

Hamlet of Fort Liard  
Water License MV2009L3-0025  
Annual report 2013

File \_\_\_\_\_ March 11, 2014

MAY 13 2014

January 1<sup>st</sup> 2013 through December 31, 2013

Application # MV2009L3-0025

Copied To MB 102

The Hamlet continues to work in compliance with terms, conditions and Regulations of license issued March 1, 2010. Quality and consistency of potable water supplied to the community remains in good practice and is maintained in water plant daily operations. Water plant operation, sewage and solid waste disposal facilities operations are staffed on a daily basis. The Hamlet employees 3 certified plant operators to ensure compliance with water license conditions.

Standard Operating Procedures for the Class 1 Water Plant were prepared and completed by Altime Engineering at the end of 2012 and put into practice in January 2013. Changes made in water plant operation and equipment were relocation of chlorine injection pumps and the related injection line location. Minor problems with UV Filters wiper system were encountered and corrected. Re-painting of the interior of the plant was completed during this reporting period. On-going plant maintenance is performed as needed. Bacteriological water tests are completed regularly with test results submitted monthly to the Environmental Health Officer. The In-Plant testing of Trihalomethanes (THM's) was implemented in January 2013 and is completed and reported monthly. Testing of in service water delivery trucks is completed on a daily basis with potable water service and emergency water service trucks tanks being cleaned and disinfected once or more during the reporting period. Water Plant Chemical and Physical parameter tests were taken with results submitted in June 2013 (*copy of test results attached*). Test results were re-transmitted in November 2013.

No changes have been made in solid waste site operations. Repairs to temporary wind fencing surrounding the waste trench area have been completed as needed. The garbage disposal trench constructed in 2010/11 is approaching its maximum fill capacity with construction of the next disposal trench area planned for in 2014. Continued sorting of municipal bulk waste of metals, appliances, tires, household hazardous waste and other bulk waste materials is ongoing within the bulk waste disposal area. Work continues on cleanup of the previous municipal waste area in preparation for future site reclamation.

A Sewage Lagoon effluent test of Lagoon #3 was taken in June 2013, test results submitted, and a scheduled decant was performed. Cell to cell lagoon transfers were completed following decant and were conducted as needed throughout the year. Water run off trapped in the lagoon taken out of service in 2008 was tested, results submitted and decant performed in July. Sewage lagoon area clean-up of blown litter and bush growing along lagoon dyke areas was removed during the summer operations period. No modifications or changes were made to sewage lagoon facilities during this reporting period. Regular maintenance has consisted of dyke structure upkeep, ongoing access road grading and blown litter clean-up.

Attachments:

- Monthly Water Consumption Volume 2013
  - Municipal Water Volume 2013
  - Plant operations Volume 2013
- Sewage Disposal Tracking and Volumes 2013
- Solid Waste tracking 2013
- CARO Analytical Services Analysis Annual Water Plant Tests

Alan Harris  
Manager Municipal Operations  
Hamlet of Fort Liard

Molly Duntra  
Acting Chief Administration Officer  
Hamlet of Fort Liard

Copy of this report to:

MVLWB, Regulatory Officer, Yellowknife  
AANDC, South Mackenzie Sub-District, Fort Smith

**Monthly Water Consumption January thru December 2013**

**INFLOW Totals** – totals obtained daily from Plant well inflow meter

January	1,598,708
February	1,467,137
March	1,624,879
April	1,582,161
May	1,832,303
June	1,819,704
July	2,120,308
August	1,823,704
September	1,598,487
October	1,635,627
November	<b>1,692,673</b>
December	1,715,620

**Yearly total 2013:      20,511,311 litres      20,511.31 m3**

**Fort Liard 2013****Plant Operation water use**

<b>Greensand Filter Backwash Totals:</b>	<b>Softner System Backwash Totals:</b>	<b>In Plant Water use Totals:</b>	
January	20,186	146,627	2535
February	14,800	135,772	3509
March	22,200	150,634	4848
April	14,800	146,368	5298
May	18,500	167,476	19,984
June	14,800	100,140	25,122
July	14,800	189,043	24,618
August	18,500	162,169	26,649
September	14,800	140,519	25,417
October	14,800	72,463	20,506
November	14,800	140,248	9372
December	<u>14,800</u>	<u>151,065</u>	<u>9831</u>
<b>Total litres</b>	<b>197,786</b>	<b>1,702,524</b>	<b>177,689</b>

