2949523
Nickel (Ni)-Total	0.0074		0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Potassium (K)-Total	23.4		0.020	mg/L	16-SEP-14	16-SEP-14	R2949523
Sodium (Na)-Total	76.2		0.030	mg/L	16-SEP-14	16-SEP-14	R2949523
Zinc (Zn)-Total	0.0214		0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Total Organic Carbon							
Total Organic Carbon	89.2		1.0	mg/L		24-SEP-14	R2961647
Total Suspended Solids							
Total Suspended Solids	156		5.0	mg/L		16-SEP-14	R2950637
pH							
pH	6.77		0.10	pH units		19-SEP-14	R2955482
L1517374-3 ARV-5							
Sampled By: Laura on 12-SEP-14 @ 14:25							
Matrix: Waste Water							
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	76		20	mg/L		19-SEP-14	R2955482
Bicarbonate (HCO3)	93		24	mg/L		19-SEP-14	R2955482
Carbonate (CO3)	<12		12	mg/L		19-SEP-14	R2955482
Hydroxide (OH)	<6.8		6.8	mg/L		19-SEP-14	R2955482
Ammonia by colour							
Ammonia, Total (as N)	<0.010		0.010	mg/L		15-SEP-14	R2948574
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<6.0		6.0	mg/L		13-SEP-14	R2951712
Carbonaceous BOD							
BOD Carbonaceous	<6.0		6.0	mg/L		13-SEP-14	R2951712
Chloride by Ion Chromatography							
Chloride	311		0.50	mg/L		13-SEP-14	R2948685
Conductivity							
Conductivity	1100		20	umhos/cm		19-SEP-14	R2955482
Fecal Coliform							
Fecal Coliforms	<3		3	MPN/100mL		17-SEP-14	R2951258
Hardness Calculated							
Hardness (as CaCO3)	162		0.30	mg/L		17-SEP-14	
Mercury Total							
Mercury (Hg)-Total	0.000024		0.000020	mg/L	15-SEP-14	15-SEP-14	R2948512
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		13-SEP-14	R2948685
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		16-SEP-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		13-SEP-14	R2948685
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	17-SEP-14	17-SEP-14	R2951949
Phenol (4AAP)							
Phenols (4AAP)	<0.0010		0.0010	mg/L	22-SEP-14	22-SEP-14	R2954753
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
L1517374-3 ARV-5							
Sampled By: Laura on 12-SEP-14 @ 14:25							
Matrix: Waste Water							
Phosphorus, Total							
Phosphorus (P)-Total	<0.050	DLA	0.050	mg/L		16-SEP-14	R2949838
Sulfate by Ion Chromatography							
Sulfate	8.42		0.50	mg/L		13-SEP-14	R2948685
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0319		0.0050	mg/L	16-SEP-14	16-SEP-14	R2949523
Arsenic (As)-Total	0.00047		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	16-SEP-14	16-SEP-14	R2949523
Calcium (Ca)-Total	28.9		0.10	mg/L	16-SEP-14	16-SEP-14	R2949523
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	16-SEP-14	16-SEP-14	R2949523
Cobalt (Co)-Total	<0.00020		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Copper (Cu)-Total	0.00120		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Iron (Fe)-Total	0.96		0.10	mg/L	16-SEP-14	16-SEP-14	R2949523
Lead (Pb)-Total	<0.000090		0.000090	mg/L	16-SEP-14	16-SEP-14	R2949523
Magnesium (Mg)-Total	21.8		0.010	mg/L	16-SEP-14	16-SEP-14	R2949523
Manganese (Mn)-Total	0.0463		0.00030	mg/L	16-SEP-14	16-SEP-14	R2949523
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Potassium (K)-Total	6.04		0.020	mg/L	16-SEP-14	16-SEP-14	R2949523
Sodium (Na)-Total	164		0.030	mg/L	16-SEP-14	16-SEP-14	R2949523
Zinc (Zn)-Total	0.0035		0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Total Organic Carbon							
Total Organic Carbon	9.0		1.0	mg/L		25-SEP-14	R2961647
Total Suspended Solids							
Total Suspended Solids	6.0		5.0	mg/L		16-SEP-14	R2950637
pH							
pH	7.63		0.10	pH units		19-SEP-14	R2955482
L1517374-4 ARV-6							
Sampled By: Laura on 12-SEP-14 @ 13:50							
Matrix: Waste Water							
Nunavut WW Group 1							
Alkalinity							
Alkalinity, Total (as CaCO3)	103		20	mg/L		19-SEP-14	R2955482
Bicarbonate (HCO3)	126		24	mg/L		19-SEP-14	R2955482
Carbonate (CO3)	<12		12	mg/L		19-SEP-14	R2955482
Hydroxide (OH)	<6.8		6.8	mg/L		19-SEP-14	R2955482
Ammonia by colour							
Ammonia, Total (as N)	0.075		0.010	mg/L		16-SEP-14	R2950114
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	<6.0		6.0	mg/L		13-SEP-14	R2951712
Carbonaceous BOD							
BOD Carbonaceous	<6.0		6.0	mg/L		13-SEP-14	R2951712
Chloride by Ion Chromatography							
Chloride	155		0.50	mg/L		13-SEP-14	R2948685
Conductivity							
Conductivity	669		20	umhos/cm		19-SEP-14	R2955482
Fecal Coliform							
Fecal Coliforms	<3		3	MPN/100mL		17-SEP-14	R2951258
Hardness Calculated							
Hardness (as CaCO3)	149		0.30	mg/L		17-SEP-14	
Mercury Total							
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	15-SEP-14	15-SEP-14	R2948512
Nitrate as N by Ion Chromatography							

