

Licence No.: 2440

Licence Issued: January 21, 2000

**IN ACCORDANCE WITH THE MANITOBA ENVIRONMENT ACT (C.C.S.M. c. E125)
THIS LICENCE IS ISSUED PURSUANT TO SECTION 11(1) TO:**

TOWN OF RAPID CITY; "the Licencee"

for the operation of the Development being the removal of biosolids and sludge solids from a wastewater treatment lagoon located on northeast quarter of Section 19-13-19 WPM, the transportation of biosolids and sludge solids, and the disposal of biosolids and sludge solids on agricultural land on the northeast quarter of Section 4-13-19 WPM, and in accordance with the Proposal filed under The Environment Act on September 20, 1999 and in accordance with the Revised Proposal filed on November 30, 1999, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"accredited laboratory" means an analytical facility accredited by the Standard Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation to be equivalent to the SCC, or able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the Canadian Standard Can/CSA-Z753, extension of the international standard ISO 9000, Guide 25;

"affected area" means a geographical area excluding the property of the Development;

"approved" means approved in writing;

"aquifer" means a water saturated geologic unit that will yield water to wells or springs at a sufficient rate so that the wells or springs can serve as practical sources of water supply;

"biosolids" means accumulated organic solids, resulting from wastewater treatment processes, that have received adequate treatment to permit the material to be recycled;

"Director" means an employee so designated pursuant to The Environment Act;

"ECSS" means Expert Committee on Soil Survey of Agriculture Canada;

"first order waterway" means a drain or watercourse serving a watershed with a drainage area of up to one square mile;

"flooding" means the flowing of water onto lands, other than waterways, due to the overtopping of a waterway or waterways;

"NIST" means the National Institute of Standards and Technology;

"odour nuisance" means a continuous or repeated odour, smell or aroma, in an affected area, which is offensive, obnoxious, troublesome, annoying, unpleasant, or disagreeable to a person:

- a. residing in the affected area;
- b. working in the affected area; or
- c. present at a location in the affected area which is normally open to the members of the public;

if the odour, smell or aroma

- d. is the subject of at least 5 written complaints in a form satisfactory to the Director and from 5 different persons falling within clauses a), b) or c), and who do not live in the same household, received by the Director within a 90 day period; or
- e. is the subject of at least one written complaint in a form satisfactory to the Director from a person falling within clauses a), b) or c) and the Director is of the opinion that if the odour, smell or aroma had occurred in a more densely populated area there would have been at least 5 written complaints from 5 different persons who do not live in the same household within a 90 day period;

"plant-available nitrogen" means nitrogen which is readily available to plants by uptake through the roots and is determined by adding 20 percent of the organic nitrogen (as nitrogen), 100 percent of the ammonia (as nitrogen) and 100 percent of the nitrate (as nitrogen);

"reference material" means soil or sludge material which is used as a reference;

"reference value" means the value established by the agency that supplied the reference material;

"second order waterway" means a drain or watercourse servicing a watershed with a drainage area greater than one square mile or having a tributary or tributaries which are first order waterways;

"sludge solids" means solids in sludge;

"sludge" means accumulated solid material containing large amounts of entrained water, which has separated from wastewater during processing;

"Standard Methods for the Examination of Water and Wastewater" means the most recent edition of Standard Methods for the Examination of Water and Wastewater published jointly by the American Public Health Association, the American Waterworks Association and the Water Environment Association;

"USEPA" means the United States Environmental Protection Agency; and

"water table" means the upper surface of the zone of saturation of a water bearing geologic unit.

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

1. In addition to any of the following specifications, limits, terms and conditions specified in this Licence, the Licencee shall, upon the request of the Director:
 - a. sample, monitor, analyze or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, handling, treatment and disposal systems, for such pollutants, ambient quality, aquatic toxicity, seepage characteristics and discharge rates and for such duration and frequencies as may be specified;
 - b. determine the environmental impact associated with the release of any pollutant from the Development; or
 - c. provide the Director within such time as may be specified, with such reports, drawings, specifications, analytical data, bioassay data, flow rate measurements and such other information as may from time to time be requested.
2. The Licencee shall, unless otherwise specified in this Licence:
 - a. carry out all preservations and analyses of liquid samples in accordance with the methods prescribed in the Standard Methods for the Examination of Water and Wastewater or in accordance with

- equivalent preservation and analytical methodologies approved by the Director; and
- b. ensure that all analytical determinations are undertaken by an accredited laboratory.
3. The Licencee shall submit all information required to be provided to the Director under this Licence, in writing, in such form (including number of copies), and of such content as may be required by the Director.
 4. The Licencee shall ensure that biosolids are only applied to agricultural land located on the northeast quarter of Section 4-13-19 WPM.
 5. The Licencee shall ensure that the cell of the wastewater treatment lagoon from which biosolids are to be removed is isolated from the rest of the wastewater treatment system while the biosolids are being mixed or removed from the cell.
 6. The Licencee shall ensure that biosolids and sludge solids are transported in containers in such a manner to prevent loss of biosolids or sludge solids to the satisfaction of an Environment Officer.
 7. The Licencee shall, in the case of physical or mechanical breakdown of the sludge treatment, handling, transportation and/or injection system:
 - a. notify the Director immediately;
 - b. identify the repairs required; and
 - c. complete the repairs in accordance with the written instructions of the Director.
 8. The Licencee shall not construct, alter or operate the Development, or permit the Development to be constructed, altered or operated, in a way that causes or results in an odour nuisance, and shall take steps as the Director may require to eliminate or to mitigate an odour nuisance.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