**Fort Liard Water Plant in house total plant water use (Softner and Greensand Filter Backwash):**

**Total 2,077,999 LITRES            2,078 m3**

**Fort Liard 2013**

**2013 Sewage Lagoon Tracking**

March 06/13 – 9:30 PM completed transfer Cell #2 to Cell #3  
March 07/13 – 1:00 PM started cell transfer Cell #1 to Cell #2  
March 11/13 – 10:00 PM completed cell transfer Cell #1 to Cell#2  
June 21/13 - received test results from Caro  
June 24/13 – Talked with MVLWB and faxed test results  
June 24/13 - Started decant lagoon #3, 4:30 PM  
June 25/13 – faxed test results to AANDC  
July 02/13 - Completed decant cell #3 – estimated volume 17,775 cu m  
July 02/13 - Started cell transfer lagoon #2 to #3  
July 06/13 – Completed lagoon #2 transfer  
July 08/13 – Started cell transfer #1 to #2  
July 12/13 – Cell #1 transfer complete  
July 18/13 – Started decant from old lagoon (X) 4:00 PM  
July 21/13 – Stopped decant, cell to low to keep pumping unattended  
July 29/13 – Completed lagoon X decant – estimated volume 7000 cu m  
August 14/13 – started transferring old garbage area water into lagoon X  
August 27/13 – dug old dump transfer ditch deeper for continuing drainage to lagoon X  
December 03/13 – started lagoon 2 to 3 transfer at 5:30 PM  
December 06/13 – completed lagoon #2 to #3 transfer at 3:00 PM  
December 10/13 – started lagoon #1 - #2 transfer at 2:30 PM  
December 13/13 – completed lagoon #1 transfer

**Quantities of sewage discharged during decant operation**

June 24 – July 02	<b>Cell #3 decant:</b>	estimated <b>17775 cu m</b>
July 18 – 21 and July 28 – 29	<b>Out of service lagoon (X) decant:</b>	estimated <b>7000 cu m</b>

**Total estimated 2013 decant: 24,775 cu m**

Fort Liard Municipal Waste tracking 2013 **Average cubic meters per load 10 cu m**

Week of	Loads	Cubic Meters	Week of	Loads	Cubic Meters
Tuesday, January 01, 2013	3	30	Monday, November 11, 2013	3	30
Monday, January 07, 2013	3	30	Monday, November 18, 2013	2	20
Monday, January 14, 2013	2	20	Monday, November 25, 2013	3	30
Monday, January 21, 2013	2	20	Monday, December 02, 2013	2	20
Monday, January 28, 2013	2	20	Monday, December 09, 2013	2	20
Monday, February 04, 2013	3	30	Monday, December 16, 2013	2	20
Monday, February 11, 2013	2	20	Monday, December 23, 2013	3	30
Monday, February 18, 2013	2	20	Monday, December 30, 2013	<u>3</u>	<u>30</u>
Monday, February 25, 2013	2	20	<b>20</b>		<b>200 cu m</b>
Monday, March 04, 2013	2	20			
Monday, March 11, 2013	3	30			
Monday, March 18, 2013	2	20		106	1060
Monday, March 25, 2013	2	20		<u>20</u>	<u>200</u>
Monday, April 01, 2013	2	20	<b>Total</b>	<b>126</b>	<b>1260 cu m</b>
Monday, April 08, 2013	2	20			
Monday, April 15, 2013	3	30			
Monday, April 22, 2013	3	30			
Monday, April 29, 2013	2	20			
Monday, May 06, 2013	3	30			
Monday, May 13, 2013	2	20			
Monday, May 20, 2013	2	20			
Monday, May 27, 2013	3	30			
Monday, June 03, 2013	2	20			
Monday, June 10, 2013	2	20			
Monday, June 17, 2013	2	20			
Monday, June 24, 2013	3	30			
Monday, July 01, 2013	2	20			
Monday, July 08, 2013	2	20			
Monday, July 15, 2013	3	30			
Monday, July 22, 2013	2	20			
Monday, July 29, 2013	2	20			
Monday, August 05, 2013	2	20			
Monday, August 12, 2013	2	20			
Monday, August 19, 2013	2	20			
Monday, August 26, 2013	3	30			
Monday, September 02, 2013	3	30			
Monday, September 9, 2013	2	20			
Monday, September 16, 2013	3	30			
Monday, September 23, 2013	3	30			
Monday, September 30, 2013	2	20			
Monday, October 07, 2013	3	30			
Monday, October 14, 2013	2	20			
Monday, October 21, 2013	2	20			
Monday, October 28, 2013	3	20			
Monday, November 04, 2013	<u>2</u>	<u>30</u>			
	<b>106</b>	<b>1060</b>			



## CERTIFICATE OF ANALYSIS

<b>REPORTED TO</b>	Fort Liard, Hamlet of 174 Valley Main Street Fort Liard, NT X0G 0A0	<b>TEL</b>	1-867-770-4104
		<b>FAX</b>	1-867-770-4004
<b>ATTENTION</b>	Alan Harris	<b>WORK ORDER</b>	3060675
<b>PO NUMBER</b>		<b>RECEIVED / TEMP</b>	Jun-12-13 11:05 / 12°C
<b>PROJECT</b>	Annual Water Plant Tests	<b>REPORTED</b>	Jun-19-13
<b>PROJECT INFO</b>		<b>COC NUMBER</b>	A00573

### General Comments:

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

A handwritten signature in cursive script, appearing to read "J. Shanko".

