



Phyllis Beaulieu
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Nunavut Water Board
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Date: March 28th 2013

RE: Water License 3AM-ARV1015 Hamlet of Arviat Annual Report 2013

Good afternoon Phyllis,

Please find attached the annual report for the above mentioned license, you will also find attachments with respect to the sample results as well as any other related information pertaining to the license requirements.

Please contact me should you have any questions, comments, or concerns.

Thanks

Jason Tologanak
Regional Director, Kivalliq Region
Community & Government Services
Rankin Inlet, Nunavut
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ANNUAL REPORT FOR THE MUNICIPALITY OF ARVIAT, 2012

YEAR BEING REPORTED: 2012

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence **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	7,078,475	Same
February	6,190,281	Same
March	6,510,132	Same
April	6,425,326	Same
May	6,716,753	Same
June	6,711,866	Same
July	6,942,288	Same
August	6,958,759	Same
September	6,408,559	Same
October	7,067,565	Same
November	6,699,165	Same
December	6,891,315	Same
ANNUAL TOTAL	80,600,484	Same

ANNUAL REPORT FOR THE MUNICIPALITY OF ARVIAT, 2012

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 2012
 - 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;
- No unauthorized discharge occurred from the Sewage Lagoon.

Spills:

Arviat house of Sam Alagalak, Sewage spill, 400L, dated 2/21/2012, #2012033

House 571, Heating Fuel, 60L, dated 4/3/2012, # 2012125

Arviat, P-50, 10L, dated 5/1/2012, # 3 201280

Hamlet Garage, P-50/EK-35, 100L, dated 6/12/2012, #2012232

Arviat, Fuel oil, 92L, dated 6/25/2012, # 2012263

Shared Child Care building, Sewage, 400L, dated 11/13/2012, # 2012442

- 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 2012 and none planned for 2013

- 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.

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William Engineering Ltd is conducting Bathymetric surveys 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 analysed from the sewage lagoon as required by the licence. Weekly water sample results that are collected and submitted to test for total coliform and E.coli are available upon request.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

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

The 2012 Lab Test Results are attached:



L1181680_COA.PDF



L1164572_COA.PDF



L1210579_COA.PDF



L1193722_COA.PDF



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

Date Received: 20-JUL-12
Report Date: 10-AUG-12 07:57 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1181680
Project P.O. #: NOT SUBMITTED
Job Reference: HAMLET OF ARVIAT WWTP
C of C Numbers:
Legal Site Desc:

Paul Nicolas
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1181680-1 ARV 2							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	0.29		0.25	mg/L		23-JUL-12	R2405585
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		26-JUL-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		23-JUL-12	R2405585
Miscellaneous Parameters							
Ammonia, Total (as N)	0.84	DLA	0.10	mg/L		02-AUG-12	R2410466
Biochemical Oxygen Demand	15.0		6.0	mg/L	20-JUL-12	25-JUL-12	R2404413
Conductivity	1580		20	umhos/cm		20-JUL-12	R2402424
Fecal Coliforms	430		3	MPN/100mL		25-JUL-12	R2404537
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	27-JUL-12	27-JUL-12	R2406740
Oil and Grease, Total	<2.0		2.0	mg/L	26-JUL-12	26-JUL-12	R2406240
Phenols (4AAP)	0.0010		0.0010	mg/L	25-JUL-12	25-JUL-12	R2405565
Sulfate	509		2.5	mg/L		23-JUL-12	R2405585
Total Suspended Solids	33.0		5.0	mg/L		23-JUL-12	R2404003
pH	8.16		0.10	pH units		20-JUL-12	R2402424
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.050	DLM	0.050	mg/L	26-JUL-12	26-JUL-12	R2406186
Antimony (Sb)-Total	0.0074	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Arsenic (As)-Total	0.0030	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Barium (Ba)-Total	0.0438	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Boron (B)-Total	1.49	DLM	0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Cadmium (Cd)-Total	<0.00010	DLM	0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Calcium (Ca)-Total	217	DLM	1.0	mg/L	26-JUL-12	26-JUL-12	R2406186
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Cobalt (Co)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Copper (Cu)-Total	0.0030	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Iron (Fe)-Total	<1.0	DLM	1.0	mg/L	26-JUL-12	26-JUL-12	R2406186
Lead (Pb)-Total	<0.00090	DLM	0.00090	mg/L	26-JUL-12	26-JUL-12	R2406186
Lithium (Li)-Total	0.031	DLM	0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Magnesium (Mg)-Total	52.1	DLM	0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Manganese (Mn)-Total	0.419	DLM	0.0030	mg/L	26-JUL-12	26-JUL-12	R2406186
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Phosphorus (P)-Total	<1.0	DLM	1.0	mg/L	26-JUL-12	26-JUL-12	R2406186
Potassium (K)-Total	40.4	DLM	0.20	mg/L	26-JUL-12	26-JUL-12	R2406186
Rubidium (Rb)-Total	0.0366	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Silicon (Si)-Total	5.65	DLM	0.50	mg/L	26-JUL-12	26-JUL-12	R2406186
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Sodium (Na)-Total	218	DLM	0.30	mg/L	26-JUL-12	26-JUL-12	R2406186
Strontium (Sr)-Total	1.59	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tin (Sn)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Titanium (Ti)-Total	0.0111	DLM	0.0050	mg/L	26-JUL-12	26-JUL-12	R2406186

* 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
L1181680-1 ARV 2							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Total Metals by ICP-MS							
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Uranium (U)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Vanadium (V)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zinc (Zn)-Total	0.024	DLM	0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	26-JUL-12	26-JUL-12	R2406186
L1181680-2 ARV 4							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	0.110		0.050	mg/L		23-JUL-12	R2405585
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.165		0.071	mg/L		26-JUL-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.055		0.050	mg/L		23-JUL-12	R2405585
Miscellaneous Parameters							
Ammonia, Total (as N)	41.6	DLA	1.0	mg/L		07-AUG-12	R2412351
Biochemical Oxygen Demand	180		6.0	mg/L	20-JUL-12	25-JUL-12	R2404413
Conductivity	698		20	umhos/cm		20-JUL-12	R2402424
Fecal Coliforms	9300		3	MPN/100mL		25-JUL-12	R2404537
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	02-AUG-12	02-AUG-12	R2413183
Oil and Grease, Total	<6.0	DLIV	6.0	mg/L	26-JUL-12	26-JUL-12	R2406240
Phenols (4AAP)	<0.01	DLM	0.010	mg/L	25-JUL-12	25-JUL-12	R2405565
Sulfate	2.21		0.50	mg/L		23-JUL-12	R2405585
Total Suspended Solids	503		5.0	mg/L		23-JUL-12	R2404003
pH	7.84		0.10	pH units		20-JUL-12	R2402424
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.593	DLM	0.050	mg/L	26-JUL-12	26-JUL-12	R2406186
Antimony (Sb)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Arsenic (As)-Total	0.0100	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Barium (Ba)-Total	0.101	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Boron (B)-Total	0.25	DLM	0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Cadmium (Cd)-Total	0.00025	DLM	0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Calcium (Ca)-Total	20.0	DLM	1.0	mg/L	26-JUL-12	26-JUL-12	R2406186
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Cobalt (Co)-Total	0.0038	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Copper (Cu)-Total	0.149	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Iron (Fe)-Total	14.0	DLM	1.0	mg/L	26-JUL-12	26-JUL-12	R2406186
Lead (Pb)-Total	0.00575	DLM	0.00090	mg/L	26-JUL-12	26-JUL-12	R2406186
Lithium (Li)-Total	<0.020	DLM	0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Magnesium (Mg)-Total	10.5	DLM	0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Manganese (Mn)-Total	0.587	DLM	0.0030	mg/L	26-JUL-12	26-JUL-12	R2406186
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Phosphorus (P)-Total	13.4	DLM	1.0	mg/L	26-JUL-12	26-JUL-12	R2406186
Potassium (K)-Total	20.2	DLM	0.20	mg/L	26-JUL-12	26-JUL-12	R2406186
Rubidium (Rb)-Total	0.0231	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186

