



## HAMLET OF FORT LIARD

October 11, 2016

Brad McInnes  
Water resource Officer, ENR  
Box 240  
Ft Simpson NT X0E 0N0  
Fax: 867 695 2381

Sewage Effluent Discharge  
Licence Number: MV2009L3-0025

The Hamlet of Fort Liard requests permission to perform emergency decant from Cell #2 of the Sewage Lagoon Disposal Facilities. This emergency decant has been recommended by Dillon Consulting to facilitate upgrade work proposed for the spring/summer of 2017.

Samples of the effluent were sent to CARO Analytical Services, September 22 to test for current contaminate levels contained in effluent. Work being proposed by Dillon Consulting on sewage lagoon improvements in 2017 recommends this lagoon cell to be emptied at this time. Details of the proposed work was outlined in the Sewage Lagoon Capacity Study Final Report submitted with the 2015 Water License Report.

Test results of cell #2 effluent from CARO Analytical Services are attached.

The planned Cell #2 decant would take place at the completion of cell #3 decant and cell 1 effluent transfer to cell #3. The decant of cell #3 was started at 3:00 PM October 6, 2016 and is forecast to take 6 or 7 days to complete.

Sincerely,

Alan Harris

Alan Harris  
Manager Municipal Operations  
Hamlet of Fort Liard  
Phone: 867 70 4104 ext. 103  
[mws@fortliard.com](mailto:mws@fortliard.com)

c.c.: Mackenzie Valley Land and Water Board  
PO Box 2130  
7<sup>th</sup> Floor 4922 48<sup>th</sup> Street  
Fax: 867 873 6610

Mackenzie Valley Land  
& Water Board

File \_\_\_\_\_

OCT 24 2016

Application # MV2009L3-0025

Copied To ES IR

**REPORTED TO** Fort Liard, Hamlet of  
174 Valley Main Street  
Fort Liard, NT X0G 0A0

**TEL** (867) 770-4104  
**FAX** (867) 770-4004

**ATTENTION** Alan Harris

**WORK ORDER** 6091731

**PO NUMBER** 4149

**RECEIVED / TEMP** 2016-09-23 15:00 / 16°C

**PROJECT** Sewage Lagoon

**REPORTED** 2016-10-05

**PROJECT INFO** Sewage Lagoon 2

**COC NUMBER** A04615

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**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.



Authorized By:

**Michelle LaBonte, B.Sc., P.Chem.**  
Lab Manager, Edmonton

*If you have any questions or concerns, please contact your Account Manager:  
Sarah Cunningham-Fleming (scunningham-fleming@caro.ca)*

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Richmond, BC V6V 2K9  
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#102 3677 Highway 97N  
Kelowna, BC V1X 5C3  
Tel: 250-765-9646 Fax: 250-765-3893

17225 109 Avenue  
Edmonton, AB T5S 1H7  
Tel: 780-489-9100 Fax: 780-489-9700

[www.caro.ca](http://www.caro.ca)

**REPORTED TO PROJECT** Fort Liard, Hamlet of Sewage Lagoon

**WORK ORDER REPORTED** 6091731 2016-10-05

Analysis Description	Method Reference	Technique	Location
Ammonia, Total in Water	APHA 4500-NH3 D	Ion Selective Electrode	Edmonton
Biochemical Oxygen Demand in Water	APHA 5210 B	Dissolved Oxygen Meter	Edmonton
Biochemical Oxygen Demand, Carbonaceous in Water	APHA 5210 B	Dissolved Oxygen Meter	Edmonton
Coliforms, Fecal (Q-Tray) in Water	APHA 9223 B*	Most Probable Number / Enzyme Substrate Endo Agar	Edmonton
Conductivity in Water	APHA 2510 B	Conductivity Meter	Edmonton
pH in Water	APHA 4500-H+ B	Electrometry	Edmonton
Solids, Total Dissolved in Water	APHA 2540 C*	Gravimetry (Dried at 103-105C)	Edmonton
Solids, Total Suspended in Water	APHA 2540 D*	Gravimetry (Dried at 103-105C)	Edmonton

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

**Method Reference Descriptions:**

APHA Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation

**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  
 mg/L Milligrams per litre  
 MPN/100 mL Most Probable Number per 100 millilitres  
 pH units pH < 7 = acidic, pH > 7 = basic  
 µS/cm Microsiemens per centimetre

## SAMPLE ANALYTICAL DATA

REPORTED TO PROJECT Fort Liard, Hamlet of Sewage Lagoon

WORK ORDER REPORTED 6091731 2016-10-05

Analyte	Result / Recovery	MRL / Units Limits	Prepared	Analyzed	Notes
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Sample ID: Sewage Lagoon #2 (6091731-01) [Water] Sampled: 2016-09-22 10:00

**General Parameters**

Ammonia, Total (as N)	6.32	0.05 mg/L	N/A	2016-09-27	
BOD, 5-day	48	2 mg/L	2016-09-24	2016-09-29	
BOD, 5-day Carbonaceous	<18.3	2 mg/L	2016-09-24	2016-09-29	BOD2
Conductivity (EC)	1000	2 µS/cm	N/A	2016-09-24	
pH	8.57	0.01 pH units	N/A	2016-09-24	HT2
Solids, Total Dissolved	646	10 mg/L	N/A	2016-09-29	
Solids, Total Suspended	108	2 mg/L	N/A	2016-09-29	

**Microbiological Parameters**

Coliforms, Fecal (Q-Tray)	< 500	1.0 MPN/100 mL	2016-09-23	2016-09-25	
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**Sample / Analysis Qualifiers:**

- BOD2 The sample dilutions set-up for the BOD analysis did not meet the oxygen depletion criterion of at least 2 mg/L.
- HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.