Issued By:

**Jennifer Shanko, ASCT For Doug Johnson**  
Business Manager, Edmonton

*Please contact CARO if more information is needed or to provide feedback on our services.*

### Locations:

#110 4011 Viking Way  
Richmond, BC V6V 2K9  
Tel: 604-279-1499 Fax: 604-279-1599

#102 3677 Highway 97N  
Kelowna, BC V1X 5C3  
Tel: 250-765-9046 Fax: 250-765-3893

17225 109 Avenue  
Edmonton, AB T5S 1H7  
Tel: 780-489-9100 Fax: 780-489-0700

www.caroservices.com



**ANALYSIS INFORMATION**

**REPORTED TO PROJECT** Fort Liard, Hamlet of Annual Water Plant Tests

**WORK ORDER REPORTED** 3060675 Jun-19-13

Analysis Description	Method Reference (* = modified from)		Location
	Preparation	Analysis	
Alkalinity, total	N/A	APHA 2320 B	Edmonton
Carbon, Dissolved Organic	N/A	APHA 5310 B	Edmonton
Carbon, Total Organic in Water	N/A	APHA 5310 B	Edmonton
Chloride in Water by IC	N/A	APHA 4110 B	Edmonton
Colour, Apparent	N/A	APHA 2120 B	Edmonton
Conductivity in Water	N/A	APHA 2510 B	Edmonton
Cyanide, Total in Liquids	APHA 4500-CN C	APHA 4500-CN E	Kelowna
Extractable Metals	APHA 3030 C *	APHA 3125 B	Richmond
Fluoride in Water by IC	N/A	APHA 4110 B	Edmonton
Hardness as CaCO3 (CALC)	N/A	APHA 2340 B	Edmonton
Major Cations (Dissolved)	APHA 3030 B	APHA 3120 B	Edmonton
Nitrate-N in Water by IC	N/A	APHA 4110 B	Edmonton
pH in Water	N/A	APHA 4500-H+ B	Edmonton
Sulfate in Water by IC	N/A	APHA 4110 B	Edmonton
Total Dissolved Solids	N/A	APHA 2540 C *	Edmonton
Total Suspended Solids	N/A	APHA 2540 D *	Edmonton
Trihalomethanes	EPA 5030B / 5021A	APHA 6200 B	Richmond
Turbidity	N/A	APHA 2130 B	Edmonton

*Note: The numbers in brackets represent the year that the method was published/approved*

**Method Reference Descriptions:**

APHA Standard Methods for the Examination of Water and Wastewater, American Public Health Association  
 EPA United States Environmental Protection Agency Test Methods

**Glossary of Terms:**

MRL Method Reporting Limit  
 < Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences  
 Color Unit Colour referenced against a platinum cobalt standard  
 mg/L Milligrams per litre  
 NTU Nephelometric Turbidity Units  
 pH units pH < 7 = acidic, pH > 7 = basic  
 uS/cm Microsiemens per centimeter





