



June 7, 2017

Ms. Tracey Braun  
Environmental Approvals Branch  
Manitoba Sustainable Development  
Suite 160- 123 Main Street  
Winnipeg, MB R3C 1A5

**Re: Application for Alternative Digestion at City of Portage la Prairie Water Pollution Control Facility**

Dear Ms. Braun:

A Notice of Minor Alteration was submitted to your department on May 8, 2017. This application was approved for materials to be removed from Biosolids Storage Tank (BST) #1. It is necessary to also land apply the biosolids material that is stored in Biosolids Storage Tank (BST) #2. The City of Portage la Prairie is requesting approval for a notice of minor alteration to allow an alternative digestion standard be considered for the stabilization of biosolids material that will also address the material in Biosolids Tank #2. Clause 2 of Biosolids License 1907 states “the licensee shall, after the 1<sup>st</sup> of June 1996, ensure that prior to removal for disposal on agricultural land, the biosolids have been subjected to anaerobic digestion for a period of 30 days at a minimum temperature of 20°C or an equivalent digestion process acceptable to the Director.” This requirement was not met in 2016 and a suspension of license was obtained to allow for the land application of biosolids from the biosolids storage tanks. The mixers in the anaerobic digester have failed and as such solids have accumulated in the anaerobic digester and caused short circuiting. This has also caused a reduction in the residence time and therefore, materials processed through the anaerobic digester do not comply with the license as written. The City of Portage la Prairie purchased two chopper pumps to replace the mixing in the digester. A letter of request to install these pumps was submitted to your department on September 2, 2016. These pumps will be installed in June 2017.

The biosolids license uses the time and temperature criteria as a confirmation of bacterial destruction and for the reduction in volatile solids to reduce vector attraction. The US EPA states that for Class B biosolids, (40 CFR Part 503, Standards for the Use or Disposal of Sewage Sludge) expected fecal coliforms levels in Class B biosolids should be < 2,000,000 CFU per gram total dry weight. The CCME “A Review of the Current Canadian Legislative Framework for Wastewater Biosolids” also refers to this standard. The US EPA standard states a reduction in volatile solids concentration lowers vector attraction. Although the anaerobic digester at the Water Pollution Control Facility is not functioning as designed, the intended outcome of bacterial destruction is occurring and meets the US EPA guidelines for Class B biosolids. Through ongoing laboratory analysis, the City of Portage la Prairie has been able



to demonstrate that the fecal coliform count is below the EPA standard as stated above. A copy of these results is included with this submission. The potential for vector attraction can be mitigated when biosolids are injected, as is done by the City of Portage la Prairie. The biosolids stored in BST #2 receives the same digestion time as the material in BST #1, which received NOA approval. The temperature within BST #2 is also warmer and has been exposed to temperatures on average of 21.1°C.

As required as part of the NOA application, the City of Portage la Prairie engaged AECOM Engineering to review the provision of using EPA guidelines of bacteria count. Their technical memorandum is included with this application as the supporting report. The memo demonstrates how bacterial destruction is considered an equivalent measurement of time and temperature under the EPA guidelines.

The City of Portage la Prairie requests that the Director approve the minor alteration of license 1907, clause 2 to allow the land application of biosolids from Biosolids Storage Tank #2 as it meets the EPA requirement of fecal coliform count of less than 2,000,000 CFU per dry gram and these biosolids will be applied via injection. We request that this alteration be in effect until November, 2017, as per the timeframe indicated in the NOA approval for BST #1. Land application of biosolids stored in the biosolids storage tank #2 will begin as soon as the approval has been received. It is necessary to have this request for alteration approved prior to the removal of solids from the storage tanks. If you have any questions or require any additional information, please contact myself at (204) 239-8359.

Regards,



Karly Friesen  
Manager, Wastewater Treatment Division

Cc: Jay Rackham, Environmental Compliance and Enforcement  
Tyler Kneeshaw, Environmental Compliance and Enforcement  
Kelly Braden P. Eng., Director of Operations  
Natalie Wilson, P. Eng., AECOM Engineering

## Memorandum

To	Karly Friesen	Page 1
CC	Jean-Marc Nadeau, Kelly Braden	
Subject	Portage la Prairie Water Pollution Control Facility Environment Act Licence 1907 Land Application Review – Biosolids Storage Tank #2	
From	Natalie Wilson, M.Sc., P.Eng. Simon Baker, M.Sc., P.Eng.	
Date	June 8, 2017	Project Number 60539202

### 1. Introduction

AECOM has been requested by the City of Portage la Prairie to review the current operation of biosolids treatment with respect to Environment Act Licence 1907, issued April 13, 1995. The licence, under General Requirements, Section 2 states that:

*"prior to removal for disposal on agricultural land, the biosolids have been subjected to anaerobic digestion for a period of 30 days at a minimum temperature of 20°C, or an equivalent digestion process acceptable to the Director".*

This provision of the Licence is very typical within the industry as it provides Class B biosolids, as defined by the United States Environmental Protection Agency (USEPA). Due to malfunctions in the digestion process, this provision of the Licence is not being met. However, this memo demonstrates that the biosolids continues to meet the requirements for Class B biosolids and thus is still acceptable for land application.