* 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
L1181680-2 ARV 4							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Total Metals by ICP-MS							
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Silicon (Si)-Total	4.71	DLM	0.50	mg/L	26-JUL-12	26-JUL-12	R2406186
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Sodium (Na)-Total	57.7	DLM	0.30	mg/L	26-JUL-12	26-JUL-12	R2406186
Strontium (Sr)-Total	0.306	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tin (Sn)-Total	0.0021	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Titanium (Ti)-Total	0.0338	DLM	0.0050	mg/L	26-JUL-12	26-JUL-12	R2406186
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Uranium (U)-Total	<0.0010	DLM	0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Vanadium (V)-Total	0.0071	DLM	0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zinc (Zn)-Total	0.086	DLM	0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	26-JUL-12	26-JUL-12	R2406186
L1181680-3 ARV 5							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		23-JUL-12	R2405585
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		26-JUL-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		23-JUL-12	R2405585
Miscellaneous Parameters							
Ammonia, Total (as N)	0.065		0.010	mg/L		02-AUG-12	R2410466
Biochemical Oxygen Demand	<6.0		6.0	mg/L	20-JUL-12	25-JUL-12	R2404413
Conductivity	309		20	umhos/cm		20-JUL-12	R2402424
Fecal Coliforms	44		3	MPN/100mL		25-JUL-12	R2404537
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	27-JUL-12	27-JUL-12	R2406740
Oil and Grease, Total	<2.0		2.0	mg/L	26-JUL-12	26-JUL-12	R2406240
Phenols (4AAP)	<0.0010		0.0010	mg/L	25-JUL-12	25-JUL-12	R2405565
Sulfate	3.88		0.50	mg/L		23-JUL-12	R2405585
Total Suspended Solids	10.0		5.0	mg/L		23-JUL-12	R2404003
pH	7.52		0.10	pH units		20-JUL-12	R2402424
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0230		0.0050	mg/L	26-JUL-12	26-JUL-12	R2406186
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Arsenic (As)-Total	0.00055		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Barium (Ba)-Total	0.0160		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Boron (B)-Total	0.031		0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	26-JUL-12	26-JUL-12	R2406186
Calcium (Ca)-Total	13.6		0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Cobalt (Co)-Total	0.00030		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Copper (Cu)-Total	0.00088		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186

* 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
L1181680-3 ARV 5							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Total Metals by ICP-MS							
Iron (Fe)-Total	2.20		0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Lead (Pb)-Total	0.000101		0.000090	mg/L	26-JUL-12	26-JUL-12	R2406186
Lithium (Li)-Total	0.0035		0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Magnesium (Mg)-Total	9.64		0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Manganese (Mn)-Total	0.157		0.00030	mg/L	26-JUL-12	26-JUL-12	R2406186
Molybdenum (Mo)-Total	0.00023		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Phosphorus (P)-Total	<0.10		0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Potassium (K)-Total	2.77		0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Rubidium (Rb)-Total	0.00311		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Selenium (Se)-Total	<0.0010		0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Silicon (Si)-Total	0.409		0.050	mg/L	26-JUL-12	26-JUL-12	R2406186
Silver (Ag)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Sodium (Na)-Total	45.9	DLA	3.0	mg/L	26-JUL-12	27-JUL-12	R2407286
Strontium (Sr)-Total	0.0876		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Thorium (Th)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tin (Sn)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Titanium (Ti)-Total	0.00123		0.00050	mg/L	26-JUL-12	26-JUL-12	R2406186
Tungsten (W)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Uranium (U)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Vanadium (V)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zinc (Zn)-Total	0.0026		0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zirconium (Zr)-Total	<0.00040		0.00040	mg/L	26-JUL-12	26-JUL-12	R2406186
L1181680-4 ARV 6							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		23-JUL-12	R2405585
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		26-JUL-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		23-JUL-12	R2405585
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.010		0.010	mg/L		02-AUG-12	R2410466
Biochemical Oxygen Demand	<6.0		6.0	mg/L	20-JUL-12	25-JUL-12	R2404413
Conductivity	412		20	umhos/cm		20-JUL-12	R2402424
Fecal Coliforms	340		3	MPN/100mL		25-JUL-12	R2404537
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	27-JUL-12	27-JUL-12	R2406740
Oil and Grease, Total	<2.0		2.0	mg/L	26-JUL-12	26-JUL-12	R2406240
Phenols (4AAP)	0.0010		0.0010	mg/L	25-JUL-12	25-JUL-12	R2405565
Sulfate	0.87		0.50	mg/L		23-JUL-12	R2405585
Total Suspended Solids	23.0		5.0	mg/L		23-JUL-12	R2404003
pH	6.99		0.10	pH units		20-JUL-12	R2402424
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0751		0.0050	mg/L	26-JUL-12	26-JUL-12	R2406186
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Arsenic (As)-Total	0.00063		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186

* 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
L1181680-4 ARV 6							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Total Metals by ICP-MS							
Barium (Ba)-Total	0.0495		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Boron (B)-Total	0.030		0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	26-JUL-12	26-JUL-12	R2406186
Calcium (Ca)-Total	19.0		0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Cobalt (Co)-Total	0.00064		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Copper (Cu)-Total	0.00063		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Iron (Fe)-Total	8.02		0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Lead (Pb)-Total	0.000123		0.000090	mg/L	26-JUL-12	26-JUL-12	R2406186
Lithium (Li)-Total	0.0041		0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Magnesium (Mg)-Total	9.44		0.010	mg/L	26-JUL-12	26-JUL-12	R2406186
Manganese (Mn)-Total	0.659		0.00030	mg/L	26-JUL-12	26-JUL-12	R2406186
Molybdenum (Mo)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Phosphorus (P)-Total	<0.10		0.10	mg/L	26-JUL-12	26-JUL-12	R2406186
Potassium (K)-Total	3.02		0.020	mg/L	26-JUL-12	26-JUL-12	R2406186
Rubidium (Rb)-Total	0.00452		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Selenium (Se)-Total	<0.0010		0.0010	mg/L	26-JUL-12	26-JUL-12	R2406186
Silicon (Si)-Total	1.87		0.050	mg/L	26-JUL-12	26-JUL-12	R2406186
Silver (Ag)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Sodium (Na)-Total	51.7	DLA	3.0	mg/L	26-JUL-12	27-JUL-12	R2407286
Strontium (Sr)-Total	0.116		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Thorium (Th)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Tin (Sn)-Total	<0.00020		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Titanium (Ti)-Total	0.00823		0.00050	mg/L	26-JUL-12	26-JUL-12	R2406186
Tungsten (W)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Uranium (U)-Total	<0.00010		0.00010	mg/L	26-JUL-12	26-JUL-12	R2406186
Vanadium (V)-Total	0.00065		0.00020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zinc (Zn)-Total	0.0380		0.0020	mg/L	26-JUL-12	26-JUL-12	R2406186
Zirconium (Zr)-Total	<0.00040		0.00040	mg/L	26-JUL-12	26-JUL-12	R2406186
L1181680-6 ARV 2 DAPHNIA (PASS/FAIL)							
Sampled By: CLIENT on 18-JUL-12							
Matrix: WASTE WATER							
Miscellaneous Parameters							
Daphnia Magna - Pass/Fail	See attached.				21-JUL-12	21-JUL-12	R2406458

* 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
DLIV	Detection Limit Adjusted: Lower Initial Volume
DLM	Detection Limit Adjusted For Sample Matrix Effects

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.			
DAPHNIA-P/F-WP	Water	Daphnia Magna Pass/Fail	EPS/1/RM/11,EPS 1/RM/14
Daphnia Magna, grown under controlled conditions, are introduced into a single 100% concentration of a sample in order to obtain an Pass/Fail indication of toxicity. A Fail occurs when greater than 50% of the organisms die.			
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 analysis of metals by inductively coupled-mass spectrometry.			
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)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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Total suspended solids in aqueous 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
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.



Daphnia Magna Bioassay Test Report - Pass/Fail

Sample ID:	L1181680-6
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Summary Results

48-hour Pass/Fail:	Pass
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Sample Information

Sample Origin:	Hamlet of Arviat
Sample Description:	Arv 2 Daphnia
Sampling Date and Time:	18-Jul-12 00:00
Sampling Method:	Grab
Sampled By:	Not provided
Container(s) Description:	1x20L Polyethylene pail with liner
Sample Volume:	10L
Date and Time Received:	20-Jul-12 10:10
Transit Irregularities:	None
Storage Temperature (°C):	20

Test Information

Test Organism:	Daphnia magna
Test Description:	Acute, 48-hour, Static, Pass/Fail
Reference Method(s):	EPS 1/RM/14, 2nd Ed. Dec. 2000, Environment Canada EPS 1/RM/11, July 1990, Environment Canada
Performed By:	DJG
Starting Date and Time:	21-Jul-12 12:00
Deviations from Reference Method:	Filtered out organisms before start of test.