## SAMPLE ANALYTICAL DATA

REPORTED TO Fort Liard, Hamlet of  
PROJECT Annual Water Plant Tests

WORK ORDER 3060675  
REPORTED Jun-19-13

Analyte	Result / Recovery	MRL / Limit	Units	Prepared	Analyzed	Notes
<b>Sample ID: Raw water (3060675-01) [Water] Sampled: Jun-11-13 10:05</b>						
<b>Major Cations (Dissolved)</b>						
Calcium, dissolved	90.9	0.1 mg/L		N/A	Jun-13-13	
Magnesium, dissolved	16.7	0.05 mg/L		N/A	Jun-13-13	
Sodium, dissolved	11.6	0.05 mg/L		N/A	Jun-13-13	
<b>Anions</b>						
Alkalinity, Total as CaCO <sub>3</sub>	259	1 mg/L		N/A	Jun-12-13	
Chloride	8.1	0.5 mg/L		N/A	Jun-14-13	
Fluoride	< 0.1	0.1 mg/L		N/A	Jun-14-13	
Nitrogen, Nitrate as N	< 0.05	0.05 mg/L		N/A	Jun-14-13	HT
Sulfate	37.5	0.5 mg/L		N/A	Jun-14-13	
<b>General Parameters</b>						
Carbon, Total Organic	7	1 mg/L		N/A	Jun-13-13	
Carbon, Dissolved Organic	7	1 mg/L		N/A	Jun-13-13	
Colour, Apparent	50	5 Color Unit		N/A	Jun-13-13	
Conductivity (EC)	579	1 uS/cm		N/A	Jun-13-13	
Cyanide, total	< 0.010	0.010 mg/L		Jun-18-13	Jun-18-13	
pH	7.60	0.05 pH units		N/A	Jun-13-13	HT
Solids, Total Dissolved	352	10 mg/L		N/A	Jun-18-13	
Solids, Total Suspended	< 2	2 mg/L		N/A	Jun-17-13	
Turbidity	6.1	0.1 NTU		N/A	Jun-13-13	
<b>Calculated Parameters</b>						
Total Trihalomethanes	< 0.004	0.004 mg/L		N/A	N/A	
Total Trihalomethanes (as CHCl <sub>3</sub> )	< 0.003	0.003 mg/L		N/A	N/A	
Hardness, Total (as CaCO <sub>3</sub> )	296	0.46 mg/L		N/A	N/A	
<b>Extractable Metals</b>						
Aluminum, extractable	0.009	0.005 mg/L		Jun-14-13	Jun-17-13	
Arsenic, extractable	< 0.0005	0.0005 mg/L		Jun-14-13	Jun-17-13	
Barium, extractable	0.534	0.005 mg/L		Jun-14-13	Jun-17-13	
Cadmium, extractable	0.00030	0.00001 mg/L		Jun-14-13	Jun-17-13	
Chromium, extractable	< 0.0005	0.0005 mg/L		Jun-14-13	Jun-17-13	
Copper, extractable	0.0003	0.0002 mg/L		Jun-14-13	Jun-17-13	
Iron, extractable	1.37	0.01 mg/L		Jun-14-13	Jun-17-13	
Lead, extractable	< 0.0001	0.0001 mg/L		Jun-14-13	Jun-17-13	
Manganese, extractable	0.128	0.0002 mg/L		Jun-14-13	Jun-17-13	
Mercury, extractable	< 0.00002	0.00002 mg/L		Jun-14-13	Jun-17-13	
Selenium, extractable	< 0.0005	0.0005 mg/L		Jun-14-13	Jun-17-13	
Uranium, extractable	0.00116	0.00002 mg/L		Jun-14-13	Jun-17-13	
Zinc, extractable	0.015	0.004 mg/L		Jun-14-13	Jun-17-13	
<b>Volatile Organic Compounds (VOC)</b>						
Bromodichloromethane	< 0.001	0.001 mg/L		N/A	Jun-18-13	
Bromoform	< 0.001	0.001 mg/L		N/A	Jun-18-13	
Chloroform	< 0.001	0.001 mg/L		N/A	Jun-18-13	
Dibromochloromethane	< 0.001	0.001 mg/L		N/A	Jun-18-13	



SAMPLE ANALYTICAL DATA

REPORTED TO PROJECT Fort Liard, Hamlet of Annual Water Plant Tests

WORK ORDER 3060675  
REPORTED Jun-19-13

Analyte	Result / Recovery	MRL / Limit	Units	Prepared	Analyzed	Notes
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Sample ID: Raw water (3060675-01) [Water] Sampled: Jun-11-13 10:05, Continued

*Volatile Organic Compounds (VOC), Continued*

Surrogate: Toluene-d8	89 %	80-120		N/A	Jun-18-13	
Surrogate: 4-Bromofluorobenzene	87 %	80-120		N/A	Jun-18-13	

**Sample / Analysis Qualifiers:**

HT Sample prepared / analyzed outside of the recommended holding time.