9. The Licencee shall ensure that all biosolids applied to agricultural land are injected into the soil and that the depth at which the biosolids are introduced into the soil is a minimum of 15 centimeters below the soil surface or that soil is mounded to a depth of 15 centimeters above the level at which the biosolids were introduced into the soil in such a manner as to cover all of the biosolids.
10. The Licencee shall ensure that:
 - a. the biosolids remain in the furrow opening; and
 - b. the surface expression of the injected biosolids is acceptable to an Environment Officer.
11. The Licencee shall ensure that the application rate of biosolids onto the land does not exceed 15 tonnes per hectare, on a dry weight basis, and that the amount of plant-available nitrogen added to the land from all sources does not exceed 100 kilograms per hectare during any year in which biosolids were applied.
12. The Licencee shall not permit the application of biosolids:
 - a. to frozen soil;
 - b. less than 300 metres from any occupied residence (other than the residence occupied by the owner of the land on which the biosolids are to be applied);
 - c. less than 1 kilometre from a residential area;
 - d. less than 15 metres from a first order waterway;
 - e. less than 30 metres from a second, or higher order waterway;
 - f. less than 50 metres from any groundwater well; or
 - g. on land that is subject to flooding.
13. The Licencee shall ensure that biosolids are not applied on land:

- a. with a depth of clay or clay till of less than 1.5 metres between the soil surface and the water table;
 - b. within 100 metres of an identifiable boundary of an aquifer which is exposed to the ground surface;
 - c. where, prior to the application of biosolids, the soil pH is less than 6.0;
 - d. where the surface slope of the land is greater than 5 percent;
 - e. where, prior to the application of biosolids, the level of nitrate-nitrogen exceeds 100 kilograms per hectare in the upper 60 centimetres of the soil; or
 - f. where, prior to the application of biosolids, the concentration of sodium bicarbonate extractable phosphorous, as P, exceeds 60 micrograms per gram in the upper 15 centimeters of the soil.
14. The Licencee shall ensure that cattle are not allowed to pasture on land on which biosolids have been applied, for a period of three years from the date of application of the biosolids.
15. The Licencee shall ensure that on all agricultural land onto which biosolids have been applied, one of the following crops is planted at the commencement of the next growing season following such application and only these crops are grown for a period of three years from the date of application of biosolids:
- a. a cereal crop;
 - b. a forage crop;
 - c. an oil seed crop;
 - d. field peas; or
 - e. lentils.
16. The Licencee shall ensure that the cumulative weight per hectare of each heavy metal in the soil, as calculated by adding the amount of each heavy metal in the biosolids applied to the background level of the same metal, does not exceed the following levels: *

Metal	Kilogram per Hectare
Cadmium	2.88
Copper	90
Nickel	90
Lead	90
Zinc	270
Mercury	0.9
Chromium	216

* Calculated values shall be based on a soil bulk density of 1200 kilograms per cubic metre and a soil depth of 15 centimetres. Analysis for heavy metals must be carried out in accordance with Schedule "B" of this Licence.

MONITORING AND REPORTING SPECIFICATIONS

17. The Licencee shall submit to the Director, not later than June 1, 2000, the details of the biosolids sampling and analysis program used to determine the volume and solids content of the biosolids removed on a daily basis and the volume and the solids content of biosolids applied to each field.
18. The Licencee shall submit to the Director, not later than June 1, 2000, the details of the field monitoring program on the biosolids disposal operation used to determine:
- a. the sodium bicarbonate extractable phosphorous, as P, in the upper 15 centimetres of the soil;

- b. the nitrate-nitrogen and total nitrogen in the upper 60 centimetres of the soil;
 - c. the pH of the soil;
 - d. the surface slope of the land;
 - e. the presence of clay and clay till to a depth of 1.5 metres;
 - f. the number of hectares in each field that can receive biosolids in accordance with the Licence; and
 - g. the number of hectares on which biosolids were applied on a daily basis.
19. The Licencee shall conduct a monitoring and analysis program that is acceptable to the Director, and in accordance with Schedules "A" and "B" of this Licence to determine:
- a. the composition of the biosolids;
 - b. the background levels of selected soil parameters for each parcel of land; and
 - c. the crops grown on land on which biosolids have been applied during the previous 3-year period.
20. The Licencee shall, on or before the 1st day of December, 2000, submit to the Director a report, which will include the following:
- a. details of the biosolids injection program including:
 - i. a description of each parcel of land on which biosolids were distributed;
 - ii. the background levels of soil parameters as listed in Schedule "A" of this Licence, for each parcel of land;
 - iii. the dry weight of biosolids applied per hectare;
 - iv. the weight of each heavy metal, in milligrams per kilogram of soil, added to each parcel of land for the metals listed in Schedule "A" of this Licence; and
 - v. the cumulative weight, in kilograms per hectare, of each heavy metal for each parcel of land as calculated by adding the amount of each heavy metal applied to the background level of the same metal;
 - b. the amount of nitrogen, phosphorus, and potassium which was added per hectare for each parcel of land;
 - c. the results of analysis of the biosolids and soil required by this Licence;
 - d. a copy of the analytical procedures used and the results of analysis of reference materials in accordance with Schedule "B" of this Licence; and
 - e. the type of crops grown on land on which biosolids were applied during the previous 3-year period.