Condition of Effluent at 100% v/v Before Preparing Dilutions

Observations

Colour:	Yellow
Odour:	Moderate
Turbidity:	Moderate
Solids:	High
Temperature (°C):	20
Dissolved Oxygen (mg/L):	2.60
Conductivity (µmhos/cm):	821
pH:	6.99
pH Adjustment:	Not Adjusted
pH Adjustment Procedure:	n/a
Hardness (mg/L) Before Adjustment:	0.9 mL Titration Solution / 10 mL of Sample x 1000 = 90
Hardness (mg/L) After Adjustment:	N/A mL Titration Solution / N/A mL of Sample x 1000 = N/A
Alkalinity (mg/L):	2.7 mL Titration Solution / 10 mL of Sample x 1000 = 270

Pre-Aeration

Aeration Rate (25-50 mL/min/L):	33.5 ± 0.2	
Aeration Time (min):	30	
Sample Test Concentration (v/v):	100%	0%
Dissolved Oxygen (D.O.) Before Pre-Aeration (%):	28.3	92.9
Average D.O. After Pre-Aeration (%):	53.1	95.5

Test Organism Data

Average age of daphnia at first brood (days):	9
Average number of neonates per brood:	35
Weekly Mortality Preceding Test (%):	3.3
Date Parents Born:	27-Jun-12
Loading Density (organisms/20 mL):	1
Age of test organisms at beginning of test (hrs):	<24

Conditions Common to All Concentrations During Test

Volume Tested:	200 mL (for control and 100%)
Triplicate solutions for control & 100%:	Yes
Neonates per Vessel:	10
Volume per Neonate:	20 mL
Test Solution Depth:	70 mm
Container Description:	Plastic Cups
Source of Holding/Dilution Water:	Dechlorinated UV Treated City of Winnipeg Tap Water



Conditions During Test

Concentration (% v/v)	Temperature (°C)			Dissolved Oxygen (mg/L)		pH		Conductivity (µmhos/cm)	Hardness (mg/L)	Immobility (# of daphnids)		Mortality (# of daphnids)
	0h	24h	48h	0h	48h	0h	48h	0h	0h	24h	48h	48h
0	20	20	20	8.67	8.45	7.81	7.89	337	90	N/A	0	0
0	20	20	20	8.64	8.52	7.86	7.89	339	90	N/A	0	0
0	20	20	20	8.59	8.51	7.87	7.89	339	90	N/A	0	0
100	20	20	20	4.83	7.50	7.25	7.87	809	90	N/A	0	0
100	20	20	20	4.85	7.49	7.23	7.89	813	90	N/A	0	0
100	20	20	20	4.75	7.53	7.18	7.90	813	90	N/A	0	0

Mortality and Immobility Information

Conc. (% v/v)	Mean Number of Daphnids at End of Test		Mean Rate of Daphnids at End of Test (%)	
	Dead	Immobile	Dead	Immobile
0	0	0	0	0
100	0	0	0	0

Reference Toxicant Test Results

Reference Toxicant:	Sodium Chloride
Date Reference Toxicant Initiated:	18-Jul-12
Recent 48h Reference Toxicant Test LC50 (mg/L NaCl):	5771
Lower 95% Confidence Limit (mg/L NaCl):	5598
Upper 95% Confidence Limit (mg/L NaCl):	5945
Historic Geometric Mean LC50 (mg/L NaCl):	5387
Lower Warning Limit (-2 S.D.):	4684
Upper Warning Limit (+2 S.D.):	6196
Method of Calculation:	Stephan LC50 Program, Probit
Confirmed by Graph:	Yes

Observations/Comments

No toxicity observed.



ALS Environmental

Chai



L1181680-COFC

COC #

L1181680

Page 1 of 1

Report To		Report To	
Company:	HAMLET OF ARVIAT (W10578)	☐ Standard	☐ Other
Contact:	ED MURPHY	☐ PDF	☐ Excel
Address:	PO Box 150	☐ Digital	☐ Fax
Phone:	867-857-2841	Email 1:	arviatsa@qiniq.com
Invoice To	Same as Report? ☒ Yes ☐ No	Email 2:	mlurphy@qiniq.com
Hardcopy of Invoice with Report?	☒ Yes ☐ No	Email 3:	
Company:		Client / Project Information	
Contact:		Job #:	HAMLET OF ARVIAT WWTP
Address:		PO / AFE:	
Phone:		LSD:	
Lab Work Order #		Quote #:	Q30948
(lab use only)		ALS Contact:	
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)
1	ARV 2	18/07/12	12:00
2	ARV 4	18/07/12	12:00
3	ARV 5	18/07/12	12:00
4	ARV 6	18/07/12	12:00
5	ARV 2 Treated Disinfectant Bio	18/07/12	12:00
6	ARV 2 Treated Disinfectant Bio	18/07/12	12:00
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Hamlet of Arviat
ATTN: ED MURPHY
PO Box 150
Arviat NU X0C 0E0

Date Received: 19-JUN-12
Report Date: 04-JUL-12 15:33 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1164572
Project P.O. #: NOT SUBMITTED
Job Reference: HAMLET OF ARTVIAT WWTP
C of C Numbers:
Legal Site Desc:

Gail Hill
Account Manager

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

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

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1164572-1 ARV-2							
Sampled By: LAUR on 18-JUN-12 @ 11:30							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	0.061		0.050	mg/L		20-JUN-12	R2386013
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		19-JUN-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		20-JUN-12	R2386013
Miscellaneous Parameters							
Ammonia, Total (as N)	3.81	DLA	0.10	mg/L		28-JUN-12	R2389667
Biochemical Oxygen Demand	6.6		6.0	mg/L	20-JUN-12	25-JUN-12	R2387455
Conductivity	971		20	umhos/cm		20-JUN-12	R2385446
Fecal Coliforms	9		3	MPN/100mL		23-JUN-12	R2387230
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	20-JUN-12	20-JUN-12	R2385515
Oil and Grease, Total	<2.0		2.0	mg/L	21-JUN-12	21-JUN-12	R2386340
Phenols (4AAP)	0.0130		0.0010	mg/L	26-JUN-12	26-JUN-12	R2388630
Sulfate	192		0.50	mg/L		20-JUN-12	R2386013
Total Suspended Solids	12.0		5.0	mg/L		22-JUN-12	R2388033
pH	7.81		0.10	pH units		20-JUN-12	R2385446
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.050	DLM	0.050	mg/L	21-JUN-12	22-JUN-12	R2387384
Antimony (Sb)-Total	0.0043	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Arsenic (As)-Total	0.0022	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Barium (Ba)-Total	0.0254	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Boron (B)-Total	0.49	DLM	0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Cadmium (Cd)-Total	0.00022	DLM	0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Calcium (Ca)-Total	114	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Cobalt (Co)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Copper (Cu)-Total	0.0130	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Iron (Fe)-Total	1.7	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Lead (Pb)-Total	0.00148	DLM	0.00090	mg/L	21-JUN-12	22-JUN-12	R2387384
Lithium (Li)-Total	<0.020	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Magnesium (Mg)-Total	17.8	DLM	0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Manganese (Mn)-Total	0.681	DLM	0.0030	mg/L	21-JUN-12	22-JUN-12	R2387384
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Phosphorus (P)-Total	<1.0	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Potassium (K)-Total	15.4	DLM	0.20	mg/L	21-JUN-12	22-JUN-12	R2387384
Rubidium (Rb)-Total	0.0133	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Silicon (Si)-Total	1.80	DLM	0.50	mg/L	21-JUN-12	22-JUN-12	R2387384
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Sodium (Na)-Total	78.7	DLM	0.30	mg/L	21-JUN-12	22-JUN-12	R2387384
Strontium (Sr)-Total	0.679	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tin (Sn)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Titanium (Ti)-Total	0.0041	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384