QUALITY CONTROL DATA

REPORTED TO Fort Liard, Hamlet of  
PROJECT Annual Water Plant Tests

WORK ORDER 3060675  
REPORTED Jun-19-13

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** Laboratory reagent water is carried through sample preparation and analysis steps. Method Blanks indicate that results are free from contamination, i.e. not biased high from sources such as the sample container or the laboratory environment
- **Duplicate (Dup):** Preparation and analysis of a replicate aliquot of a sample. Duplicates provide a measure of the analytical method's precision, i.e. how reproducible a result is. Duplicates are only reported if they are associated with your sample data.
- **Blank Spike (BS):** A known amount of standard is carried through sample preparation and analysis steps. Blank Spikes, also known as laboratory control samples (LCS), are prepared from a different source of standard than used for the calibration. They ensure that the calibration is acceptable (i.e. not biased high or low) and also provide a measure of the analytical method's accuracy (i.e. closeness of the result to a target value).
- **Standard Reference Material (SRM):** A material of similar matrix to the samples, externally certified for the parameter(s) listed. Standard Reference Materials ensure that the preparation steps in the method are adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	RPD	RPD Limit	Notes
<b>Anions, Batch B3F0488</b>									
<b>Blank (B3F0488-BLK1)</b> Prepared: Jun-12-13, Analyzed: Jun-12-13									
Alkalinity, Total as CaCO3	3	1 mg/L							BLK
<b>LCS (B3F0488-BS1)</b> Prepared: Jun-12-13, Analyzed: Jun-12-13									
Alkalinity, Total as CaCO3	243	1 mg/L	250		97	94-108			
<b>Anions, Batch B3F0560</b>									
<b>Blank (B3F0560-BLK1)</b> Prepared: Jun-14-13, Analyzed: Jun-14-13									
Chloride	< 0.5	0.5 mg/L							
Fluoride	< 0.1	0.1 mg/L							
Nitrogen, Nitrate as N	< 0.05	0.05 mg/L							
Sulfate	< 0.5	0.5 mg/L							
<b>Blank (B3F0560-BLK2)</b> Prepared: Jun-14-13, Analyzed: Jun-14-13									
Chloride	< 0.5	0.5 mg/L							
Fluoride	< 0.1	0.1 mg/L							
Nitrogen, Nitrate as N	< 0.05	0.05 mg/L							
Sulfate	< 0.5	0.5 mg/L							
<b>Blank (B3F0560-BLK3)</b> Prepared: Jun-14-13, Analyzed: Jun-14-13									
Chloride	< 0.5	0.5 mg/L							
Fluoride	< 0.1	0.1 mg/L							
Nitrogen, Nitrate as N	< 0.05	0.05 mg/L							
Sulfate	< 0.5	0.5 mg/L							
<b>Blank (B3F0560-BLK4)</b> Prepared: Jun-14-13, Analyzed: Jun-14-13									
Chloride	< 0.5	0.5 mg/L							
Fluoride	< 0.1	0.1 mg/L							
Nitrogen, Nitrate as N	< 0.05	0.05 mg/L							
Sulfate	< 0.5	0.5 mg/L							



QUALITY CONTROL DATA

REPORTED TO Fort Liard, Hamlet of  
PROJECT Annual Water Plant Tests

WORK ORDER 3060675  
REPORTED Jun-19-13

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	RPD	RPD Limit	Notes
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Anions, Batch B3F0560, Continued

Blank (B3F0560-BLK5)		Prepared: Jun-14-13, Analyzed: Jun-14-13							
Chloride	< 0.5	0.5 mg/L							
Fluoride	< 0.1	0.1 mg/L							
Nitrogen, Nitrate as N	< 0.05	0.05 mg/L							
Sulfate	< 0.5	0.5 mg/L							

LCS (B3F0560-BS1)		Prepared: Jun-14-13, Analyzed: Jun-14-13							
Chloride	9.8	0.5 mg/L	10.0		98	91-114			
Fluoride	1.0	0.1 mg/L	1.00		103	75-118			
Nitrogen, Nitrate as N	1.00	0.05 mg/L	1.00		100	88-114			
Sulfate	48.6	0.5 mg/L	50.0		97	92-117			

LCS (B3F0560-BS2)		Prepared: Jun-14-13, Analyzed: Jun-14-13							
Chloride	10.2	0.5 mg/L	10.0		102	81-114			
Fluoride	1.0	0.1 mg/L	1.00		105	75-118			
Nitrogen, Nitrate as N	1.06	0.05 mg/L	1.00		106	88-114			
Sulfate	50.1	0.5 mg/L	50.0		100	92-117			

Extractable Metals, Batch B3F0572

Blank (B3F0572-BLK1)		Prepared: Jun-14-13, Analyzed: Jun-17-13							
Aluminum, extractable	< 0.005	0.005 mg/L							
Arsenic, extractable	< 0.0005	0.0005 mg/L							
Barium, extractable	< 0.005	0.005 mg/L							
Cadmium, extractable	< 0.00001	0.00001 mg/L							
Chromium, extractable	< 0.0005	0.0005 mg/L							
Copper, extractable	< 0.0002	0.0002 mg/L							
Iron, extractable	< 0.01	0.01 mg/L							
Lead, extractable	< 0.0001	0.0001 mg/L							
Manganese, extractable	< 0.0002	0.0002 mg/L							
Mercury, extractable	< 0.00002	0.00002 mg/L							
Selenium, extractable	< 0.0005	0.0005 mg/L							
Uranium, extractable	< 0.00002	0.00002 mg/L							
Zinc, extractable	< 0.004	0.004 mg/L							

