

## **SUMMARY OF COMMENTS/RECOMMENDATIONS**

**PROPONENT:** Rural Municipality of Springfield  
**PROPOSAL NAME:** Land Application of Sludge  
**CLASS OF DEVELOPMENT:** 2  
**TYPE OF DEVELOPMENT:** Waste/Scrap  
**CLIENT FILE NO.:** 5446.00

### **OVERVIEW:**

On January 15, 2010, the Department received an Environment Act Proposal (EAP) from the Rural Municipality of Springfield for the removal of sludge from the municipal wastewater treatment lagoons located in SW 3-11-5EPM and NE 22-11-5EPM that previously served the Communities of Dugald and Oakbank respectively. The sludge would be removed from the cells of the lagoons, transported to farmlands, surface applied, and tilled into the soils within one to four days of being applied. Registered land owners of the parcels of land involved had been contacted and are willing to have the municipal sludge applied to their agricultural land. The parcels of land on which the sludge may be applied are located within: SE and SW 2-11-5EPM; NE, NW and SW 5-11-5EPM; NE, NW and SE 8-11-5EPM; NE 9-11-5EPM; NE and SE 10-11-5EPM; NW and SW 11-11-5EPM; NE, NW, SE and NW 12-11-5EPM; SE and SW 16-11-5EPM; NW and SW 23-11-5EPM; and NE and SE 36-11-5EPM in the Rural Municipality of Springfield.

The Department, on February 8, 2010, placed copies of the EAP report in the Public Registries located at 123 Main St. (Union Station), the Millennium Public Library, the Rural Municipality of Springfield, and the Manitoba Eco-Network and provided copies of the EAP report to the Canadian Environmental Assessment Agency (CEAA) and Technical Advisory Committee (TAC) members. As well, the Department placed public notifications of the EAP in the Winnipeg Free Press on Saturday, February 13, 2010 and the Beausejour Clipper on Monday, February 15, 2010. The newspaper and TAC notifications invited responses until March 16, 2010. A March 23, 2010 addendum letter with specific information was distributed to the members of the TAC who had requested it for inclusion with the review.

On September 17, 2010 Manitoba Conservation forwarded requests for additional information from the public and TAC to the proponent. Copies of the public, TAC and federal correspondence and request letters were sent to the Public Registries. The proponent's January 7, 2011 response to the requests was then provided to the participating public and TAC for review and comment on January 24, 2011.

On February 22, 2011 Manitoba Conservation forwarded requests for additional information from the TAC to the proponent. Copies of the TAC correspondence and request letters were sent to the Public Registries. The proponent's March 14, 2011 response to the requests was then provided to the participating TAC for review and comment on March 17, 2011.

On August 16, 2011 a draft Environment Act Licence was distributed to the TAC and the proponent for review and comment and the associated changes have been made as appropriate.

There were no further comments.

### **COMMENTS FROM THE PUBLIC:**

#### **Watts, Kris – March 8, 2010**

- *What level of treatment will the sludge receive before it is applied? Would it be sufficient in removing any residual pharmaceuticals commonly found in wastewater? What farmland is sludge being applied to? What do the producers produce? Grains, beef or dairy cattle?*

#### **Proponent Responses – January 7, 2011:**

- There is no specific treatment process for sludge from a wastewater lagoon. Due to a very long retention time (> 5 years) in the cells, sludge digestion process is completed via storage involving reduction of volatile solid matter.

Active pharmaceutical compounds are an emerging pollutant and are currently not regulated in Manitoba. These compounds are not monitored and hence the effectiveness of a wastewater lagoon in removing them is unknown at this time.

The sludge is being applied to the lands identified in the EAP Report as the Local Study Area. This includes the following sections in Township 11 Range 5 EPM: E halves of 36 and 10, W halves of 23, 11 and 5, N halves of 8 and 5, S half of 16, NE quarter of 9, all quarters of 12 and the south halves of S half 2.

In the period between 2009 and 2011, previous and planned crop rotations include grains, oilseeds and forages (wheat / winter wheat, canola, oats, soybeans, corn, sunflower and alfalfa).