* 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
L1164572-1 ARV-2							
Sampled By: LAUR on 18-JUN-12 @ 11:30							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Uranium (U)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Vanadium (V)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zinc (Zn)-Total	0.112	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	21-JUN-12	22-JUN-12	R2387384
L1164572-2 ARV-4							
Sampled By: LAUR on 18-JUN-12 @ 14:30							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	0.386		0.050	mg/L		20-JUN-12	R2386013
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.469		0.071	mg/L		19-JUN-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.082		0.050	mg/L		20-JUN-12	R2386013
Miscellaneous Parameters							
Ammonia, Total (as N)	3.21	DLA	0.10	mg/L		28-JUN-12	R2389667
Biochemical Oxygen Demand	80.0		6.0	mg/L	20-JUN-12	25-JUN-12	R2387455
Conductivity	479		20	umhos/cm		20-JUN-12	R2385446
Fecal Coliforms	<3		3	MPN/100mL		23-JUN-12	R2387230
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	20-JUN-12	20-JUN-12	R2385515
Oil and Grease, Total	<2.0		2.0	mg/L	21-JUN-12	21-JUN-12	R2386340
Phenols (4AAP)	0.0060		0.0010	mg/L	26-JUN-12	26-JUN-12	R2388630
Sulfate	6.73		0.50	mg/L		20-JUN-12	R2386013
Total Suspended Solids	124		5.0	mg/L		22-JUN-12	R2388033
pH	9.64		0.10	pH units		20-JUN-12	R2385446
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.157	DLM	0.050	mg/L	21-JUN-12	22-JUN-12	R2387384
Antimony (Sb)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Arsenic (As)-Total	0.0075	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Barium (Ba)-Total	0.0110	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Boron (B)-Total	0.15	DLM	0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Cadmium (Cd)-Total	0.00016	DLM	0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Calcium (Ca)-Total	15.1	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Cobalt (Co)-Total	0.0027	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Copper (Cu)-Total	0.0573	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Iron (Fe)-Total	2.9	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Lead (Pb)-Total	0.00151	DLM	0.00090	mg/L	21-JUN-12	22-JUN-12	R2387384
Lithium (Li)-Total	<0.020	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Magnesium (Mg)-Total	8.28	DLM	0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Manganese (Mn)-Total	0.228	DLM	0.0030	mg/L	21-JUN-12	22-JUN-12	R2387384
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Phosphorus (P)-Total	4.2	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Potassium (K)-Total	17.2	DLM	0.20	mg/L	21-JUN-12	22-JUN-12	R2387384
Rubidium (Rb)-Total	0.0172	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384

* 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
L1164572-2 ARV-4							
Sampled By: LAUR on 18-JUN-12 @ 14:30							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Silicon (Si)-Total	2.68	DLM	0.50	mg/L	21-JUN-12	22-JUN-12	R2387384
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Sodium (Na)-Total	68.3	DLM	0.30	mg/L	21-JUN-12	22-JUN-12	R2387384
Strontium (Sr)-Total	0.156	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tin (Sn)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Titanium (Ti)-Total	0.0034	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Uranium (U)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Vanadium (V)-Total	0.0041	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zinc (Zn)-Total	0.028	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	21-JUN-12	22-JUN-12	R2387384
L1164572-3 ARV-5							
Sampled By: LAUR on 18-JUN-12 @ 14:50							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		20-JUN-12	R2386013
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		19-JUN-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		20-JUN-12	R2386013
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.010		0.010	mg/L		27-JUN-12	R2389667
Biochemical Oxygen Demand	<6.0		6.0	mg/L	20-JUN-12	25-JUN-12	R2387455
Conductivity	585		20	umhos/cm		20-JUN-12	R2385446
Fecal Coliforms	4		3	MPN/100mL		23-JUN-12	R2387230
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	20-JUN-12	20-JUN-12	R2385515
Oil and Grease, Total	<2.0		2.0	mg/L	21-JUN-12	21-JUN-12	R2386340
Phenols (4AAP)	<0.0010		0.0010	mg/L	26-JUN-12	26-JUN-12	R2388630
Sulfate	10.4		0.50	mg/L		20-JUN-12	R2386013
Total Suspended Solids	20.0		5.0	mg/L		22-JUN-12	R2388033
pH	7.29		0.10	pH units		20-JUN-12	R2385446
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.086	DLM	0.050	mg/L	21-JUN-12	22-JUN-12	R2387384
Antimony (Sb)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Arsenic (As)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Barium (Ba)-Total	0.0139	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Boron (B)-Total	0.14	DLM	0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Cadmium (Cd)-Total	<0.00010	DLM	0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Calcium (Ca)-Total	14.8	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Cobalt (Co)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Copper (Cu)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384

* 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
L1164572-3 ARV-5							
Sampled By: LAUR on 18-JUN-12 @ 14:50							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Iron (Fe)-Total	7.2	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Lead (Pb)-Total	<0.00090	DLM	0.00090	mg/L	21-JUN-12	22-JUN-12	R2387384
Lithium (Li)-Total	<0.020	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Magnesium (Mg)-Total	15.6	DLM	0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Manganese (Mn)-Total	0.0585	DLM	0.0030	mg/L	21-JUN-12	22-JUN-12	R2387384
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Phosphorus (P)-Total	<1.0	DLM	1.0	mg/L	21-JUN-12	22-JUN-12	R2387384
Potassium (K)-Total	5.56	DLM	0.20	mg/L	21-JUN-12	22-JUN-12	R2387384
Rubidium (Rb)-Total	0.0042	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Silicon (Si)-Total	0.66	DLM	0.50	mg/L	21-JUN-12	22-JUN-12	R2387384
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Sodium (Na)-Total	87.8	DLM	0.30	mg/L	21-JUN-12	22-JUN-12	R2387384
Strontium (Sr)-Total	0.139	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tin (Sn)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Titanium (Ti)-Total	0.0037	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Uranium (U)-Total	<0.0010	DLM	0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Vanadium (V)-Total	<0.0020	DLM	0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zinc (Zn)-Total	<0.020	DLM	0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	21-JUN-12	22-JUN-12	R2387384
L1164572-4 ARV-6							
Sampled By: LAUR on 18-JUN-12 @ 14:05							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		20-JUN-12	R2386013
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		19-JUN-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		20-JUN-12	R2386013
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.010		0.010	mg/L		27-JUN-12	R2389667
Biochemical Oxygen Demand	6.0		6.0	mg/L	20-JUN-12	25-JUN-12	R2387455
Conductivity	139		20	umhos/cm		20-JUN-12	R2385446
Fecal Coliforms	<3		3	MPN/100mL		23-JUN-12	R2387230
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	20-JUN-12	20-JUN-12	R2385515
Oil and Grease, Total	<2.0		2.0	mg/L	21-JUN-12	21-JUN-12	R2386340
Phenols (4AAP)	0.0030		0.0010	mg/L	26-JUN-12	26-JUN-12	R2388630
Sulfate	0.78		0.50	mg/L		20-JUN-12	R2386013
Total Suspended Solids	7.0		5.0	mg/L		22-JUN-12	R2388033
pH	7.39		0.10	pH units		20-JUN-12	R2385446
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0598		0.0050	mg/L	21-JUN-12	22-JUN-12	R2387384
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Arsenic (As)-Total	0.00028		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384

* 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
L1164572-4 ARV-6							
Sampled By: LAUR on 18-JUN-12 @ 14:05							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Barium (Ba)-Total	0.0278		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Boron (B)-Total	0.019		0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	21-JUN-12	22-JUN-12	R2387384
Calcium (Ca)-Total	9.47		0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Cobalt (Co)-Total	0.00064		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Copper (Cu)-Total	0.00143		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Iron (Fe)-Total	1.91		0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Lead (Pb)-Total	0.000205		0.000090	mg/L	21-JUN-12	22-JUN-12	R2387384
Lithium (Li)-Total	<0.0020		0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Magnesium (Mg)-Total	3.28		0.010	mg/L	21-JUN-12	22-JUN-12	R2387384
Manganese (Mn)-Total	0.769	DLA	0.030	mg/L	21-JUN-12	28-JUN-12	R2390210
Molybdenum (Mo)-Total	0.00023		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Phosphorus (P)-Total	<0.10		0.10	mg/L	21-JUN-12	22-JUN-12	R2387384
Potassium (K)-Total	3.04		0.020	mg/L	21-JUN-12	22-JUN-12	R2387384
Rubidium (Rb)-Total	0.00390		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Selenium (Se)-Total	<0.0010		0.0010	mg/L	21-JUN-12	22-JUN-12	R2387384
Silicon (Si)-Total	1.05		0.050	mg/L	21-JUN-12	22-JUN-12	R2387384
Silver (Ag)-Total	<0.00010		0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Sodium (Na)-Total	12.4		0.030	mg/L	21-JUN-12	22-JUN-12	R2387384
Strontium (Sr)-Total	0.0549		0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Thorium (Th)-Total	<0.00010		0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Tin (Sn)-Total	<0.00020		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Titanium (Ti)-Total	0.00410		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Tungsten (W)-Total	<0.00010		0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Uranium (U)-Total	<0.00010		0.00010	mg/L	21-JUN-12	22-JUN-12	R2387384
Vanadium (V)-Total	0.00031		0.00020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zinc (Zn)-Total	0.0170		0.0020	mg/L	21-JUN-12	22-JUN-12	R2387384
Zirconium (Zr)-Total	<0.00040		0.00040	mg/L	21-JUN-12	22-JUN-12	R2387384

* 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

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 analysis of metals by inductively coupled-mass spectrometry.			
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 aqueous 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**
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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.