Duplicate (B3F0572-DUP1)		Source: 3060675-01		Prepared: Jun-14-13, Analyzed: Jun-17-13					
Aluminum, extractable	< 0.005	0.005 mg/L	0.009						20
Arsenic, extractable	< 0.0005	0.0005 mg/L	< 0.0005						20
Barium, extractable	0.514	0.005 mg/L	0.534				4		20
Cadmium, extractable	0.00027	0.00001 mg/L	0.00030				13		20
Chromium, extractable	< 0.0005	0.0005 mg/L	< 0.0005						20
Copper, extractable	0.0002	0.0002 mg/L	0.0003						20
Iron, extractable	1.31	0.01 mg/L	1.37				4		20
Lead, extractable	< 0.0001	0.0001 mg/L	< 0.0001						20
Manganese, extractable	0.123	0.0002 mg/L	0.128				4		20
Mercury, extractable	< 0.00002	0.00002 mg/L	< 0.00002						20
Selenium, extractable	< 0.0005	0.0005 mg/L	< 0.0005						20
Uranium, extractable	0.00111	0.00002 mg/L	0.00116				4		20
Zinc, extractable	0.015	0.004 mg/L	0.015						20

Matrix Spike (B3F0572-MS1)		Source: 3060675-01		Prepared: Jun-14-13, Analyzed: Jun-17-13					
Arsenic, extractable	0.188	0.0005 mg/L	0.200	< 0.0005	94	86-117			
Barium, extractable	1.39	0.005 mg/L	1.00	0.534	56	83-114			
Cadmium, extractable	0.00059	0.00001 mg/L	0.100	0.00030	96	37-113			
Chromium, extractable	0.390	0.0005 mg/L	0.400	< 0.0005	97	83-114			
Copper, extractable	0.393	0.0002 mg/L	0.400	0.0003	88	86-117			
Iron, extractable	3.19	0.01 mg/L	2.00	1.37	91	69-130			



QUALITY CONTROL DATA

REPORTED TO Fort Liard, Hamlet of  
PROJECT Annual Water Plant Tests

WORK ORDER 3030675  
REPORTED Jun-19-13

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	RPD	RPD Limit	Notes
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Extractable Metals, Batch B3F0572, Continued

Matrix Spike (B3F0572-MS1), Continued		Source: 3060675-01		Prepared: Jun-14-13, Analyzed: Jun-17-13					
Lead, extractable	0.197	0.0001 mg/L	0.200	< 0.0001	99	87-113			
Manganese, extractable	0.506	0.0002 mg/L	0.400	0.128	95	81-136			
Selenium, extractable	0.0949	0.0005 mg/L	0.100	< 0.0005	95	85-121			
Zinc, extractable	0.955	0.004 mg/L	1.00	0.015	94	82-120			

Reference (B3F0572-SRM1)		Prepared: Jun-14-13, Analyzed: Jun-17-13							
Aluminum, extractable	0.244	0.005 mg/L	0.233		105	58-142			
Arsenic, extractable	0.445	0.0005 mg/L	0.438		102	81-119			
Barium, extractable	3.36	0.005 mg/L	3.35		100	83-117			
Cadmium, extractable	0.233	0.00001 mg/L	0.224		104	83-117			
Chromium, extractable	0.462	0.0005 mg/L	0.437		106	81-119			
Copper, extractable	0.919	0.0002 mg/L	0.844		109	94-116			
Iron, extractable	1.36	0.01 mg/L	1.29		106	77-126			
Lead, extractable	0.123	0.0001 mg/L	0.112		110	72-128			
Manganese, extractable	0.367	0.0002 mg/L	0.345		108	84-116			
Selenium, extractable	0.0339	0.0005 mg/L	0.0331		102	70-130			
Uranium, extractable	0.281	0.00002 mg/L	0.286		106	85-115			
Zinc, extractable	0.912	0.004 mg/L	0.881		104	72-128			

General Parameters, Batch B3F0435

Blank (B3F0435-BLK1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Colour, Apparent	< 5	5 Color Unit							
LCS (B3F0435-BS1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Colour, Apparent	20	5 Color Unit	20.0		100	98-102			
Duplicate (B3F0435-DUP1)		Source: 3060675-01		Prepared: Jun-13-13, Analyzed: Jun-13-13					
Colour, Apparent	50	5 Color Unit	50			< 1	5		

General Parameters, Batch B3F0437

Blank (B3F0437-BLK1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Turbidity	< 0.1	0.1 NTU							
LCS (B3F0437-BS1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Turbidity	25.0	0.1 NTU	25.0		100	83-106			
Duplicate (B3F0437-DUP1)		Source: 3060675-01		Prepared: Jun-13-13, Analyzed: Jun-13-13					
Turbidity	6.2	0.1 NTU	6.1			1	12		