* 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
L1517374-4 ARV-6							
Sampled By: Laura on 12-SEP-14 @ 13:50							
Matrix: Waste Water							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		13-SEP-14	R2948685
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		16-SEP-14	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		13-SEP-14	R2948685
Oil and Grease, Total							
Oil and Grease, Total	<2.0		2.0	mg/L	17-SEP-14	17-SEP-14	R2951949
Phenol (4AAP)							
Phenols (4AAP)	0.0013		0.0010	mg/L	22-SEP-14	22-SEP-14	R2954753
Phosphorus, Total							
Phosphorus (P)-Total	0.059	DLA	0.050	mg/L		16-SEP-14	R2949838
Sulfate by Ion Chromatography							
Sulfate	<0.50		0.50	mg/L		13-SEP-14	R2948685
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0369		0.0050	mg/L	16-SEP-14	16-SEP-14	R2949523
Arsenic (As)-Total	0.00081		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Cadmium (Cd)-Total	0.000010		0.000010	mg/L	16-SEP-14	16-SEP-14	R2949523
Calcium (Ca)-Total	37.6		0.10	mg/L	16-SEP-14	16-SEP-14	R2949523
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	16-SEP-14	16-SEP-14	R2949523
Cobalt (Co)-Total	0.00165		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Copper (Cu)-Total	0.00086		0.00020	mg/L	16-SEP-14	16-SEP-14	R2949523
Iron (Fe)-Total	19.0		0.10	mg/L	16-SEP-14	16-SEP-14	R2949523
Lead (Pb)-Total	0.000115		0.000090	mg/L	16-SEP-14	16-SEP-14	R2949523
Magnesium (Mg)-Total	13.5		0.010	mg/L	16-SEP-14	16-SEP-14	R2949523
Manganese (Mn)-Total	1.91		0.00030	mg/L	16-SEP-14	16-SEP-14	R2949523
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Potassium (K)-Total	5.52		0.020	mg/L	16-SEP-14	16-SEP-14	R2949523
Sodium (Na)-Total	64.7		0.030	mg/L	16-SEP-14	16-SEP-14	R2949523
Zinc (Zn)-Total	0.0227		0.0020	mg/L	16-SEP-14	16-SEP-14	R2949523
Total Organic Carbon							
Total Organic Carbon	<1.0		1.0	mg/L		25-SEP-14	R2961647
Total Suspended Solids							
Total Suspended Solids	102		5.0	mg/L		16-SEP-14	R2950637
pH							
pH	7.07		0.10	pH units		19-SEP-14	R2955482

* 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-WP	Water	Chloride by Ion Chromatography	EPA 300.1 (Modified)

Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.

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-WP	Water	Nitrite as N by Ion Chromatography	EPA 300.1 (Modified)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
NO3-IC-WP	Water	Nitrate as N by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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-WP	Water	Sulfate by Ion Chromatography	EPA 300.1 (Modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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.

10-312947

ALS Environmental

L1517374-COFC

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L1517374

Page ___ of ___

Report To			
Company:	Hamlet of Arviat	Standard: Other (specify):	Service Request: (Rush subject to availability - Contact ALS to confirm TAT)
Contact:	Steve England	Select: PDF Excel Digital Fax	Regular (Standard Turnaround Times - Business Days)
Address:	Box 150	Email 1:	Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
	Arviat NU X0C-0E0	Email 2:	Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
Phone:	867-857-2841 Fax: 867-857-2519		Same Day or Weekend Emergency - Contact ALS to confirm TAT
Invoice To	Same as Report ? (circle) Yes or No (if No, provide details)	**Client / Project Information**	**Analysis Request**
	Copy of Invoice with Report? (circle) Yes or No	Job #:	(Indicate Filtered or Preserved, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		**ALS Contact:**	**Sampler:** Laura

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BOD-WP	TSS	EC-WP	pH-WP	SO4-IC-WP	ANIONS-IC-WP	NH3-DOC-WP	Fecal Coli-MF-WP	MET-T-T-MS-WP	Hg-T-CVAF-WP	TSS-VOL-WT	DISANDS-ICPMS-WP	Number of Containers
	ARV-2	12-09-14	2:16pm		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	ARV-4	12-09-14	2:04pm		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	ARV-5	12-09-14	2:25pm		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	ARV-6	12-09-14	1:50pm		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Special Instructions / Regulation 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 specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	Sept 12/14	2:39		13-9-14	11:40	9.5 °C				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION | WHITE - LABORATORY COPY | YELLOW - CLIENT COPY | GENF 18.01 Front

Appendix F: 2013 Annual Report, revised March 30, 2015

2013 ANNUAL REPORT
FOR THE HAMLET OF ARVIAT

Revised March 30, 2015

YEAR BEING REPORTED: 2013

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence No. **3AM-ARV1015** issued to the Hamlet of Arviat.

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 quantities of water used as reported in our On Tap Water Delivery System and the estimated discharge of sewage waste based on quantities used.

Month Reported	Quantity of Water Obtained from all sources (litres)	Quantity of Sewage Waste Discharged
January 2013	7,140,851.10	Same
February 2013	6,460,473.40	Same
March 2013	6,928,125.40	Same
April 2013	6,619,917.76	Same
May 2013	6,777,028.53	Same
June 2013	6,607,188.00	Same
July 2013	6,853,929.90	Same
August 2013	6,942,504.00	Same
September 2013	6,768,278.40	Same
October 2013	7,188,547.10	Same
November 2013	7,256,243.70	Same
December 2013	7,535,727.50	Same
ANNUAL TOTAL	83,078,814.79	83,078,814.79

NB: No meter is existing to measure the sewage discharge volume. Therefore water consumption volume is considered as equal volume to the Sewage discharge volume.

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;

- no major maintenance or modifications work has been undertaken during 2013
- A RO unit was procured to treat one million litres of sea water, lake water or brackish water every day. Original supplier was contacted in the fall of 2012 for making RO unit as plug and Play so that it can be easily transported by air to any of the communities in case of emergency.
-

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

Spills:

- 2013005, 2013-01-10, 4 miles East of Arviat, Helicopter
- 2013091, 2013-03-19, near the Arctic College, Hydraulic oil, 60L.
- 2013183, 2013-06-03, Arviat High School, Heating Fuel, 300L
- 2013187, 2013-06-04, lot 493, Heating fuel, 15L
- 2013241, 2013-07-08, Bay 2 Garage, Heating Fuel, 50L
- 2013274, 2013-08-02, Hydraulic oil, 200L

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 or restoration work completed in 2013 and none planned for 2014

vii. 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;

- An engineering consultant ARKTIS Solutions Inc. has completed a feasibility study on Nunavut Communities waste management facilities and recommended new guidelines. CGS is planning to implement these new standard and criteria for the future waste management projects as the GN guidelines.
- William Engineering Ltd is conducting water quality study on the existing water source and the proposed secondary water source. This study will be completed in 2014.

viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and updates or revisions to the approved Operation and Maintenance Plans.

- O&M plans will be updated as the facilities are updated and modified or the new construction takes place.
- No specific instruction was received for any of the items under this License on O&M plan.

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- Attached to this report are the lab analysis results that were collected, submitted and analyzed as per the Monitoring Program. These results were not submitted with the original 2013 Annual Report.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

The Hamlet is working closely with CGS to satisfy the requirements of Water Licence and the demand of the AANDC inspector.