Chain of Custody
Canada



L1164572-COFC

COC #

Page 1 of 1

Report To Company: HAMLET OF ARVIAT (W10578) Contact: ED MURPHY Address: PO Box 150 ARVIAT, NUNAVUT, XOC 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:		Report Format / Delivery ☒ Standard ☐ Other ☒ PDF ☐ Excel ☐ Digital ☐ Fax Email 1: arviatsao@ginig.com Email 2: <u>mluistyo@gov.nv.ca</u> Email 3:		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																																																																																														
Client / Project Information Job #: HAMLET OF ARVIAT WWTP PO / AFE: LSD: Quote #: Q30948		Analysis Request Please indicate below Filtered, Preserved or both (F, P, F/P) <table border="1"> <tr> <th>Sample #</th> <th>Sample Identification (This description will appear on the report)</th> <th>Date (dd-mm-yy)</th> <th>Time (hh:mm)</th> <th>Sampler:</th> <th>Sample Type</th> <th>BOD-WP</th> <th>TSS</th> <th>EC-WP</th> <th>PH-WP</th> <th>SO4-IC-WP</th> <th>ANIONS-N2N3-IC-WP</th> <th>NH3-0COL-WP</th> <th>FECAL COLIFORM (FC-MP)</th> <th>MET-T-L-MS-WP</th> <th>HG-T-CVAF-WP</th> <th>OGG-TOT-WT</th> <th>PHENOLS-4AAP-WT</th> <th>Number of Containers</th> </tr> <tr> <td>ARV-2</td> <td>Wastewater</td> <td>18-06-12</td> <td>11:30am</td> <td>Laurie TASSIUK</td> <td>Wastewater</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>P</td> <td>P</td> <td>P</td> <td>P</td> <td>X</td> <td>P</td> <td>P</td> <td>7</td> </tr> <tr> <td>ARV-4</td> <td>Wastewater</td> <td>18-06-12</td> <td>2:30pm</td> <td></td> <td>Wastewater</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>P</td> <td>P</td> <td>P</td> <td>P</td> <td>X</td> <td>P</td> <td>P</td> <td>7</td> </tr> <tr> <td>ARV-5</td> <td>Wastewater</td> <td>18-06-12</td> <td>2:50pm</td> <td></td> <td>Wastewater</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>P</td> <td>P</td> <td>P</td> <td>P</td> <td>X</td> <td>P</td> <td>P</td> <td>7</td> </tr> <tr> <td>ARV-6</td> <td>Wastewater</td> <td>18-06-12</td> <td>2:05pm</td> <td></td> <td>Wastewater</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>P</td> <td>P</td> <td>P</td> <td>P</td> <td>X</td> <td>P</td> <td>P</td> <td>7</td> </tr> </table>		Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sampler:	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	Wastewater	18-06-12	11:30am	Laurie TASSIUK	Wastewater	X	X	X	X	X	P	P	P	P	X	P	P	7	ARV-4	Wastewater	18-06-12	2:30pm		Wastewater	X	X	X	X	X	P	P	P	P	X	P	P	7	ARV-5	Wastewater	18-06-12	2:50pm		Wastewater	X	X	X	X	X	P	P	P	P	X	P	P	7	ARV-6	Wastewater	18-06-12	2:05pm		Wastewater	X	X	X	X	X	P	P	P	P	X	P	P	7
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sampler:	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																																																																																
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ARV-6	Wastewater	18-06-12	2:05pm		Wastewater	X	X	X	X	X	P	P	P	P	X	P	P	7																																																																																
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) Released by: <u>[Signature]</u> Date (dd-mm-yy): 06-18-12 Time (hh:mm): 3:20		SHIPMENT RECEPTION (lab use only) Received by: <u>[Signature]</u> Date: 18-06-12 Time: 15:00 Temperature: 4-7 °C		SHIPMENT VERIFICATION (lab use only) Verified by: _____ Date: _____ Time: _____ Observations: Yes / No? If Yes add SIF	
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Hamlet of Arviat
ATTN: ED MURPHY
PO Box 150
Arviat NU X0C 0E0

Date Received: 18-SEP-12
Report Date: 28-SEP-12 15:20 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1210579
Project P.O. #: NOT SUBMITTED
Job Reference: HAMLET OF ARVIAT WWTP
C of C Numbers:
Legal Site Desc:

Barb Bayer
General Manager, Winnipeg

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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1210579-1 ARV2 WASTEWATER							
Sampled By: CLIENT on 17-SEP-12 @ 09:00							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		18-SEP-12	R2438787
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		19-SEP-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		18-SEP-12	R2438787
Miscellaneous Parameters							
Ammonia, Total (as N)	8.5	DLA	1.0	mg/L		20-SEP-12	R2440280
Biochemical Oxygen Demand	<6.0		6.0	mg/L	19-SEP-12	24-SEP-12	R2441587
Conductivity	3380		20	umhos/cm		18-SEP-12	R2438390
Fecal Coliforms	4		3	MPN/100mL		22-SEP-12	R2441233
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	21-SEP-12	21-SEP-12	R2441823
Oil and Grease, Total	<2.0		2.0	mg/L	20-SEP-12	20-SEP-12	R2439727
Phenols (4AAP)	<0.0010		0.0010	mg/L	21-SEP-12	21-SEP-12	R2441913
Sulfate	577		2.5	mg/L		18-SEP-12	R2438787
Total Suspended Solids	14.0		5.0	mg/L		19-SEP-12	R2439616
pH	8.08		0.10	pH units		18-SEP-12	R2438390
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.050	DLM	0.050	mg/L	19-SEP-12	19-SEP-12	R2439423
Antimony (Sb)-Total	0.0042	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Arsenic (As)-Total	0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Barium (Ba)-Total	0.0525	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Boron (B)-Total	1.41	DLM	0.10	mg/L	19-SEP-12	19-SEP-12	R2439423
Cadmium (Cd)-Total	<0.00010	DLM	0.00010	mg/L	19-SEP-12	19-SEP-12	R2439423
Calcium (Ca)-Total	252	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Cobalt (Co)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Copper (Cu)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Iron (Fe)-Total	<1.0	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Lead (Pb)-Total	<0.00090	DLM	0.00090	mg/L	19-SEP-12	19-SEP-12	R2439423
Lithium (Li)-Total	0.037	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Magnesium (Mg)-Total	75.9	DLM	0.10	mg/L	19-SEP-12	19-SEP-12	R2439423
Manganese (Mn)-Total	0.362	DLM	0.0030	mg/L	19-SEP-12	19-SEP-12	R2439423
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Phosphorus (P)-Total	<1.0	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Potassium (K)-Total	47.4	DLM	0.20	mg/L	19-SEP-12	19-SEP-12	R2439423
Rubidium (Rb)-Total	0.0350	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Silicon (Si)-Total	4.68	DLM	0.50	mg/L	19-SEP-12	19-SEP-12	R2439423
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Sodium (Na)-Total	445	DLA	3.0	mg/L	19-SEP-12	20-SEP-12	R2440339
Strontium (Sr)-Total	1.85	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Tin (Sn)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Titanium (Ti)-Total	0.0077	DLM	0.0050	mg/L	19-SEP-12	19-SEP-12	R2439423