### **COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE:**

#### **Environmental Services Branch – Conservation**

##### **April 8, 2010**

- *Recommend the proponent be required to resample soil for spread fields located at NW 23- and NE 36-11-05 EPM, laboratory report number 1228763 and 1228759, respectively. Soil samples taken to a depth of 12 inches (30cm) are not suitable to determine soil nitrate-nitrogen concentrations. Soil samples must be taken to a depth of 24 inches (60 cm), as required by the Nutrient Management Regulation, to accurately determine soil nitrate-nitrogen concentrations for*

- calculation of acceptable agronomic sludge application rates and to assess environmental risk*
- *Recommend the proponent be required to reanalyse or resample soil for the spread field located at NE 10-011-05 EPM. The soil nitrate-nitrogen concentrations (laboratory report number 1233399) for the 0-6 inch sample are reported as, >80 parts per million. A precise numeric value must be provided to accurately determine soil nitrate-nitrogen concentrations for calculating acceptable and agronomic sludge application rates and to assess environmental risk.*
  - *The conversion factor used for the calculation of soil nutrients from parts per million (ppm) to pounds per acre ( $lb\ ac^{-1}$ ) differs slightly from the  $lb\ ac^{-1}$  values reported in the soil laboratory certificates of analysis. Suggest Stantec be asked to provide information and rationale for the conversion factor used to calculate soil nutrient concentrations.*
  - *Soil samples were taken in May 2009 post-seeding and fertilization and are not suitable for determining accurate soil nutrient concentrations, sludge application rates, or environmental risk(s). It is recommended the proponent resample the land for sludge application post-harvest and pre-sludge application to determine more accurate soil nutrient concentrations for establishing sludge application rates, in accordance with the Nutrient Management Regulation and to better assess environmental risk(s).*
  - *Sludge application is prohibited on lands where the regulated soil nitrate-nitrogen concentrations exceed those as proscribed for Nutrient Management Zone (NMZ) N1 ( $151.7\ kg\ ha^{-1}$ ;  $140\ lb\ ac^{-1}$ ), NMZ N2 ( $101\ kg\ ha^{-1}$ ;  $90\ lb\ ac^{-1}$ ), or NMZ N3 ( $33.6\ kg\ ha^{-1}$ ;  $30\ lb\ ac^{-1}$ ) of the Nutrient Management Regulation and proposed application rates must consider regulated soil residual nitrate-nitrogen concentration limits.*
  - *Recommend the proponent resample all land exceeding soil residual nitrate-nitrogen concentration limits in Nutrient Management Zone N1 ( $151.7\ kg\ ha^{-1}$ ;  $140\ lb\ ac^{-1}$ ) or N3 ( $33.6\ kg\ ha^{-1}$ ;  $30\ lb\ ac^{-1}$ ), as proscribed by the Nutrient Management Regulation, to prevent environmental risk and soil nutrient loading.*
  - *Recommend the proponent identify and provide soil sample analysis for the additional 280 hectares of land required for sludge application. Only 1156 hectares have been identified, however 1436 hectares are required. Taking into consideration all cells of each lagoon require sludge be removed and land applied, it is necessary to ensure there are sufficient suitable spread fields available.*
  - *Soil residual nutrient concentration limits of land belonging to Nutrient Management Zones prescribed by the Nutrient Management Regulation, must be followed regardless of its size. For example, the proposed threshold land base value of greater than 1 ha for Nutrient Management Zone N3 (page 2 of the EAP*

- report) can not be applied when determining available land base or sludge application rates.*
- *Application of livestock manure to any land receiving sludge must be done in accordance with the Livestock Manure and Mortalities Management Regulation (M.R. 42/98) and soil residual nitrate- nitrogen limits and phosphorus loading thresholds as prescribed in Section 12, must also be observed to prevent cumulative environmental risk and soil nutrient loading. The proponent must identify any such lands for the 2010 crop year.*
  - *Consider requiring a soil nutrient monitoring program for the estimated three year benefit period for all lands which receive sludge to ensure unacceptable nutrient loading or other environmental impact has not occurred as a result of sludge application. The bench mark soil sampling strategy could be used to monitor soil nutrient concentrations and an annual report could be provided to the R.M of Springfield and all land owners involved.*

Proponent Responses – January 7, 2011:

- Soil sampling will be re-conducted prior to sludge application, with sampling depths for nutrient concentration determination to include 0-15 cm (0-6 in) and 15-60 cm (6-24 in) depth increments.
- This field will be re-sampled and re-analyzed prior to sludge application.
- The conversion factor used to convert Nitrogen ppm to lb ac<sup>-1</sup> was:

$$\text{lb N ac}^{-1} = (\text{ppm N 0-15cm} \times 2) + (\text{ppm N 15-60cm} \times 4)$$

This is a standard calculation for conversion. The slight differences between the converted values and the lab reported values for lb N ac<sup>-1</sup> is likely due to significant figures (i.e. no decimal places) reported in the lab report for ppm values. Conversions were used for N, to provide a consistent approach, as conversion had to be conducted for BiCarb P as lb P ac<sup>-1</sup> were not reported by the lab

- As recommended in Section 5.3.2, the Proponent has committed to completing post-harvest pre-sludge application soil sampling to determine prescriptive application rates for each field.