Appendix A: ARV-4 Effluent Quality Limits – 1 page
Appendix B: Monitoring Program Sampling Parameters Summary – 1 page
Appendix C: Certificates of Analysis, July 31, 2013 and August 20, 2013 – 18 pages

Appendix A: ARV-4 Effluent Quality Limits

2013 Arviat Monitoring Stations and Sampling Parameters for Water License No. 3AM-ARV1015
Part D, Item 2: ARV-4 Effluent Quality Limits

Parameter	Maximum Concentration of any Grab Sample	ARV-4	
		31-Jul-13	20-Aug-13
BOD_5	80 mg/L	79 mg/L	80.1 mg/L
Total Suspended Solids	100 mg/L	150 mg/L	118 mg/L
Fecal Coliforms	$1x10^4$ CFU/100 mL	2300 MPN/100 mL	2300 MPN/100 mL
Oil and Grease	no visible sheen	2.0 mg/L	2.2 mg/L
pH	between 6 and 9	7.95	7.43

Exceeds Effluent Quality Limits

Some ARV-4 sample parameters exceed effluent quality limits set in Part D, Item 2 of the Licence. ARV-4 is sampled from a pond outside of the sewage lagoon berms, not at the end out the wetlands. The location of ARV-4 should be confirmed with an Inspector prior to the 2015 sampling season.

Appendix B: Monitoring Program Sampling Parameters Summary

2013 Arviat Monitoring Stations and Sampling Parameters Summary for Water License No. 3AM-ARV1015

			ARV-2a			ARV-4			ARV-5			ARV-6		
Parameters	**Unit**	**Detection Limit**	**31-Jul-13**	**20-Aug-13**	**CCME Guideline[1]**	**31-Jul-13**	**20-Aug-13**	**CCME Guideline[1]**	**31-Jul-13**	**20-Aug-13**	**CCME Guideline[1]**	**31-Jul-13**	**20-Aug-13**	**CCME Guideline[1]**
BOD_5	mg/L	6.0	24.9	<6.0	n/g	79	80.1	n/g	<6.0	<6.0	n/g	<6.0	<6.0	n/g
pH	pH units	0.1	8.16	7.96	6.5-9.0	7.95	7.43	6.5-9.0	7.11	6.88	6.5-9.0	6.39	6.57	6.5-9.0
Total Suspended Solids	mg/L	5.0	62	26		150	118		50	16		116	9	
Nitrate-Nitrite	mg/L	0.071	<0.35	<0.35	n/g	0.605	1.39	n/g	<0.35	<0.35	n/g	<0.071	<0.071	n/g
Total Phenols	mg/L	0.0010	0.0014	<0.0010	0.004	<0.005	<0.005	0.004	<0.0010	<0.0010	0.004	0.0013	<0.0010	0.004
Sodium	mg/L	0.010	268	75.3	n/g	77.9	97.3	n/g	350	275	n/g	66.6	345	n/g
Magnesium	mg/L	0.10	47.5	10.7	n/g	9.78	12.2	n/g	50.1	31.9	n/g	9.9	66.2	n/g
Total Arsenic	mg/L	0.0020	0.00528	0.00036	0.005	0.0103	0.00918	0.005	0.00206	0.00099	0.005	0.00152	0.00445	0.005
Total Copper	mg/L	0.0020	0.00108	0.00094	0.002	0.0401	0.0256	0.002	0.00102	0.00052	0.002	0.00151	0.00064	0.002
Total Iron	mg/L	1.0	0.26	1.34	0.3	4.55	3.65	0.3mg/L	6.39	5.69	0.3	36.4	0.24	0.3
Total Mercury	mg/L	0.000020	<0.000020	<0.000020	0.0000026	<0.000020	<0.00020	0.0000026	<0.000020	<0.000020	0.0000026	<0.000020	<0.000020	0.0000026
Total Zinc	mg/L	0.020	0.0106	0.0473	n/g	0.0365	0.0312	n/g	0.0054	0.0102	n/g	0.0977	0.0143	n/g
Fecal Coliforms	MPN/100mL	3/100	9	930	n/g	2300	2300	n/g	93	430	n/g	<3		n/g
Conductivity	umhos/cm	20	2370	3020	n/g	810	832	n/g	2080	1770	n/g	543	634	n/g
Ammonia Nitrogen	mg/L	0.10	3.69	0.065	1.54	31.7	17.9	4.84	0.068	0.012	15.5	0.245	10.1	48.3
Oil&Grease	mg/L	2.0	<2.0	<2.0	n/g	2	2.2	n/g	<2.0	<2.0	n/g	<2.0	<2.0	n/g
Sulphate	mg/L	0.50	439	449	n/g	5.06	7.67	n/g	8.6	6.3	n/g	<0.50	9.84	n/g
Potassium	mg/L	0.20	48.4	7.84	n/g	28.7	33.4	n/g	12.9	12	n/g	1.72	56.9	n/g
Calcium	mg/L	1.0	249	29	n/g	18.2	20.7	n/g	40.7	39.9	n/g	28.9	265	n/g
Total Cadmium	mg/L	0.000220	<0.000010	<0.000010	0.00013	0.000078	0.000056	0.00013	<0.000010	<0.000010	0.00013	<0.000010	0.000012	0.00013
Total Chromium	mg/L	0.010	0.0013	<0.0010	0.0001	0.0014	0.0012	0.0001	<0.0010	<0.0010	0.0001	0.0018	0.0011	0.0001
Total Lead	mg/L	0.00090	0.000159	<0.000090	0.00235	0.00185	0.00125	0.00235	0.000461	<0.000090	0.007	0.000354	0.000112	0.00653
Total Nickel	mg/L	0.020	0.0057	<0.0020	0.07982	0.0102	0.0089	0.0079	<0.0020	<0.0020	0.15	<0.0020	<0.0020	0.146

[1] Canadian Environmental Quality Guidelines - Water Quality Guidelines for the Protection of Aquatic Life
n/g - no guideline

Exceeds Guidelines for Protection of Aquatic Life

Appendix C: Certificates of Analysis, July 31, 2013 and August 20, 2013

Hamlet of Arviat
ATTN: ED MURPHY
PO Box 150
Arviat NU X0C 0E0

Date Received: 01-AUG-13
Report Date: 15-AUG-13 09:02 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1341687