* 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
L1210579-1 ARV2 WASTEWATER							
Sampled By: CLIENT on 17-SEP-12 @ 09:00							
Matrix: WATER							
Total Metals by ICP-MS							
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Uranium (U)-Total	0.0013	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Vanadium (V)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Zinc (Zn)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	19-SEP-12	19-SEP-12	R2439423
L1210579-2 ARV4 WASTEWATER							
Sampled By: CLIENT on 17-SEP-12 @ 09:00							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	0.729		0.050	mg/L		18-SEP-12	R2438787
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.847		0.071	mg/L		19-SEP-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.118		0.050	mg/L		18-SEP-12	R2438787
Miscellaneous Parameters							
Ammonia, Total (as N)	24.1	DLA	1.0	mg/L		18-SEP-12	R2438670
Biochemical Oxygen Demand	39.2		6.0	mg/L	19-SEP-12	24-SEP-12	R2441587
Conductivity	811		20	umhos/cm		18-SEP-12	R2438390
Fecal Coliforms	9300		3	MPN/100mL		22-SEP-12	R2441233
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	21-SEP-12	21-SEP-12	R2441823
Oil and Grease, Total	<2.0		2.0	mg/L	20-SEP-12	20-SEP-12	R2439727
Sulfate	13.7		0.50	mg/L		18-SEP-12	R2438787
Total Suspended Solids	85.0		5.0	mg/L		19-SEP-12	R2439616
pH	8.17		0.10	pH units		18-SEP-12	R2438390
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.50	DLM	0.50	mg/L	19-SEP-12	19-SEP-12	R2439423
Antimony (Sb)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Arsenic (As)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Barium (Ba)-Total	0.024	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Beryllium (Be)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Bismuth (Bi)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Boron (B)-Total	<1.0	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Cadmium (Cd)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Calcium (Ca)-Total	20	DLM	10	mg/L	19-SEP-12	19-SEP-12	R2439423
Cesium (Cs)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Chromium (Cr)-Total	<0.10	DLM	0.10	mg/L	19-SEP-12	19-SEP-12	R2439423
Cobalt (Co)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Copper (Cu)-Total	0.037	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Iron (Fe)-Total	<10	DLM	10	mg/L	19-SEP-12	19-SEP-12	R2439423
Lead (Pb)-Total	<0.0090	DLM	0.0090	mg/L	19-SEP-12	19-SEP-12	R2439423
Lithium (Li)-Total	<0.20	DLM	0.20	mg/L	19-SEP-12	19-SEP-12	R2439423
Magnesium (Mg)-Total	11.0	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Manganese (Mn)-Total	0.269	DLM	0.030	mg/L	19-SEP-12	19-SEP-12	R2439423
Molybdenum (Mo)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Nickel (Ni)-Total	<0.20	DLM	0.20	mg/L	19-SEP-12	19-SEP-12	R2439423
Phosphorus (P)-Total	<10	DLM	10	mg/L	19-SEP-12	19-SEP-12	R2439423
Potassium (K)-Total	24.0	DLM	2.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Rubidium (Rb)-Total	0.022	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Selenium (Se)-Total	<0.10	DLM	0.10	mg/L	19-SEP-12	19-SEP-12	R2439423

* 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
L1210579-2 ARV4 WASTEWATER							
Sampled By: CLIENT on 17-SEP-12 @ 09:00							
Matrix: WATER							
Total Metals by ICP-MS							
Silicon (Si)-Total	19.8	DLM	5.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Silver (Ag)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Sodium (Na)-Total	92.3	DLM	3.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Strontium (Sr)-Total	0.199	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Tellurium (Te)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Thallium (Tl)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Thorium (Th)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Tin (Sn)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Titanium (Ti)-Total	<0.050	DLM	0.050	mg/L	19-SEP-12	19-SEP-12	R2439423
Tungsten (W)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Uranium (U)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Vanadium (V)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Zinc (Zn)-Total	0.26	DLM	0.20	mg/L	19-SEP-12	19-SEP-12	R2439423
Zirconium (Zr)-Total	<0.040	DLM	0.040	mg/L	19-SEP-12	19-SEP-12	R2439423
L1210579-3 ARV5 WASTEWATER							
Sampled By: CLIENT on 17-SEP-12 @ 09:00							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		18-SEP-12	R2438787
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		19-SEP-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		18-SEP-12	R2438787
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.010		0.010	mg/L		18-SEP-12	R2438670
Biochemical Oxygen Demand	<6.0		6.0	mg/L	19-SEP-12	24-SEP-12	R2441587
Conductivity	1040		20	umhos/cm		18-SEP-12	R2438390
Fecal Coliforms	15		3	MPN/100mL		22-SEP-12	R2441233
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	21-SEP-12	21-SEP-12	R2441823
Oil and Grease, Total	<2.0		2.0	mg/L	20-SEP-12	20-SEP-12	R2439727
Sulfate	12.9		0.50	mg/L		18-SEP-12	R2438787
Total Suspended Solids	13.0		5.0	mg/L		19-SEP-12	R2439616
pH	7.53		0.10	pH units		18-SEP-12	R2438390
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.050	DLM	0.050	mg/L	19-SEP-12	19-SEP-12	R2439423
Antimony (Sb)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Arsenic (As)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Barium (Ba)-Total	0.0268	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Boron (B)-Total	<0.10	DLM	0.10	mg/L	19-SEP-12	19-SEP-12	R2439423
Cadmium (Cd)-Total	<0.00010	DLM	0.00010	mg/L	19-SEP-12	19-SEP-12	R2439423
Calcium (Ca)-Total	25.6	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Cobalt (Co)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Copper (Cu)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Iron (Fe)-Total	1.4	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Lead (Pb)-Total	<0.00090	DLM	0.00090	mg/L	19-SEP-12	19-SEP-12	R2439423

* 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
L1210579-3 ARV5 WASTEWATER							
Sampled By: CLIENT on 17-SEP-12 @ 09:00							
Matrix: WATER							
Total Metals by ICP-MS							
Lithium (Li)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Magnesium (Mg)-Total	19.6	DLM	0.10	mg/L	19-SEP-12	19-SEP-12	R2439423
Manganese (Mn)-Total	0.0489	DLM	0.0030	mg/L	19-SEP-12	19-SEP-12	R2439423
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Phosphorus (P)-Total	<1.0	DLM	1.0	mg/L	19-SEP-12	19-SEP-12	R2439423
Potassium (K)-Total	7.32	DLM	0.20	mg/L	19-SEP-12	19-SEP-12	R2439423
Rubidium (Rb)-Total	0.0056	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	19-SEP-12	19-SEP-12	R2439423
Silicon (Si)-Total	<0.50	DLM	0.50	mg/L	19-SEP-12	19-SEP-12	R2439423
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Sodium (Na)-Total	144	DLM	0.30	mg/L	19-SEP-12	19-SEP-12	R2439423
Strontium (Sr)-Total	0.185	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Tin (Sn)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Titanium (Ti)-Total	<0.0050	DLM	0.0050	mg/L	19-SEP-12	19-SEP-12	R2439423
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Uranium (U)-Total	<0.0010	DLM	0.0010	mg/L	19-SEP-12	19-SEP-12	R2439423
Vanadium (V)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Zinc (Zn)-Total	<0.020	DLM	0.020	mg/L	19-SEP-12	19-SEP-12	R2439423
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	19-SEP-12	19-SEP-12	R2439423
L1210579-4 ARV6 WASTEWATER							
Sampled By: CLIENT on 17-SEP-12 @ 09:00							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		18-SEP-12	R2438787
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		19-SEP-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		18-SEP-12	R2438787
Miscellaneous Parameters							
Ammonia, Total (as N)	0.193		0.010	mg/L		18-SEP-12	R2438670
Biochemical Oxygen Demand	<6.0		6.0	mg/L	19-SEP-12	24-SEP-12	R2441587
Conductivity	681		20	umhos/cm		18-SEP-12	R2438390
Fecal Coliforms	430		3	MPN/100mL		22-SEP-12	R2441233
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	26-SEP-12	26-SEP-12	R2444683
Oil and Grease, Total	<2.0		2.0	mg/L	20-SEP-12	20-SEP-12	R2439727
Sulfate	0.82		0.50	mg/L		18-SEP-12	R2438787
Total Suspended Solids	15.0		5.0	mg/L		19-SEP-12	R2439616
pH	6.87		0.10	pH units		18-SEP-12	R2438390
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.050	DLM	0.050	mg/L	19-SEP-12	19-SEP-12	R2439423
Antimony (Sb)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Arsenic (As)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Barium (Ba)-Total	0.0794	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	19-SEP-12	19-SEP-12	R2439423

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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* 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

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 analysis of metals by inductively coupled-mass spectrometry.			
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 aqueous 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**
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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

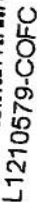
Chain of Custody Numbers:

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.