The field-specific prescriptive application rates will help ensure that the residual concentrations of nitrate-nitrogen and phosphorus do not exceed those outlined in the *Nutrient Management Regulation of the Water Protection Act*.

- The field-specific prescriptive application rates will consider field-specific residual concentrations of nitrate-nitrogen and will ensure that these residual concentrations do not exceed those outlined in the *Nutrient Management Regulation of the Water Protection Act*.

- All land soil sampling will be re-conducted prior to sludge application, with sampling depths for nutrient concentration determination to include 0-15 cm (0-6 in) and 15-60 cm (6-24 in) depth increments.
- Based on the gross application rate determination, a total land area of 1436 ha is required for sludge application including a 15 % safety factor (approx. 1248 without safety factor). As discussed above, the proponent acknowledges that an additional 280 hectares of land may be required (p. 20-21, Section 5.3.1) and that additional lands will be identified, sampled and submitted to Manitoba Conservation for review prior to application of sludge, and recommends this be conducted once the application program has commenced and the need for additional land is confirmed.
- The proponent proposed a threshold of 1 ha for (p. 2) consideration of managing sludge application by the limiting Nutrient Management Zone based on the following considerations:
  - An area of 1 ha is not considered significant in extent in terms of potential environmental effects in relation to an agricultural field management unit (i.e. typically approximately 64 ha);
  - Areas <1 ha become difficult to manage practically in relation to field management activities, such as applying sludge application, tillage, etc.;
  - The resolution/accuracy of soil survey data at 1:20,000 becomes limiting when considering areas approaching or less than the minimum size delineation;
  - Quantifying nutrient residuals becomes cost prohibitive when very small Nutrient Management Zones have to be considered.
- Cooperating producers will be notified of the requirements outlined, as required. The proponent will identify any such lands for the 2010 crop year, as part of the prescriptive application rates and summary reporting to Manitoba Conservation (as outlined in Section 5.3.2 of the EAP).
- The proponent is not supportive of a soil nutrient monitoring program for the estimated three year benefit period. Generally, this is not a requirement for proponents of other practices involving nutrient application (e.g. inorganic fertilizer, animal manures, etc.). The proponent is meeting existing regulatory requirements and exercising due diligence through the proposed sludge application program, including sampling soil residuals nutrient concentrations and producing field-specific prescriptive application rates based on sludge quality, consideration of other nutrient inputs and anticipated crop removals. There would be significant challenges with implementing a long-term monitoring program on private lands, including, but not limited to, confounding factors determining source and rates of additional nutrient applications, and absence of control over long-term access to private lands.

Disposition:

- The draft Environment Act Licence contains clauses which;
  - cause the Licencee to apply the sludge solids to areas within the designated area which are not subject to flooding;

- require that the sludge solids to be incorporated a minimum of 15 centimetres below the soil surface within 48 hours of application; and
- require that the application and incorporation of the sludge solids is acceptable to an Environment Officer.
- Minimum setbacks from any occupied residence, residential area, waterways and groundwater wells are designated in the draft Environment Act Licence.
- The draft Environment Act Licence contains Clauses that require the Licencee to remove, transport, and incorporate the sludge solids into the soils in such a manner as to prevent the disruption of natural wildlife and fish habitats.
- The draft Environment Act Licence contains a Clause that requires the Licencee, during all sludge land activities, to comply with the requirements of *Manitoba Regulation 62/2008* respecting *Nutrient Management Regulation* or any future amendment thereof.