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

Paul Nicolas
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1341687-1 ARV-2							
Sampled By: CLIENT on 31-JUL-13 @ 16:05							
Matrix: Eff							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		02-AUG-13	R2666791
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		06-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		02-AUG-13	R2666791
Miscellaneous Parameters							
Ammonia, Total (as N)	3.69	DLA	0.10	mg/L		06-AUG-13	R2667383
Biochemical Oxygen Demand	24.9		6.0	mg/L		02-AUG-13	R2667237
Conductivity	2370		20	umhos/cm		02-AUG-13	R2665584
Fecal Coliforms	9		3	MPN/100mL		02-AUG-13	R2667219
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	09-AUG-13	09-AUG-13	R2669217
Oil and Grease, Total	<2.0		2.0	mg/L	07-AUG-13	07-AUG-13	R2668652
Phenols (4AAP)	0.0014		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667862
Sulfate	439		2.5	mg/L		02-AUG-13	R2666791
Total Suspended Solids	62.0		5.0	mg/L		02-AUG-13	R2666381
pH	8.16		0.10	pH units		02-AUG-13	R2665584
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0119		0.0050	mg/L	06-AUG-13	06-AUG-13	R2667048
Antimony (Sb)-Total	0.00969		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Arsenic (As)-Total	0.00528		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Barium (Ba)-Total	0.0716		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Boron (B)-Total	1.4	DLA	1.0	mg/L	06-AUG-13	07-AUG-13	R2667800
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	06-AUG-13	06-AUG-13	R2667048
Calcium (Ca)-Total	249	DLA	10	mg/L	06-AUG-13	07-AUG-13	R2667800
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Chromium (Cr)-Total	0.0013		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Cobalt (Co)-Total	0.00063		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Copper (Cu)-Total	0.00108		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Iron (Fe)-Total	0.26		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Lead (Pb)-Total	0.000159		0.000090	mg/L	06-AUG-13	06-AUG-13	R2667048
Lithium (Li)-Total	0.0364		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Magnesium (Mg)-Total	47.5		0.010	mg/L	06-AUG-13	06-AUG-13	R2667048
Manganese (Mn)-Total	0.556	DLA	0.030	mg/L	06-AUG-13	07-AUG-13	R2667800
Molybdenum (Mo)-Total	0.00028		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Nickel (Ni)-Total	0.0057		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Phosphorus (P)-Total	2.08		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Potassium (K)-Total	48.4	DLA	2.0	mg/L	06-AUG-13	07-AUG-13	R2667800
Rubidium (Rb)-Total	0.0471		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Selenium (Se)-Total	<0.0010		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Silicon (Si)-Total	8.92		0.050	mg/L	06-AUG-13	06-AUG-13	R2667048
Silver (Ag)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Sodium (Na)-Total	268	DLA	3.0	mg/L	06-AUG-13	07-AUG-13	R2667800
Strontium (Sr)-Total	1.87	DLA	0.010	mg/L	06-AUG-13	07-AUG-13	R2667800
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Thorium (Th)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Tin (Sn)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Titanium (Ti)-Total	0.00861		0.00050	mg/L	06-AUG-13	06-AUG-13	R2667048

* 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
L1341687-1 ARV-2							
Sampled By: CLIENT on 31-JUL-13 @ 16:05							
Matrix: Eff							
Total Metals by ICP-MS							
Tungsten (W)-Total	0.00018		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Uranium (U)-Total	0.00043		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Vanadium (V)-Total	0.00077		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zinc (Zn)-Total	0.0106		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zirconium (Zr)-Total	0.00047		0.00040	mg/L	06-AUG-13	06-AUG-13	R2667048
L1341687-2 ARV-4							
Sampled By: CLIENT on 31-JUL-13 @ 15:50							
Matrix: Eff							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	0.379		0.050	mg/L		02-AUG-13	R2666791
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.605		0.071	mg/L		06-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.226		0.050	mg/L		02-AUG-13	R2666791
Miscellaneous Parameters							
Ammonia, Total (as N)	31.7	DLA	1.0	mg/L		13-AUG-13	R2671680
Biochemical Oxygen Demand	79		20	mg/L		02-AUG-13	R2667237
Conductivity	810		20	umhos/cm		02-AUG-13	R2665584
Fecal Coliforms	2300		3	MPN/100mL		02-AUG-13	R2667219
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	09-AUG-13	09-AUG-13	R2669217
Oil and Grease, Total	2.0		2.0	mg/L	07-AUG-13	07-AUG-13	R2668652
Phenols (4AAP)	<0.005	DLM	0.0050	mg/L	08-AUG-13	08-AUG-13	R2668743
Sulfate	5.06		0.50	mg/L		02-AUG-13	R2666791
Total Suspended Solids	150		5.0	mg/L		02-AUG-13	R2666381
pH	7.95		0.10	pH units		02-AUG-13	R2665584
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.191		0.0050	mg/L	06-AUG-13	06-AUG-13	R2667048
Antimony (Sb)-Total	0.00049		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Arsenic (As)-Total	0.0103		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Barium (Ba)-Total	0.0307		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Bismuth (Bi)-Total	0.00023		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Boron (B)-Total	0.213		0.010	mg/L	06-AUG-13	06-AUG-13	R2667048
Cadmium (Cd)-Total	0.000078		0.000010	mg/L	06-AUG-13	06-AUG-13	R2667048
Calcium (Ca)-Total	18.2		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Chromium (Cr)-Total	0.0014		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Cobalt (Co)-Total	0.00237		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Copper (Cu)-Total	0.0401		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Iron (Fe)-Total	4.55		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Lead (Pb)-Total	0.00185		0.000090	mg/L	06-AUG-13	06-AUG-13	R2667048
Lithium (Li)-Total	0.0059		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Magnesium (Mg)-Total	9.78		0.010	mg/L	06-AUG-13	06-AUG-13	R2667048
Manganese (Mn)-Total	0.271		0.00030	mg/L	06-AUG-13	06-AUG-13	R2667048
Molybdenum (Mo)-Total	0.00086		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Nickel (Ni)-Total	0.0102		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Phosphorus (P)-Total	9.96		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Potassium (K)-Total	28.7		0.020	mg/L	06-AUG-13	06-AUG-13	R2667048
Rubidium (Rb)-Total	0.0297		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048