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COC #

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GENF 18.01 Front



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

Date Received: 14-AUG-12
Report Date: 24-AUG-12 13:16 (MT)
Version: FINAL

Client Phone: 867-857-2841

Certificate of Analysis

Lab Work Order #: L1193722
Project P.O. #: NOT SUBMITTED
Job Reference: HAMLET OF ARVIAT WWTP
C of C Numbers:
Legal Site Desc:

Paul Nicolas

Paul Nicolas
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1193722-1 ARV-2							
Sampled By: CLIENT on 13-AUG-12							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.25	DLM	0.25	mg/L		15-AUG-12	R2417762
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		16-AUG-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.25	DLM	0.25	mg/L		15-AUG-12	R2417762
Miscellaneous Parameters							
Ammonia, Total (as N)	5.7	DLA	1.0	mg/L		23-AUG-12	R2422980
Biochemical Oxygen Demand	<6.0		6.0	mg/L	15-AUG-12	20-AUG-12	R2420411
Conductivity	2500		20	umhos/cm		15-AUG-12	R2417250
Fecal Coliforms	1500		3	MPN/100mL		18-AUG-12	R2419583
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	21-AUG-12	21-AUG-12	R2420923
Oil and Grease, Total	<2.0		2.0	mg/L	17-AUG-12	17-AUG-12	R2418795
Phenols (4AAP)	<0.0010		0.0010	mg/L	21-AUG-12	21-AUG-12	R2421332
Sulfate	572		2.5	mg/L		15-AUG-12	R2417762
Total Suspended Solids	16.0		5.0	mg/L		15-AUG-12	R2418202
pH	7.93		0.10	pH units		15-AUG-12	R2417250
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.050	DLM	0.050	mg/L	17-AUG-12	17-AUG-12	R2419798
Antimony (Sb)-Total	0.0052	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Arsenic (As)-Total	0.0033	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Barium (Ba)-Total	0.0565	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Beryllium (Be)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Bismuth (Bi)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Boron (B)-Total	1.98	DLM	0.10	mg/L	17-AUG-12	17-AUG-12	R2419798
Cadmium (Cd)-Total	<0.00010	DLM	0.00010	mg/L	17-AUG-12	17-AUG-12	R2419798
Calcium (Ca)-Total	243	DLM	1.0	mg/L	17-AUG-12	17-AUG-12	R2419798
Cesium (Cs)-Total	<0.0010	DLM	0.0010	mg/L	17-AUG-12	17-AUG-12	R2419798
Chromium (Cr)-Total	<0.010	DLM	0.010	mg/L	17-AUG-12	17-AUG-12	R2419798
Cobalt (Co)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Copper (Cu)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Iron (Fe)-Total	<1.0	DLM	1.0	mg/L	17-AUG-12	17-AUG-12	R2419798
Lead (Pb)-Total	<0.00090	DLM	0.00090	mg/L	17-AUG-12	17-AUG-12	R2419798
Lithium (Li)-Total	0.041	DLM	0.020	mg/L	17-AUG-12	17-AUG-12	R2419798
Magnesium (Mg)-Total	67.6	DLM	0.10	mg/L	17-AUG-12	17-AUG-12	R2419798
Manganese (Mn)-Total	0.624	DLM	0.0030	mg/L	17-AUG-12	17-AUG-12	R2419798
Molybdenum (Mo)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Nickel (Ni)-Total	<0.020	DLM	0.020	mg/L	17-AUG-12	17-AUG-12	R2419798
Phosphorus (P)-Total	<1.0	DLM	1.0	mg/L	17-AUG-12	17-AUG-12	R2419798
Potassium (K)-Total	51.3	DLM	0.20	mg/L	17-AUG-12	17-AUG-12	R2419798
Rubidium (Rb)-Total	0.0421	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Selenium (Se)-Total	<0.010	DLM	0.010	mg/L	17-AUG-12	17-AUG-12	R2419798
Silicon (Si)-Total	3.66	DLM	0.50	mg/L	17-AUG-12	17-AUG-12	R2419798
Silver (Ag)-Total	<0.0010	DLM	0.0010	mg/L	17-AUG-12	17-AUG-12	R2419798
Sodium (Na)-Total	332	DLA	3.0	mg/L	17-AUG-12	21-AUG-12	R2421141
Strontium (Sr)-Total	1.83	DLM	0.0010	mg/L	17-AUG-12	17-AUG-12	R2419798
Tellurium (Te)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Thallium (Tl)-Total	<0.0010	DLM	0.0010	mg/L	17-AUG-12	17-AUG-12	R2419798
Thorium (Th)-Total	<0.0010	DLM	0.0010	mg/L	17-AUG-12	17-AUG-12	R2419798
Tin (Sn)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Titanium (Ti)-Total	0.0142	DLM	0.0050	mg/L	17-AUG-12	17-AUG-12	R2419798

* 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
L1193722-1 ARV-2							
Sampled By: CLIENT on 13-AUG-12							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Tungsten (W)-Total	<0.0010	DLM	0.0010	mg/L	17-AUG-12	17-AUG-12	R2419798
Uranium (U)-Total	<0.0010	DLM	0.0010	mg/L	17-AUG-12	17-AUG-12	R2419798
Vanadium (V)-Total	<0.0020	DLM	0.0020	mg/L	17-AUG-12	17-AUG-12	R2419798
Zinc (Zn)-Total	<0.020	DLM	0.020	mg/L	17-AUG-12	17-AUG-12	R2419798
Zirconium (Zr)-Total	<0.0040	DLM	0.0040	mg/L	17-AUG-12	17-AUG-12	R2419798
L1193722-2 ARV-4							
Sampled By: CLIENT on 13-AUG-12							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	1.93		0.050	mg/L		15-AUG-12	R2417762
Nitrate+Nitrite							
Nitrate and Nitrite as N	2.55		0.071	mg/L		16-AUG-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	0.627		0.050	mg/L		15-AUG-12	R2417762
Miscellaneous Parameters							
Ammonia, Total (as N)	10.8	DLA	1.0	mg/L		23-AUG-12	R2422980
Biochemical Oxygen Demand	48.0		6.0	mg/L	15-AUG-12	20-AUG-12	R2420411
Conductivity	571		20	umhos/cm		15-AUG-12	R2417250
Fecal Coliforms	230		3	MPN/100mL		18-AUG-12	R2419583
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	21-AUG-12	21-AUG-12	R2420923
Oil and Grease, Total	<2.0		2.0	mg/L	17-AUG-12	17-AUG-12	R2418795
Phenols (4AAP)	0.0010		0.0010	mg/L	21-AUG-12	21-AUG-12	R2421332
Sulfate	2.88		0.50	mg/L		15-AUG-12	R2417762
Total Suspended Solids	267		5.0	mg/L		15-AUG-12	R2418202
pH	7.60		0.10	pH units		15-AUG-12	R2417250
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.119		0.0050	mg/L	16-AUG-12	16-AUG-12	R2418566
Antimony (Sb)-Total	0.00038		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Arsenic (As)-Total	0.00956		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Barium (Ba)-Total	0.0267		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Boron (B)-Total	0.266		0.010	mg/L	16-AUG-12	16-AUG-12	R2418566
Cadmium (Cd)-Total	0.000093		0.000010	mg/L	16-AUG-12	16-AUG-12	R2418566
Calcium (Ca)-Total	13.1		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Chromium (Cr)-Total	0.0011		0.0010	mg/L	16-AUG-12	16-AUG-12	R2418566
Cobalt (Co)-Total	0.00178		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Copper (Cu)-Total	0.0295		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Iron (Fe)-Total	3.60		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Lead (Pb)-Total	0.00117		0.000090	mg/L	16-AUG-12	16-AUG-12	R2418566
Lithium (Li)-Total	0.0042		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Magnesium (Mg)-Total	6.33		0.010	mg/L	16-AUG-12	16-AUG-12	R2418566
Manganese (Mn)-Total	0.199		0.00030	mg/L	16-AUG-12	16-AUG-12	R2418566
Molybdenum (Mo)-Total	0.00079		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Nickel (Ni)-Total	0.0077		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Phosphorus (P)-Total	6.89		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Potassium (K)-Total	23.3		0.020	mg/L	16-AUG-12	16-AUG-12	R2418566
Rubidium (Rb)-Total	0.0227		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566