### **Local Government**

- *The proposed application lands are designated “Agricultural Preserve” pursuant to the RM of Springfield Development Plan, and as such, are suitable for agricultural uses (subject to applicable provincial and municipal regulations governing agricultural practices).*
- *Community Planning Services has no objections to the environment act proposal, but would suggest that areas designated for Rural Residential use within the Development Plan also be recognized and protected through the establishment of a suitable buffer zone (specifically, those Rural Residential Areas in SE 5-11-5E, SW 4-11-5E, NW 33-10-5E, and NE 32-10-5E in close proximity to proposed application lands).*

### **Proponent Responses – January 7, 2011:**

- The Local Study Area, as illustrated in Figure 1, is buffered from existing rural residential features. Sludge application will only occur on un-developed lands currently under agricultural production, with application rates determined to meet annual nutrient residual criteria (i.e. NMR 62/2008) and other regulatory guidelines (e.g. CCME soil metal residuals). Land that is designated for Rural Residential use within the Development Plan in the legal land locations referenced (i.e. SE 5-11-5E, SW 4-11-5E, NW 33-10-5E, and NE 32-10-5E) are in close proximity to the application lands, but are currently identified to receive sludge application.

### **Science, Technology, Energy and Mines**

- *Section 29-11-5 EPM contains glaciofluvial sand and gravel deposit that exposes the water table. This area should be avoided for the disposal of waste material.*

- *We have no concerns with the application as proposed.*

Proponent Responses – January 7, 2011:

- The current landbase identified for sludge application is located at least 1.8 km from the sand and gravel deposit, which was exposed by borrow pits northwest of the Regional Study Area (see Figure 1). The project maintains a sufficient buffer from this feature. The proposed areas of sludge application have minimal risk of groundwater contamination according to the aquifer pollution hazard map of Springfield (Rutulis, 1990).

Disposition:

- The draft Environment Act Licence contains clauses that do not permit sludge to be applied to land:
  - with a depth of clay or clay till of less than 1.5 metres between the soil surface and the water table; or
  - within 100 metres of an identifiable boundary of an aquifer which is exposed to the ground surface.

**Water Stewardship**

March 22, 2010

- *The Water Rights Act indicates that no person shall control water or construct, establish or maintain any “water control works” unless he or she holds a valid licence to do so. “Water control works” are defined as any dyke, dam, surface or subsurface drain, drainage, improved natural waterway, canal, tunnel, bridge, culvert borehole or contrivance for carrying or conducting water, that temporarily or permanently alters or may alter the flow or level of water, including but not limited to water in a water body, by any means, including drainage, OR changes or may change the location or direction of flow of water, including but not limited to water in a water body, by any means, including drainage. If a proposal advocates any of the aforementioned activities, an application for a Water Rights Licence to Construct Water Control Works is required. Application forms are available from any office of Manitoba Water Stewardship.*
  - *A contact person is Mr. Geoff Reimer C.E.T., Senior Water Resource Officer, Water Control Works and Drainage Licensing, Manitoba Water Stewardship, Box 4558, Stonewall, Manitoba R0C 2Z0, telephone: (204) 467-4450, email: geoff.reimer@gov.mb.ca.*
- *The proponent needs to be informed that if the proposal in question advocates any construction activities, erosion and sediment control measures should be implemented until all of the sites have stabilized.*
- *The Department recommends an Environment Act Licence to include the following requirements:*

- *Pursuant to the Nutrient Management Regulation, a Licencee shall implement a three metre setback adjacent to third order drains (Nutrient Buffer Zone). The application of nitrogen or phosphorus is prohibited within the Nutrient Buffer Zone.*
- *A Licencee shall increase the number of hectares identified for spreading to a total of 1436 hectares. The Environment Act Proposal only identified 1156 hectares.*
- *A Licencee shall be required to resample the land area intended for spreading post harvest and pre application of biosolids. This information shall be submitted to Manitoba Water Stewardship for further review. From a nutrient standpoint, the soil samples taken in the spring of 2009 are not suitable for determining the appropriateness of biosolids application.*
- *As contained within Section 7 of the Nutrient Management Regulation, the residual soil nitrate-nitrogen limit for soils mapped as Nutrient Management Zone N3 is 33.6 kg/ha (30 lb/ac). A threshold of 1 hectare should not be applied when determining biosolid application rates.*
- *Effective January 1, 2011, a Nutrient Management Plan must be registered with Manitoba Water Stewardship if:*
  - *Nutrients will be applied to any field that exceeds the residual soil nitrate-nitrogen limits listed in the Nutrient Management Regulation for Nutrient Management Zones N1, N2, and N3.*
  - *Nutrients will be applied to any field resulting in soil test phosphorus measuring 60 ppm or more within Nutrient Management Zones N1, N2, and N3 and the phosphorus application rates listed in the Nutrient Management Regulation are not achievable.*
- *Biosolids cannot be applied to land between November 10<sup>th</sup> of one year and April 10<sup>th</sup> of the following year, effective January 1, 2011, for Nutrient Management Zones N1, N2, and N3.*
- *A quality control/quality assurance program shall be conducted by the laboratory used by the Licencee. Alternatively, instead of a formal accreditation process, a proficiency testing process which evaluates inter-laboratory comparisons such as the North American Proficiency Testing Program would also be considered.*