* 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
L1341687-2 ARV-4							
Sampled By: CLIENT on 31-JUL-13 @ 15:50							
Matrix: Eff							
Total Metals by ICP-MS							
Selenium (Se)-Total	<0.0010		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Silicon (Si)-Total	4.37		0.050	mg/L	06-AUG-13	06-AUG-13	R2667048
Silver (Ag)-Total	0.00033		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Sodium (Na)-Total	77.9	DLA	3.0	mg/L	06-AUG-13	07-AUG-13	R2667800
Strontium (Sr)-Total	0.210		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Thorium (Th)-Total	0.00013		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Tin (Sn)-Total	0.00059		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Titanium (Ti)-Total	0.0106		0.00050	mg/L	06-AUG-13	06-AUG-13	R2667048
Tungsten (W)-Total	0.00021		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Uranium (U)-Total	0.00049		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Vanadium (V)-Total	0.00714		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zinc (Zn)-Total	0.0365		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zirconium (Zr)-Total	0.00057		0.00040	mg/L	06-AUG-13	06-AUG-13	R2667048
L1341687-3 ARV-5							
Sampled By: CLIENT on 31-JUL-13 @ 16:15							
Matrix: Eff							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		02-AUG-13	R2666791
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		06-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		02-AUG-13	R2666791
Miscellaneous Parameters							
Ammonia, Total (as N)	0.068		0.010	mg/L		06-AUG-13	R2667383
Biochemical Oxygen Demand	<6.0		6.0	mg/L		02-AUG-13	R2667237
Conductivity	2080		20	umhos/cm		02-AUG-13	R2665584
Fecal Coliforms	93		3	MPN/100mL		02-AUG-13	R2667219
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	09-AUG-13	09-AUG-13	R2669217
Oil and Grease, Total	<2.0		2.0	mg/L	07-AUG-13	07-AUG-13	R2668652
Phenols (4AAP)	<0.0010		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667862
Sulfate	8.6		2.5	mg/L		02-AUG-13	R2666791
Total Suspended Solids	50.0		5.0	mg/L		02-AUG-13	R2666381
pH	7.11		0.10	pH units		02-AUG-13	R2665584
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.123		0.0050	mg/L	06-AUG-13	06-AUG-13	R2667048
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Arsenic (As)-Total	0.00206		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Barium (Ba)-Total	0.0653		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Boron (B)-Total	0.173		0.010	mg/L	06-AUG-13	06-AUG-13	R2667048
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	06-AUG-13	06-AUG-13	R2667048
Calcium (Ca)-Total	40.7		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Cobalt (Co)-Total	0.00029		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Copper (Cu)-Total	0.00102		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048

* 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
L1341687-3 ARV-5							
Sampled By: CLIENT on 31-JUL-13 @ 16:15							
Matrix: Eff							
Total Metals by ICP-MS							
Iron (Fe)-Total	6.39		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Lead (Pb)-Total	0.000461		0.000090	mg/L	06-AUG-13	06-AUG-13	R2667048
Lithium (Li)-Total	0.0147		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Magnesium (Mg)-Total	50.1		0.010	mg/L	06-AUG-13	06-AUG-13	R2667048
Manganese (Mn)-Total	0.168		0.00030	mg/L	06-AUG-13	06-AUG-13	R2667048
Molybdenum (Mo)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Phosphorus (P)-Total	0.12		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Potassium (K)-Total	12.9		0.020	mg/L	06-AUG-13	06-AUG-13	R2667048
Rubidium (Rb)-Total	0.00873		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Selenium (Se)-Total	<0.0010		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Silicon (Si)-Total	2.34		0.050	mg/L	06-AUG-13	06-AUG-13	R2667048
Silver (Ag)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Sodium (Na)-Total	350	DLA	3.0	mg/L	06-AUG-13	07-AUG-13	R2667800
Strontium (Sr)-Total	0.409		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Thorium (Th)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Tin (Sn)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Titanium (Ti)-Total	0.00866		0.00050	mg/L	06-AUG-13	06-AUG-13	R2667048
Tungsten (W)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Uranium (U)-Total	0.00012		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Vanadium (V)-Total	0.00044		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zinc (Zn)-Total	0.0054		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zirconium (Zr)-Total	<0.00040		0.00040	mg/L	06-AUG-13	06-AUG-13	R2667048
L1341687-4 ARV-6							
Sampled By: CLIENT on 31-JUL-13 @ 15:31							
Matrix: Eff							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		02-AUG-13	R2666791
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		06-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		02-AUG-13	R2666791
Miscellaneous Parameters							
Ammonia, Total (as N)	0.245		0.010	mg/L		06-AUG-13	R2667383
Biochemical Oxygen Demand	<6.0		6.0	mg/L		02-AUG-13	R2667237
Conductivity	543		20	umhos/cm		02-AUG-13	R2665584
Fecal Coliforms	<3		3	MPN/100mL		02-AUG-13	R2667219
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	09-AUG-13	09-AUG-13	R2669217
Oil and Grease, Total	<2.0		2.0	mg/L	07-AUG-13	07-AUG-13	R2668652
Phenols (4AAP)	0.0013		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667862
Sulfate	<0.50		0.50	mg/L		02-AUG-13	R2666791
Total Suspended Solids	116		5.0	mg/L		02-AUG-13	R2666381
pH	6.39		0.10	pH units		02-AUG-13	R2665584
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.175		0.0050	mg/L	06-AUG-13	06-AUG-13	R2667048
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Arsenic (As)-Total	0.00152		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048

* 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
L1341687-4 ARV-6							
Sampled By: CLIENT on 31-JUL-13 @ 15:31							
Matrix: Eff							
Total Metals by ICP-MS							
Barium (Ba)-Total	0.111		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Boron (B)-Total	0.050		0.010	mg/L	06-AUG-13	06-AUG-13	R2667048
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	06-AUG-13	06-AUG-13	R2667048
Calcium (Ca)-Total	28.9		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Chromium (Cr)-Total	0.0018		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Cobalt (Co)-Total	0.00205		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Copper (Cu)-Total	0.00151		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Iron (Fe)-Total	36.4		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Lead (Pb)-Total	0.000354		0.000090	mg/L	06-AUG-13	06-AUG-13	R2667048
Lithium (Li)-Total	0.0061		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Magnesium (Mg)-Total	9.90		0.010	mg/L	06-AUG-13	06-AUG-13	R2667048
Manganese (Mn)-Total	1.64	DLA	0.030	mg/L	06-AUG-13	07-AUG-13	R2667800
Molybdenum (Mo)-Total	0.00027		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Phosphorus (P)-Total	0.12		0.10	mg/L	06-AUG-13	06-AUG-13	R2667048
Potassium (K)-Total	1.72		0.020	mg/L	06-AUG-13	06-AUG-13	R2667048
Rubidium (Rb)-Total	0.00471		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Selenium (Se)-Total	<0.0010		0.0010	mg/L	06-AUG-13	06-AUG-13	R2667048
Silicon (Si)-Total	2.94		0.050	mg/L	06-AUG-13	06-AUG-13	R2667048
Silver (Ag)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Sodium (Na)-Total	66.6	DLA	3.0	mg/L	06-AUG-13	07-AUG-13	R2667800
Strontium (Sr)-Total	0.179		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Thorium (Th)-Total	0.00015		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Tin (Sn)-Total	<0.00020		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Titanium (Ti)-Total	0.0121		0.00050	mg/L	06-AUG-13	06-AUG-13	R2667048
Tungsten (W)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Uranium (U)-Total	<0.00010		0.00010	mg/L	06-AUG-13	06-AUG-13	R2667048
Vanadium (V)-Total	0.00191		0.00020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zinc (Zn)-Total	0.0977		0.0020	mg/L	06-AUG-13	06-AUG-13	R2667048
Zirconium (Zr)-Total	0.00055		0.00040	mg/L	06-AUG-13	06-AUG-13	R2667048