REPORTED TO Fort Liard, Hamlet of  
PROJECT Sewage Lagoon

WORK ORDER 6091731  
REPORTED 2016-10-05

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
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**General Parameters, Batch B611382**

Reference (B611382-SRM1)			Prepared: 2016-09-24, Analyzed: 2016-09-24						
pH	6.90	0.01 pH units	7.00		99	98-102			
Reference (B611382-SRM2)			Prepared: 2016-09-24, Analyzed: 2016-09-24						
pH	6.91	0.01 pH units	7.00		99	98-102			

**General Parameters, Batch B611383**

Blank (B611383-BLK1)			Prepared: 2016-09-24, Analyzed: 2016-09-24						
Conductivity (EC)	< 2	2 µS/cm							
Blank (B611383-BLK2)			Prepared: 2016-09-24, Analyzed: 2016-09-24						
Conductivity (EC)	< 2	2 µS/cm							
LCS (B611383-BS1)			Prepared: 2016-09-24, Analyzed: 2016-09-24						
Conductivity (EC)	1000	2 µS/cm	1000		100	99-103			
LCS (B611383-BS2)			Prepared: 2016-09-24, Analyzed: 2016-09-24						
Conductivity (EC)	1000	2 µS/cm	1000		100	99-103			

**General Parameters, Batch B611470**

Blank (B611470-BLK1)			Prepared: 2016-09-24, Analyzed: 2016-09-29						
BOD, 5-day	< 1	2 mg/L							
Blank (B611470-BLK2)			Prepared: 2016-09-24, Analyzed: 2016-09-29						
BOD, 5-day	< 1	2 mg/L							
LCS (B611470-BS1)			Prepared: 2016-09-24, Analyzed: 2016-09-29						
BOD, 5-day	192	2 mg/L	198		97	85-115			
Duplicate (B611470-DUP1)			Source: 6091731-01 Prepared: 2016-09-24, Analyzed: 2016-09-29						
BOD, 5-day	48	2 mg/L	48					15	

## APPENDIX 1: QUALITY CONTROL DATA

REPORTED TO PROJECT Fort Liard, Hamlet of Sewage Lagoon

WORK ORDER REPORTED 6091731 2016-10-05

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
<b>General Parameters, Batch B611471</b>									
Blank (B611471-BLK1)									Prepared: 2016-09-24, Analyzed: 2016-09-29
BOD, 5-day Carbonaceous	< 1	2 mg/L							
Blank (B611471-BLK2)									Prepared: 2016-09-24, Analyzed: 2016-09-29
BOD, 5-day Carbonaceous	< 1	2 mg/L							
LCS (B611471-BS1)									Prepared: 2016-09-24, Analyzed: 2016-09-29
BOD, 5-day Carbonaceous	192	2 mg/L	198		97	85-115			
<b>General Parameters, Batch B611598</b>									
Blank (B611598-BLK1)									Prepared: 2016-09-27, Analyzed: 2016-09-27
Ammonia, Total (as N)	< 0.05	0.05 mg/L							
LCS (B611598-BS1)									Prepared: 2016-09-27, Analyzed: 2016-09-27
Ammonia, Total (as N)	0.20	0.05 mg/L	0.200		101	94-113			
<b>General Parameters, Batch B611651</b>									
Blank (B611651-BLK1)									Prepared: 2016-09-29, Analyzed: 2016-09-29
Solids, Total Dissolved	< 20	10 mg/L							
Reference (B611651-SRM1)									Prepared: 2016-09-29, Analyzed: 2016-09-29
Solids, Total Dissolved	264	10 mg/L	240		110	85-115			
<b>General Parameters, Batch B611652</b>									
Blank (B611652-BLK1)									Prepared: 2016-09-29, Analyzed: 2016-09-29
Solids, Total Suspended	< 2	2 mg/L							
LCS (B611652-BS1)									Prepared: 2016-09-29, Analyzed: 2016-09-29
Solids, Total Suspended	50	2 mg/L	50.0		101	94-105			
<b>Microbiological Parameters, Batch B611448</b>									
Blank (B611448-BLK1)									Prepared: 2016-09-23, Analyzed: 2016-09-25
Coliforms, Fecal (Q-Tray)	< 1.0	1.0 MPN/100 mL							
Duplicate (B611448-DUP1)				Source: 6091731-01					Prepared: 2016-09-23, Analyzed: 2016-09-25
Coliforms, Fecal (Q-Tray)	< 1.0	1.0 MPN/100 mL		< 500				24	