Proponent Responses – January 7, 2011:

- The Proponent acknowledges that an additional 280 hectares of land may be required to meet landbase requirements including the safety factor (p. 20-21, Section 5.3.1) and that additional lands will be identified, sampled and submitted to Manitoba Conservation for review prior to application of sludge, and recommends this be conducted once the application program has commenced and the need for additional land is confirmed.

- The Proponent acknowledges that fields will need to be re-sampled prior to biosolids application. It is anticipated that biosolids application will be conducted in the spring and fall of 2011. Soil sampling for field-specific biosolids application rate determination will be conducted in the spring and fall of 2011, prior to biosolids application.
- The proposed Project does not consist of any components that are captured by the *Water Rights Act*.
- The proposed Project does not advocate any construction activities.

February 10, 2011

- *The Nutrient Management Regulation under The Water Protection Act states that the maximum residual soil nitrate-nitrogen limit for soils mapped as Nutrient Management Zone N3 is 33.6 kg/ha (30 lb/ac). The Nutrient Management Regulation residual soil nitrate-nitrogen limits apply to all soils within Nutrient Management Zone N3 regardless of size. Therefore, when calculating application rates, a minimum threshold of 1 hectare should not be applied.*

Proponent Responses – March 14, 2011:

- Sludge will be applied based on the maximum residual soil nitrate-nitrogen limit of the most limiting Nutrient Management Zone, regardless of size. The proposed land base threshold of 1 ha for Nutrient Management Zone N3 will not be applied when determining sludge application rates.

In designing the sludge application program based on prescriptive sludge application rates, Stantec may opt to remove the most limiting Nutrient Management Zone (e.g., NMZ N3) from the application land base area, by physically staking the Nutrient Management Zone unit, or through the use of GPS-based applications, to prohibit application. The maximum residual soil nitrate-nitrogen limit of the most limiting Nutrient Management Zone present within the remaining field land base would be used for determining sludge application rates. Alternatively, and where practical, a field may be divided into application zones, with each zone receiving sludge application at a rate corresponding to the most limiting NMZ within that zone. These approaches would allow for flexibility in execution of the land application program.

The details of the sludge application, including field application rates as discussed above, will be submitted on behalf of the Rural Municipality of Springfield to Manitoba Conservation Environmental Assessment and Licensing Branch, as per Section 6.0 (p. 22) of the Environment Act Proposal.

Stantec is confident that the approach outlined above is in accordance with the intent and meaning of the *Nutrient Management Regulation*.

Disposition:

- The draft Environment Act Licence contains clauses which;
  - cause the Licencee to apply the sludge solids to areas within the designated area which are not subject to flooding;
  - require that the sludge solids to be incorporated a minimum of 15 centimetres below the soil surface within 48 hours of application; and
  - require that the application and incorporation of the sludge solids is acceptable to an Environment Officer.
- Minimum setbacks from any occupied residence, residential area, waterways and groundwater wells are designated in the draft Environment Act Licence.
- The draft Environment Act Licence contains a Clause that requires the Licencee, during all sludge land activities, to comply with the requirements of *Manitoba Regulation 62/2008* respecting *Nutrient Management Regulation* or any future amendment thereof.
- The draft Environment Act Licence contains Clauses that require the Licencee to remove, transport, and incorporate the sludge solids into the soils in such a manner as to prevent the disruption of natural wildlife and fish habitats.

**COMMENTS FROM FEDERAL REPRESENTATION:**

**Canadian Environmental Assessment Agency**

March 12, 2010

- *Based on the responses to the survey the application of the Canadian Environmental Assessment Act (the Act) by a federal authority will not be required for this project.*

**PUBLIC HEARING:**

A public hearing was not requested.

**RECOMMENDATION:**

The Proponent should be issued a Licence to remove sludge solids from the wastewater treatment lagoons located at SW 3-11-5EPM and NE 22-11-5EPM for incorporation on the proposed receiving land locations subject to the specifications, limits, terms and conditions of the Licence. The Licence should be assigned to the Central Region.

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