* 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 For 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**
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.			
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.			
FC-MPN-WP	Water	Fecal Coliform	APHA 9221A-C
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	U.S. EPA 200.8-TL
Total Metals by ICP-MS: This analysis is carried out using sample preparation procedures adapted from Standard Methods for the examination of Water and Wastewater Method 3030E and analytical procedures adapted from U.S EPA Method 200.8 for analyis of metals by inductively coupled-mass spectrometery.			
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-WP	Water	Nitrite as N by Ion Chromatography	EPA 300.1 (modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
NO3-IC-WP	Water	Nitrate as N by Ion Chromatography	EPA 300.1 (modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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.			
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-WP	Water	Sulfate by Ion Chromatography	EPA 300.1 (modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

ALS Environmental

Chain of Custody / Analytical Request Form

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

L1341687-COFC

L1341687

COC # _____

Page 1 of 1

Report To				Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	HAMLET OF ARVIAT (W1057							◉ Regular (Standard Turnaround Times - Business Days)
Contact:	ED MURPHY			☒ PDF	☐ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 150			Email 1:	arviatsao@qiniq.com			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	ARVIAT, NUNAVUT, XOC 0E0			Email 2:				○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-857-2841	Fax:		Email 3:				
Invoice To	Same as Report ?	☒ Yes	☐ No	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?		☐ Yes	☒ No	Job #:	HAMLET OF ARVIAT WWTP			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q30948			
Lab Work Order # (lab use only)				ALS Contact:		Sampler:		

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BOD-WP	TSS	EC-WP	PH-WP	SO4-IC-WP	ANIONS-N2N3-IC-WP	NH3-0COL-WP	FECAL COLIFORM (FC-MP)	MET-T-L-MS-WP	HG-T-CVAF-WP	OGG-TOT-WT	PHENOLS-4AAP-WT	Number of Containers
	ARV-2	31-07-13	4:05 pm	E F F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-4	31-07-13	3:50 pm	E F F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-5	31-07-13	4:15 pm	E F F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ARV-6	31-07-13	3:31 pm	E F F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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
	31-07-13		TT	01/08/2013	11:45AM	9 °C				

GENF 18.01 Front

Hamlet of Arviat
ATTN: ED MURPHY
PO Box 150
Arviat NU X0C 0E0

Date Received: 21-AUG-13
Report Date: 03-SEP-13 12:34 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1351289

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

Paul Nicolas
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1351289-1 ARV 2							
Sampled By: CLIENT on 20-AUG-13 @ 09:06							
Matrix: EFFLUENT							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		22-AUG-13	R2679780
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		26-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		22-AUG-13	R2679780
Miscellaneous Parameters							
Ammonia, Total (as N)	0.065		0.010	mg/L		22-AUG-13	R2678233
Biochemical Oxygen Demand	<6.0		6.0	mg/L		22-AUG-13	R2680412
Conductivity	3020		20	umhos/cm		22-AUG-13	R2678122
Fecal Coliforms	930		3	MPN/100mL		22-AUG-13	R2681336
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	28-AUG-13	28-AUG-13	R2681294
Oil and Grease, Total	<2.0		2.0	mg/L	23-AUG-13	23-AUG-13	R2679371
Phenols (4AAP)	<0.0010		0.0010	mg/L	27-AUG-13	27-AUG-13	R2680612
Sulfate	449		2.5	mg/L		22-AUG-13	R2679780
Total Suspended Solids	26.0		5.0	mg/L		23-AUG-13	R2679665
pH	7.96		0.10	pH units		22-AUG-13	R2678122
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0169		0.0050	mg/L	23-AUG-13	23-AUG-13	R2679374
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Arsenic (As)-Total	0.00036		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Barium (Ba)-Total	0.0674		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Boron (B)-Total	0.044		0.010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	23-AUG-13	23-AUG-13	R2679374
Calcium (Ca)-Total	29.0		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cobalt (Co)-Total	0.00052		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Copper (Cu)-Total	0.00094		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Iron (Fe)-Total	1.34		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Lead (Pb)-Total	<0.000090		0.000090	mg/L	23-AUG-13	23-AUG-13	R2679374
Lithium (Li)-Total	0.0072		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Magnesium (Mg)-Total	10.7		0.010	mg/L	23-AUG-13	23-AUG-13	R2679374
Manganese (Mn)-Total	1.11	DLA	0.030	mg/L	23-AUG-13	26-AUG-13	R2680182
Molybdenum (Mo)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Phosphorus (P)-Total	<0.10		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Potassium (K)-Total	7.84		0.020	mg/L	23-AUG-13	23-AUG-13	R2679374
Rubidium (Rb)-Total	0.00955		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Selenium (Se)-Total	<0.0010		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Silicon (Si)-Total	2.73		0.050	mg/L	23-AUG-13	23-AUG-13	R2679374
Silver (Ag)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Sodium (Na)-Total	75.3	DLA	3.0	mg/L	23-AUG-13	26-AUG-13	R2680182
Strontium (Sr)-Total	0.179		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Thorium (Th)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Tin (Sn)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Titanium (Ti)-Total	0.00114		0.00050	mg/L	23-AUG-13	23-AUG-13	R2679374