General Parameters, Batch B3F0468

Blank (B3F0468-BLK1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Carbon, Total Organic	< 1	1 mg/L							
Blank (B3F0468-BLK2)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Carbon, Total Organic	< 1	1 mg/L							
Blank (B3F0468-BLK3)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Carbon, Total Organic	< 1	1 mg/L							
LCS (B3F0468-BS1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Carbon, Total Organic	53	1 mg/L	50.0		105	50-117			



## QUALITY CONTROL DATA

REPORTED TO Fort Liard, Hamlet of  
PROJECT Annual Water Plant Tests

WORK ORDER 3060675  
REPORTED Jun-19-13

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	RPD	RPD Limit	Notes
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## General Parameters, Batch B3F0468, Continued

LCS (B3F0468-BS2) Prepared: Jun-13-13, Analyzed: Jun-13-13

Carbon, Total Organic 53 1 mg/L 50.0 106 90-117

## General Parameters, Batch B3F0470

Blank (B3F0470-BLK1) Prepared: Jun-13-13, Analyzed: Jun-13-13

Carbon, Dissolved Organic &lt;1 1 mg/L

Blank (B3F0470-BLK2) Prepared: Jun-13-13, Analyzed: Jun-13-13

Carbon, Dissolved Organic &lt;1 1 mg/L

Blank (B3F0470-BLK3) Prepared: Jun-13-13, Analyzed: Jun-13-13

Carbon, Dissolved Organic &lt;1 1 mg/L

LCS (B3F0470-BS1) Prepared: Jun-13-13, Analyzed: Jun-13-13

Carbon, Dissolved Organic 52 1 mg/L 50.0 105 92-114

LCS (B3F0470-BS2) Prepared: Jun-13-13, Analyzed: Jun-13-13

Carbon, Dissolved Organic 53 1 mg/L 50.0 106 92-114

## General Parameters, Batch B3F0475

Duplicate (B3F0475-DUP1) Source: 3060675-01 Prepared: Jun-13-13, Analyzed: Jun-13-13

pH 7.62 0.05 pH units 7.60 &lt;1 3

Reference (B3F0475-SRM1) Prepared: Jun-13-13, Analyzed: Jun-13-13

pH 7.92 0.05 pH units 7.80 102 98-102

## General Parameters, Batch B3F0476

Blank (B3F0476-BLK1) Prepared: Jun-13-13, Analyzed: Jun-13-13

Conductivity (EC) &lt;1 1 uS/cm

LCS (B3F0476-BS1) Prepared: Jun-13-13, Analyzed: Jun-13-13

Conductivity (EC) 1000 1 uS/cm 1000 100 97-103

Duplicate (B3F0476-DUP1) Source: 3060675-01 Prepared: Jun-13-13, Analyzed: Jun-13-13

Conductivity (EC) 578 1 uS/cm 579 &lt;1 3

## General Parameters, Batch B3F0603

Blank (B3F0603-BLK1) Prepared: Jun-17-13, Analyzed: Jun-17-13

Solids, Total Suspended &lt;2 2 mg/L

Blank (B3F0603-BLK2) Prepared: Jun-17-13, Analyzed: Jun-17-13

Solids, Total Suspended &lt;2 2 mg/L

Blank (B3F0603-BLK3) Prepared: Jun-17-13, Analyzed: Jun-17-13

Solids, Total Suspended &lt;2 2 mg/L

LCS (B3F0603-BS1) Prepared: Jun-17-13, Analyzed: Jun-17-13

Solids, Total Suspended 92 2 mg/L 100 92 95-105

LCS (B3F0603-BS2) Prepared: Jun-17-13, Analyzed: Jun-17-13

Solids, Total Suspended 90 2 mg/L 100 90 95-105



QUALITY CONTROL DATA

REPORTED TO Fort Liard, Hamlet of  
PROJECT Annual Water Plant Tests

WORK ORDER 3060675  
REPORTED Jun-19-13

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	RPD	RPD Limit	Notes
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General Parameters, Batch B3F0605

Blank (B3F0605-BLK1)		Prepared: Jun-18-13, Analyzed: Jun-18-13							
Solids, Total Dissolved	< 10	10 mg/L							
LCS (B3F0605-BS1)		Prepared: Jun-18-13, Analyzed: Jun-18-13							
Solids, Total Dissolved	348	10 mg/L	400		37	33-104			
Duplicate (B3F0605-DUP1)		Source: 3060675-01		Prepared: Jun-18-13, Analyzed: Jun-18-13					
Solids, Total Dissolved	344	10 mg/L		352			2	7	

General Parameters, Batch B3F0661

Blank (B3F0661-BLK1)		Prepared: Jun-18-13, Analyzed: Jun-18-13							
Cyanide, total	< 0.010	0.010 mg/L							
LCS (B3F0661-BS1)		Prepared: Jun-18-13, Analyzed: Jun-18-13							
Cyanide, total	0.041	0.010 mg/L	0.0400		102	85-110			