### 2. Solids Treatment Process

The solids treatment at WPCF involves removing waste activated sludge from the sequencing batch reactors to an aerated equalization tank prior to thickening in two gravity belt thickeners. After thickening the solids stream is directed to one 1900 m<sup>3</sup> digester.

Temperatures in the digester averaged 21°C in 2016. While the calculated retention time averaged 24.5 days in 2016, it is not believed to be representative of actual operation. Due to failure of mixing equipment in the digester, solids have likely accumulated within the digester, which would cause noticeable short circuiting. This short circuiting is believed to decrease the residence time for digestion. After digestion, the solids are stored in two biosolids storage tanks until the land application program, which runs in spring and fall of each year.

### 3. Biosolids Land Application

The USEPA has well-established regulations for land application of biosolids in particular Title 40 of the Code of Federal Regulations, Part 503. The intent of these regulations is to:

*“protect public health and the environment from any reasonably anticipated adverse effects of certain pollutants that might be present in sewage sludge biosolids”*

These regulations are followed throughout the United States and are used in many jurisdictions around the world, including Canada, in the development of biosolids regulations. Although the Province of Manitoba does not necessarily follow all aspects of Part 503, it follows the key requirements of the USEPA, namely controlling pollutant (heavy metals) limits, and requiring a treatment process for pathogen and vector attraction reduction.

**Table 1: Comparison of Licence 1907 and USEPA Part 503**

	<b>Licence 1907</b>	<b>USEPA Part 503</b>
Pollutant (Heavy Metal) limits	Heavy metal application rate (kg/hectare)	Heavy metal application rate (kg/hectare)
Pathogen Reduction Limits	Anaerobic digestion	Three Alternatives are allowed. Alternative 2 includes anaerobic digestion as one of the allowable treatment options.
Vector Attraction Reduction Limits	Injection into the soil	Twelve Options are allowed. Option 9 is for injection into the soil.

**Table 1** shows that Licence 1907 follows the same approach for biosolids application as the USEPA 503 regulations. However, due to the faulty mixing equipment, it is likely that the City’s digester is not providing sufficient anaerobic digestion time before transfer to the biosolids storage tanks. This means that the biosolids for land application are likely not in strict compliance with the provisions of Licence 1907.

The City needs to dispose of the biosolids currently stored in the biosolids storage tanks and therefore needs to be able to demonstrate that land application without sufficient anaerobic digestion time remains within the overall intent of Licence 1907 i.e. land application of Class B biosolids. AECOM recommends that other provisions of USEPA Part 503 be used to demonstrate that the existing biosolids can be classified as Class B to provide equivalency with the provisions of Licence 1907.

As described in **Table 1**, Pathogen Reduction Limits in USEPA Part 503 can be one of three Alternatives. All three Alternatives are considered by USEPA as equivalent to each other, i.e. one Alternative is not considered better or worse than another Alternative. Licence 1907 follows the approach of Alternative 2 where treatment in a prescribed process (e.g. anaerobic digestion) is deemed to have reduced pathogens to the necessary level. Alternative 1 requires actual

measurement of pathogens in the biosolids to demonstrate that pathogens have been reduced to the necessary level. Alternative 1 is summarized below:

*“Test for fecal coliform density as an indicator for all pathogens. The geometric mean of seven samples shall be less than 2 million MPNs per gram per total solids or less than 2 million CFUs per gram of total solids at the time of use or disposal.”*

Historical data confirms that the biosolids from Biosolids Storage Tank No. 2 were in compliance of Alternative 1 of USEPA Regulations, Part 503. The current operational intent for Biosolids Storage Tank No. 2 is that land application will occur from this tank later in 2017, so extensive sampling of the fecal coliform density has not yet been conducted in 2017. The one sample taken in spring 2017 has a concentration of 0.009 million MPNs per gram of total solids. Previous sampling results from the fall 2016 sampling program had a geometric mean density of 0.004 million MPNs per gram of total solids over 10 samples. Sampling from the spring 2016 sampling program had a geometric mean density of 0.17 million MPNs per gram of total solids over 27 samples. All sampling events were well below the maximum allowed by the USEPA.

#### **4. Conclusion**

Historical testing from Biosolids Storage Tank No. 2 shows that the biosolids contain fecal coliform densities well below the minimum required to demonstrate pathogen reduction when compared to the USEPA Regulations, Part 503 and is therefore suitable for land application (subject to confirmation testing for fecal coliform density prior to land application) and compliance with the provisions of Licence 1907 related to heavy metals and sub-surface soil injection.