* 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
L1351289-1 ARV 2							
Sampled By: CLIENT on 20-AUG-13 @ 09:06							
Matrix: EFFLUENT							
Total Metals by ICP-MS							
Tungsten (W)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Uranium (U)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Vanadium (V)-Total	0.00042		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zinc (Zn)-Total	0.0473		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zirconium (Zr)-Total	<0.00040		0.00040	mg/L	23-AUG-13	23-AUG-13	R2679374
L1351289-2 ARV 4							
Sampled By: CLIENT on 20-AUG-13 @ 10:10							
Matrix: EFFLUENT							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	1.00		0.050	mg/L		22-AUG-13	R2679780
Nitrate+Nitrite							
Nitrate and Nitrite as N	1.39		0.071	mg/L		26-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.388		0.050	mg/L		22-AUG-13	R2679780
Miscellaneous Parameters							
Ammonia, Total (as N)	17.9	DLA	1.0	mg/L		23-AUG-13	R2679432
Biochemical Oxygen Demand	80.1		6.0	mg/L		22-AUG-13	R2680412
Conductivity	832		20	umhos/cm		22-AUG-13	R2678122
Fecal Coliforms	2300		3	MPN/100mL		22-AUG-13	R2681336
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	28-AUG-13	28-AUG-13	R2681294
Oil and Grease, Total	2.2		2.0	mg/L	23-AUG-13	23-AUG-13	R2679371
Phenols (4AAP)	<0.005	DLM	0.0050	mg/L	27-AUG-13	27-AUG-13	R2680612
Sulfate	7.67		0.50	mg/L		22-AUG-13	R2679780
Total Suspended Solids	118		5.0	mg/L		23-AUG-13	R2679665
pH	7.43		0.10	pH units		22-AUG-13	R2678122
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.154		0.0050	mg/L	23-AUG-13	23-AUG-13	R2679374
Antimony (Sb)-Total	0.00036		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Arsenic (As)-Total	0.00918		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Barium (Ba)-Total	0.0235		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Boron (B)-Total	0.208		0.010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cadmium (Cd)-Total	0.000056		0.000010	mg/L	23-AUG-13	23-AUG-13	R2679374
Calcium (Ca)-Total	20.7		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Chromium (Cr)-Total	0.0012		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cobalt (Co)-Total	0.00207		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Copper (Cu)-Total	0.0256		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Iron (Fe)-Total	3.65		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Lead (Pb)-Total	0.00125		0.000090	mg/L	23-AUG-13	23-AUG-13	R2679374
Lithium (Li)-Total	0.0060		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Magnesium (Mg)-Total	12.2		0.010	mg/L	23-AUG-13	23-AUG-13	R2679374
Manganese (Mn)-Total	0.284		0.00030	mg/L	23-AUG-13	23-AUG-13	R2679374
Molybdenum (Mo)-Total	0.00083		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Nickel (Ni)-Total	0.0089		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Phosphorus (P)-Total	8.32		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Potassium (K)-Total	33.4		0.020	mg/L	23-AUG-13	23-AUG-13	R2679374
Rubidium (Rb)-Total	0.0304		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374

* 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
L1351289-2 ARV 4							
Sampled By: CLIENT on 20-AUG-13 @ 10:10							
Matrix: EFFLUENT							
Total Metals by ICP-MS							
Selenium (Se)-Total	<0.0010		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Silicon (Si)-Total	5.91		0.050	mg/L	23-AUG-13	23-AUG-13	R2679374
Silver (Ag)-Total	0.00018		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Sodium (Na)-Total	97.3	DLA	3.0	mg/L	23-AUG-13	26-AUG-13	R2680182
Strontium (Sr)-Total	0.233		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Thorium (Th)-Total	0.00011		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Tin (Sn)-Total	0.00047		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Titanium (Ti)-Total	0.00871		0.00050	mg/L	23-AUG-13	23-AUG-13	R2679374
Tungsten (W)-Total	0.00020		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Uranium (U)-Total	0.00042		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Vanadium (V)-Total	0.00624		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zinc (Zn)-Total	0.0312		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zirconium (Zr)-Total	0.00064		0.00040	mg/L	23-AUG-13	23-AUG-13	R2679374
L1351289-3 ARV 5							
Sampled By: CLIENT on 20-AUG-13 @ 10:13							
Matrix: EFFLUENT							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		22-AUG-13	R2679780
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		26-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		22-AUG-13	R2679780
Miscellaneous Parameters							
Ammonia, Total (as N)	0.012		0.010	mg/L		22-AUG-13	R2678233
Biochemical Oxygen Demand	<6.0		6.0	mg/L		22-AUG-13	R2680412
Conductivity	1770		20	umhos/cm		22-AUG-13	R2678122
Fecal Coliforms	430		3	MPN/100mL		22-AUG-13	R2681336
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	28-AUG-13	28-AUG-13	R2681294
Oil and Grease, Total	<2.0		2.0	mg/L	23-AUG-13	23-AUG-13	R2679371
Phenols (4AAP)	<0.0010		0.0010	mg/L	27-AUG-13	27-AUG-13	R2680612
Sulfate	6.3		2.5	mg/L		22-AUG-13	R2679780
Total Suspended Solids	16.0		5.0	mg/L		23-AUG-13	R2679665
pH	6.88		0.10	pH units		22-AUG-13	R2678122
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0372		0.0050	mg/L	23-AUG-13	23-AUG-13	R2679374
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Arsenic (As)-Total	0.00099		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Barium (Ba)-Total	0.0701		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Boron (B)-Total	0.091		0.010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	23-AUG-13	23-AUG-13	R2679374
Calcium (Ca)-Total	39.9		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cobalt (Co)-Total	0.00030		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Copper (Cu)-Total	0.00052		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374

* 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
L1351289-3 ARV 5							
Sampled By: CLIENT on 20-AUG-13 @ 10:13							
Matrix: EFFLUENT							
Total Metals by ICP-MS							
Iron (Fe)-Total	5.69		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Lead (Pb)-Total	<0.000090		0.000090	mg/L	23-AUG-13	23-AUG-13	R2679374
Lithium (Li)-Total	0.0141		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Magnesium (Mg)-Total	31.9		0.010	mg/L	23-AUG-13	23-AUG-13	R2679374
Manganese (Mn)-Total	0.256		0.00030	mg/L	23-AUG-13	23-AUG-13	R2679374
Molybdenum (Mo)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Phosphorus (P)-Total	<0.10		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Potassium (K)-Total	12.0		0.020	mg/L	23-AUG-13	23-AUG-13	R2679374
Rubidium (Rb)-Total	0.0104		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Selenium (Se)-Total	0.0013		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Silicon (Si)-Total	2.94		0.050	mg/L	23-AUG-13	23-AUG-13	R2679374
Silver (Ag)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Sodium (Na)-Total	275	DLA	3.0	mg/L	23-AUG-13	26-AUG-13	R2680182
Strontium (Sr)-Total	0.347		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Thorium (Th)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Tin (Sn)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Titanium (Ti)-Total	0.00272		0.00050	mg/L	23-AUG-13	23-AUG-13	R2679374
Tungsten (W)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Uranium (U)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Vanadium (V)-Total	0.00028		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zinc (Zn)-Total	0.0102		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zirconium (Zr)-Total	<0.00040		0.00040	mg/L	23-AUG-13	23-AUG-13	R2679374
L1351289-4 ARV 6							
Sampled By: CLIENT on 20-AUG-13 @ 10:30							
Matrix: EFFLUENT							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		22-AUG-13	R2679780
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		26-AUG-13	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		22-AUG-13	R2679780
Miscellaneous Parameters							
Ammonia, Total (as N)	10.1	DLA	1.0	mg/L		23-AUG-13	R2679432
Biochemical Oxygen Demand	<6.0		6.0	mg/L		22-AUG-13	R2680412
Conductivity	634		20	umhos/cm		22-AUG-13	R2678122
Fecal Coliforms	See Below.	NDLA	3	MPN/100mL		22-AUG-13	R2683125
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	28-AUG-13	28-AUG-13	R2681294
Oil and Grease, Total	<2.0		2.0	mg/L	23-AUG-13	23-AUG-13	R2679371
Phenols (4AAP)	<0.0010		0.0010	mg/L	27-AUG-13	27-AUG-13	R2680612
Sulfate	9.84		0.50	mg/L		22-AUG-13	R2679780
Total Suspended Solids	9.0		5.0	mg/L		23-AUG-13	R2679665
pH	6.57		0.10	pH units		22-AUG-13	R2678122
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0136		0.0050	mg/L	23-AUG-13	23-AUG-13	R2679374
Antimony (Sb)-Total	0.00744		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Arsenic (As)-Total	0.00445		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374