Major Cations (Dissolved), Batch B3F0471

Blank (B3F0471-BLK1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Calcium, dissolved	< 0.1	0.1 mg/L							
Magnesium, dissolved	< 0.05	0.05 mg/L							
Sodium, dissolved	0.07	0.05 mg/L							BLK
LCS (B3F0471-BS1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Calcium, dissolved	49.5	0.1 mg/L	50.0		99	94-106			
Magnesium, dissolved	24.9	0.05 mg/L	25.0		99	90-106			
Sodium, dissolved	50.0	0.05 mg/L	50.0		100	92-106			
Reference (B3F0471-SRM1)		Prepared: Jun-13-13, Analyzed: Jun-13-13							
Calcium, dissolved	6.8	0.1 mg/L	6.50		101	76-124			
Magnesium, dissolved	6.15	0.05 mg/L	6.11		101	81-119			
Sodium, dissolved	17.4	0.05 mg/L	17.4		100	72-129			

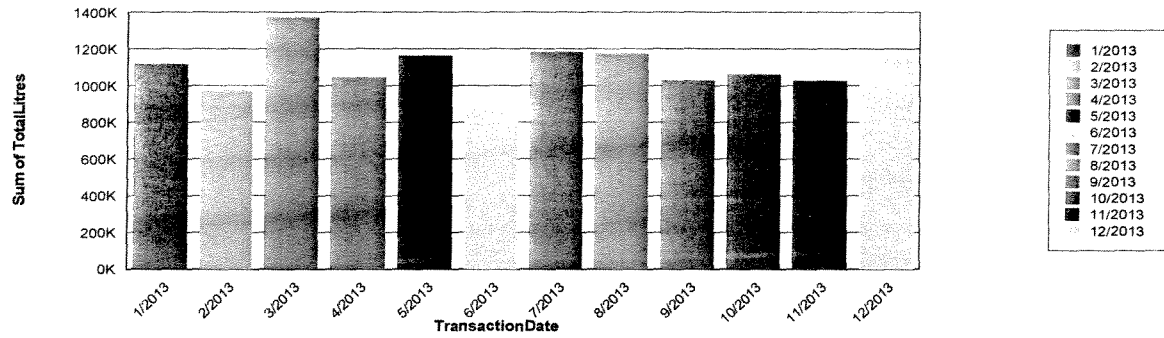
Volatile Organic Compounds (VOC), Batch B3F0663

Blank (B3F0663-BLK1)		Prepared: Jun-18-13, Analyzed: Jun-18-13							
Bromodichloromethane	< 0.001	0.001 mg/L							
Bromoform	< 0.001	0.001 mg/L							
Chloroform	< 0.001	0.001 mg/L							
Dibromochloromethane	< 0.001	0.001 mg/L							
Surrogate: Toluene-d8	0.0234	mg/L	0.0250		93	80-120			
Surrogate: 4-Bromofluorobenzene	0.0230	mg/L	0.0250		92	80-120			
LCS (B3F0663-BS1)		Prepared: Jun-18-13, Analyzed: Jun-18-13							
Bromodichloromethane	0.019	0.001 mg/L	0.0200		94	80-120			
Bromoform	0.018	0.001 mg/L	0.0200		90	90-120			
Chloroform	0.019	0.001 mg/L	0.0200		97	80-120			
Dibromochloromethane	0.019	0.001 mg/L	0.0200		94	80-120			
Surrogate: Toluene-d8	0.0222	mg/L	0.0250		89	80-120			
Surrogate: 4-Bromofluorobenzene	0.0212	mg/L	0.0250		85	80-120			
LCS (B3F0663-BS2)		Prepared: Jun-18-13, Analyzed: Jun-18-13							
Surrogate: Toluene-d8	0.0230	mg/L	0.0250		92	80-120			
Surrogate: 4-Bromofluorobenzene	0.0220	mg/L	0.0250		88	80-120			

## --SEWAGE(TOLAGOON)

### Sum of TotalLitres / TransactionDate

For --SEWAGE(TOLAGOON)



	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Total
SEWAGE	1,116,950	970,100	1,370,608	1,041,300	1,161,450	872,200	1,183,700	1,170,350	1,027,950	1,059,100	1,023,500	1,152,550	<b>13,149,758</b>
<b>Total</b>	<b>1,116,950</b>	<b>970,100</b>	<b>1,370,608</b>	<b>1,041,300</b>	<b>1,161,450</b>	<b>872,200</b>	<b>1,183,700</b>	<b>1,170,350</b>	<b>1,027,950</b>	<b>1,059,100</b>	<b>1,023,500</b>	<b>1,152,550</b>	<b>13,149,758</b>