* 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
L1193722-2 ARV-4							
Sampled By: CLIENT on 13-AUG-12							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Selenium (Se)-Total	0.0020		0.0010	mg/L	16-AUG-12	16-AUG-12	R2418566
Silicon (Si)-Total	5.80		0.050	mg/L	16-AUG-12	16-AUG-12	R2418566
Silver (Ag)-Total	0.00019		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Sodium (Na)-Total	72.5		0.030	mg/L	16-AUG-12	16-AUG-12	R2418566
Strontium (Sr)-Total	0.176		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Thorium (Th)-Total	0.00019		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Tin (Sn)-Total	0.00133		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Titanium (Ti)-Total	0.00637		0.00050	mg/L	16-AUG-12	16-AUG-12	R2418566
Tungsten (W)-Total	0.00024		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Uranium (U)-Total	0.00027		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Vanadium (V)-Total	0.00412		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Zinc (Zn)-Total	0.0199		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Zirconium (Zr)-Total	0.00171		0.00040	mg/L	16-AUG-12	16-AUG-12	R2418566
L1193722-3 ARV-5							
Sampled By: CLIENT on 13-AUG-12							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		15-AUG-12	R2417762
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		16-AUG-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		15-AUG-12	R2417762
Miscellaneous Parameters							
Ammonia, Total (as N)	0.031		0.010	mg/L		21-AUG-12	R2421165
Biochemical Oxygen Demand	<6.0		6.0	mg/L	15-AUG-12	20-AUG-12	R2420411
Conductivity	697		20	umhos/cm		15-AUG-12	R2417250
Fecal Coliforms	<3		3	MPN/100mL		18-AUG-12	R2419583
Mercury (Hg)-Total	<0.000020		0.000020	mg/L	21-AUG-12	21-AUG-12	R2420923
Oil and Grease, Total	<2.0		2.0	mg/L	17-AUG-12	17-AUG-12	R2418795
Phenols (4AAP)	<0.0010		0.0010	mg/L	21-AUG-12	21-AUG-12	R2421332
Sulfate	1.78		0.50	mg/L		15-AUG-12	R2417762
Total Suspended Solids	14.0		5.0	mg/L		15-AUG-12	R2418202
pH	7.37		0.10	pH units		15-AUG-12	R2417250
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.0718		0.0050	mg/L	16-AUG-12	16-AUG-12	R2418566
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Arsenic (As)-Total	0.00093		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Barium (Ba)-Total	0.0294		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Beryllium (Be)-Total	0.00041		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Boron (B)-Total	0.065		0.010	mg/L	16-AUG-12	16-AUG-12	R2418566
Cadmium (Cd)-Total	0.000016		0.000010	mg/L	16-AUG-12	16-AUG-12	R2418566
Calcium (Ca)-Total	23.4		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Chromium (Cr)-Total	<0.0010		0.0010	mg/L	16-AUG-12	16-AUG-12	R2418566
Cobalt (Co)-Total	0.00023		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Copper (Cu)-Total	0.00065		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566

* 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
L1193722-3 ARV-5							
Sampled By: CLIENT on 13-AUG-12							
Matrix: WASTEWATER							
Total Metals by ICP-MS							
Iron (Fe)-Total	5.89		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Lead (Pb)-Total	0.00160		0.000090	mg/L	16-AUG-12	16-AUG-12	R2418566
Lithium (Li)-Total	0.0057		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Magnesium (Mg)-Total	13.8		0.010	mg/L	16-AUG-12	16-AUG-12	R2418566
Manganese (Mn)-Total	0.0979		0.00030	mg/L	16-AUG-12	16-AUG-12	R2418566
Molybdenum (Mo)-Total	0.00022		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Nickel (Ni)-Total	<0.0020		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Phosphorus (P)-Total	<0.10		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Potassium (K)-Total	4.83		0.020	mg/L	16-AUG-12	16-AUG-12	R2418566
Rubidium (Rb)-Total	0.00516		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Selenium (Se)-Total	<0.0010		0.0010	mg/L	16-AUG-12	16-AUG-12	R2418566
Silicon (Si)-Total	0.446		0.050	mg/L	16-AUG-12	16-AUG-12	R2418566
Silver (Ag)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Sodium (Na)-Total	105		0.030	mg/L	16-AUG-12	16-AUG-12	R2418566
Strontium (Sr)-Total	0.182		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Thorium (Th)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Tin (Sn)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Titanium (Ti)-Total	0.00406		0.00050	mg/L	16-AUG-12	16-AUG-12	R2418566
Tungsten (W)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Uranium (U)-Total	0.00011		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Vanadium (V)-Total	0.00102		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Zinc (Zn)-Total	<0.0020		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Zirconium (Zr)-Total	<0.00040		0.00040	mg/L	16-AUG-12	16-AUG-12	R2418566
L1193722-4 ARV-6							
Sampled By: CLIENT on 13-AUG-12							
Matrix: WASTEWATER							
Nitrate + Nitrite							
Nitrate as N by Ion Chromatography							
Nitrate-N	<0.050		0.050	mg/L		15-AUG-12	R2417762
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		16-AUG-12	
Nitrite as N by Ion Chromatography							
Nitrite-N	<0.050		0.050	mg/L		15-AUG-12	R2417762
Miscellaneous Parameters							
Ammonia, Total (as N)	0.410		0.010	mg/L		21-AUG-12	R2421165
Biochemical Oxygen Demand	7.8		6.0	mg/L	15-AUG-12	20-AUG-12	R2420411
Conductivity	650		20	umhos/cm		15-AUG-12	R2417250
Fecal Coliforms	<3		3	MPN/100mL		18-AUG-12	R2419583
Mercury (Hg)-Total	<0.00020	DLM	0.00020	mg/L	21-AUG-12	21-AUG-12	R2420923
Oil and Grease, Total	101	DLIV	6.0	mg/L	17-AUG-12	17-AUG-12	R2418795
Phenols (4AAP)	0.0030		0.0010	mg/L	21-AUG-12	21-AUG-12	R2421332
Sulfate	<0.50		0.50	mg/L		15-AUG-12	R2417762
Total Suspended Solids	152		5.0	mg/L		15-AUG-12	R2418202
pH	6.39		0.10	pH units		15-AUG-12	R2417250
Total Metals by ICP-MS							
Aluminum (Al)-Total	0.129		0.0050	mg/L	16-AUG-12	16-AUG-12	R2418566
Antimony (Sb)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Arsenic (As)-Total	0.00215		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566

* 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
L1193722-4 ARV-6 Sampled By: CLIENT on 13-AUG-12 Matrix: WASTEWATER							
Total Metals by ICP-MS							
Barium (Ba)-Total	0.145		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Beryllium (Be)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Bismuth (Bi)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Boron (B)-Total	0.054		0.010	mg/L	16-AUG-12	16-AUG-12	R2418566
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	16-AUG-12	16-AUG-12	R2418566
Calcium (Ca)-Total	34.2		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Cesium (Cs)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Chromium (Cr)-Total	0.0056		0.0010	mg/L	16-AUG-12	16-AUG-12	R2418566
Cobalt (Co)-Total	0.00221		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Copper (Cu)-Total	0.00138		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Iron (Fe)-Total	53.1		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Lead (Pb)-Total	0.000189		0.000090	mg/L	16-AUG-12	16-AUG-12	R2418566
Lithium (Li)-Total	0.0064		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Magnesium (Mg)-Total	10.8		0.010	mg/L	16-AUG-12	16-AUG-12	R2418566
Manganese (Mn)-Total	2.37		0.00030	mg/L	16-AUG-12	16-AUG-12	R2418566
Molybdenum (Mo)-Total	0.00042		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Nickel (Ni)-Total	<0.00020		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Phosphorus (P)-Total	0.10		0.10	mg/L	16-AUG-12	16-AUG-12	R2418566
Potassium (K)-Total	3.67		0.020	mg/L	16-AUG-12	16-AUG-12	R2418566
Rubidium (Rb)-Total	0.00638		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Selenium (Se)-Total	<0.0010		0.0010	mg/L	16-AUG-12	16-AUG-12	R2418566
Silicon (Si)-Total	3.42		0.050	mg/L	16-AUG-12	16-AUG-12	R2418566
Silver (Ag)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Sodium (Na)-Total	80.6		0.030	mg/L	16-AUG-12	16-AUG-12	R2418566
Strontium (Sr)-Total	0.227		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Thallium (Tl)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Thorium (Th)-Total	0.00016		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Tin (Sn)-Total	<0.00020		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Titanium (Ti)-Total	0.00699		0.00050	mg/L	16-AUG-12	16-AUG-12	R2418566
Tungsten (W)-Total	<0.00010		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Uranium (U)-Total	0.00017		0.00010	mg/L	16-AUG-12	16-AUG-12	R2418566
Vanadium (V)-Total	0.00289		0.00020	mg/L	16-AUG-12	16-AUG-12	R2418566
Zinc (Zn)-Total	0.0110		0.0020	mg/L	16-AUG-12	16-AUG-12	R2418566
Zirconium (Zr)-Total	0.00068		0.00040	mg/L	16-AUG-12	16-AUG-12	R2418566

* 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
DLIV	Detection Limit Adjusted: Lower Initial Volume
DLM	Detection Limit Adjusted For Sample Matrix Effects

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 analysis of metals by inductively coupled-mass spectrometry.			
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 aqueous 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.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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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 ww - milligrams per kilogram based on wet weight of sample

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

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

< - Less than.

D.L. - The reporting limit.

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

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

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

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

[illegible][illegible]

L1193722-COFC

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 on)	
Released by:	Date (dd-mm-yy)	Received by:	Date:	Time:	Temperature:
<i>[Signature]</i>	<i>13/01/2</i>	<i>[Signature]</i>	<i>14 Aug</i>	<i>15:31</i>	<i>°C</i>
			Verified by:	Date:	Observations:
					Yes / No ? If Yes add SIF

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