* 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
L1351289-4 ARV 6							
Sampled By: CLIENT on 20-AUG-13 @ 10:30							
Matrix: EFFLUENT							
Total Metals by ICP-MS							
Barium (Ba)-Total	0.0853		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Boron (B)-Total	1.21		0.010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cadmium (Cd)-Total	0.000012		0.000010	mg/L	23-AUG-13	23-AUG-13	R2679374
Calcium (Ca)-Total	265	DLA	10	mg/L	23-AUG-13	26-AUG-13	R2680182
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Chromium (Cr)-Total	0.0011		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Cobalt (Co)-Total	0.00055		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Copper (Cu)-Total	0.00064		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Iron (Fe)-Total	0.24		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Lead (Pb)-Total	0.000112		0.000090	mg/L	23-AUG-13	23-AUG-13	R2679374
Lithium (Li)-Total	0.0388		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Magnesium (Mg)-Total	66.2	DLA	1.0	mg/L	23-AUG-13	26-AUG-13	R2680182
Manganese (Mn)-Total	0.815	DLA	0.030	mg/L	23-AUG-13	26-AUG-13	R2680182
Molybdenum (Mo)-Total	0.00029		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Phosphorus (P)-Total	2.36		0.10	mg/L	23-AUG-13	23-AUG-13	R2679374
Potassium (K)-Total	56.9	DLA	2.0	mg/L	23-AUG-13	26-AUG-13	R2680182
Rubidium (Rb)-Total	0.0486		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Selenium (Se)-Total	<0.0010		0.0010	mg/L	23-AUG-13	23-AUG-13	R2679374
Silicon (Si)-Total	13.2		0.050	mg/L	23-AUG-13	23-AUG-13	R2679374
Silver (Ag)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Sodium (Na)-Total	345	DLA	3.0	mg/L	23-AUG-13	26-AUG-13	R2680182
Strontium (Sr)-Total	1.87	DLA	0.010	mg/L	23-AUG-13	26-AUG-13	R2680182
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Thorium (Th)-Total	<0.00010		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Tin (Sn)-Total	<0.00020		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Titanium (Ti)-Total	0.0106		0.00050	mg/L	23-AUG-13	23-AUG-13	R2679374
Tungsten (W)-Total	0.00014		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Uranium (U)-Total	0.00036		0.00010	mg/L	23-AUG-13	23-AUG-13	R2679374
Vanadium (V)-Total	0.00050		0.00020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zinc (Zn)-Total	0.0143		0.0020	mg/L	23-AUG-13	23-AUG-13	R2679374
Zirconium (Zr)-Total	0.00045		0.00040	mg/L	23-AUG-13	23-AUG-13	R2679374

* 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 For Sample Matrix Effects
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
NDLA	No Data: Sample spoiled in Laboratory Accident

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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.			
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.			
FC-MPN-WP	Water	Fecal Coliform	APHA 9221A-C
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	U.S. EPA 200.8-TL
Total Metals by ICP-MS: This analysis is carried out using sample preparation procedures adapted from Standard Methods for the examination of Water and Wastewater Method 3030E and analytical procedures adapted from U.S EPA Method 200.8 for analyis of metals by inductively coupled-mass spectrometery.			
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-WP	Water	Nitrite as N by Ion Chromatography	EPA 300.1 (modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
NO3-IC-WP	Water	Nitrate as N by Ion Chromatography	EPA 300.1 (modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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.			
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-WP	Water	Sulfate by Ion Chromatography	EPA 300.1 (modified)
Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.			
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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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.

ALS Environmental

L1351289-COFC

COC # _____

Page 1 of 1

Report To		Re	Service Requested (Rush for routine analysis subject to availability)
Company:	HAMLET OF ARVIAT (W10578)	☑	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	ED MURPHY	☐ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 150	Email 1: arviatsao@qiniq.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	ARVIAT, NUNAVUT, XOC 0E0	Email 2:	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-857-2841 Fax:	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: HAMLET OF ARVIAT WWTP	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q30948	
Lab Work Order # (lab use only)		ALS Contact:	Sampler:

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BOD-WP	TSS	EC-WP	PH-WP	SO4-IC-WP	ANIONS-N2N3-IC-WP	NH3-0COL-WP	FECAL COLIFORM (FC-MP)	MET-T-L-MS-WP	HG-T-CVAF-WP	OGG-TOT-WT	PHENOLS-4AAP-WT	Number of Containers
	ARV 2	20-08-13	9:00	EFF	x	x	x	x	x	x	x	x	x	x	x	x	
	ARV 4	20-08-13	19:10	EFF	x	x	x	x	x	x	x	x	x	x	x	x	
	ARV 5	20-08-13	10:13	EFF	x	x	x	x	x	x	x	x	x	x	x	x	
	ARV 6	20-08-13	10:30	EFF	x	x	x	x	x	x	x	x	x	x	x	x	

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

Bottles Required per sample: 500 ml BOD, 500 ml Routine, 250 ml Nutrient + H2SO4 pres, 125 ml Sterile Bacti, 250 ml Metals + HNO3 pres, 40 ml glass vial Mercury + HCL, 1 L Amber W/M Oil & Grease, 250 ml Amber Phenols + H2SO4

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
	20-08-13	11:05		21/8/2013	4:00pm	6 °C				

GENF 18.01 Front