TERMINATION

21. This Licence shall terminate on the 1st day of April, 2004.

REVIEW AND REVOCATION

- A. If, in the opinion of the Director, the Licencee has exceeded or is exceeding or has or is failing to meet the specifications, limits, terms, or conditions set out in this Licence, the Director may, temporarily or permanently, revoke this Licence.
- B. If the Licencee has not commenced operation of the Development within one year of the date of this Licence, the Licence is revoked.
- C. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of The Environment Act.

"original signed by"

Larry Strachan, P. Eng.

**Director
Environment Act**

Client File No.: 4475.00

SCHEDULE "A" TO ENVIRONMENT ACT LICENCE NO. 2440

Biosolids

1. A representative sample of biosolids shall be collected from each cell of the wastewater treatment lagoon from which biosolids will be removed. A representative sample of biosolids shall be a composite of sludge samples taken from a minimum of 5 locations distributed over the surface of the cell.
2. The sample of biosolids shall be analyzed for the following parameters: *
 - a. conductivity
 - b. pH
 - c. total solids
 - d. volatile solids
 - e. nitrate nitrogen
 - f. total Kjeldahl nitrogen
 - g. ammonia nitrogen
 - h. organic nitrogen
 - i. total phosphorus
 - j. lead
 - k. mercury
 - l. nickel
 - m. potassium
 - n. cadmium
 - o. copper
 - p. zinc
 - q. chromium

* Analysis for heavy metals must be carried out in accordance with Schedule "B" of this Licence.

Soil

3. Composite samples from each field onto which biosolids will be applied shall be taken prior to application of biosolids. Each field of twenty-four hectares or less shall be sampled from a minimum of twelve representative sites or a minimum of one sample site per two hectares for larger fields. Each sample site shall be sampled from 0 to 15 centimetres and from 0 to 60 centimetres. The entire core extracted for each sample shall be collected. All samples from similar depths within a field shall be bulked in one container for thorough mixing prior to analysis yielding two samples per field.
4. Soil samples from 0 centimetres to 15 centimetres shall be analyzed for the following: *
 - a. pH
 - b. potassium
 - c. nickel
 - d. mercury
 - e. zinc
 - f. sodium bicarbonate extractable phosphorus, as P
 - g. cadmium
 - h. chromium
 - i. copper

j. lead

* Analysis for heavy metals must be carried out in accordance with Schedule "B" of this Licence.

5. Soil samples from 0 to 60 centimetres shall be analyzed for the following:

- a. nitrate nitrogen
- b. total nitrogen

Crops

6. The type of crop grown on lands on which biosolids have been applied during the previous 3-year period shall be listed along with the legal description of the land and the date of application of biosolids.

SCHEDULE "B" TO ENVIRONMENT ACT LICENCE NO. 2440

The analysis for all metals shall be carried out in accordance with the following requirements:

1. Soil and sludge samples shall be prepared using non-contaminating grinding and sieving procedures such as agate or porcelain mortar and pestle along with nylon sieves. Soil samples shall be ground to at least 100 mesh size prior to digestion or sample pretreatment.
2. Analysis for heavy metals must be carried out following strong acid digestion.
3. The laboratory performing these analyses shall operate an acceptable quality assurance program including the following:
 - a. Samples of reference material shall be analyzed to monitor the accuracy of the sludge and soil analyses and each set of ten or less samples of sludge or soil shall include, a minimum of the following:
 - i. For sludge samples:
 - one USEPA Municipal Digested Sludge sample;
 - ii. For soil samples:
 - one NIST Estuarine Sediment sample (SRM 1646 or suitable replacement whose analyte concentrations reflect that found in the samples); and
 - one of three ECSS soil samples (Nos. 2, 4, and 7) which best reflects local soil conditions. (The three ECSS soil samples are available from Agriculture Canada, Land Resource Centre, Central Experimental Farm, Ottawa);
 - b. Field duplicates of samples shall be analyzed based on a frequency of one in each set of ten or less field samples and that the acceptance criteria for duplicate analysis should be within ± 10 percent.
4. A copy of the analytical procedures and the analytical results for the reference materials, and any other controls used in the analysis, shall be submitted with the field sample results.
5. If the analytical results of the reference materials do not meet the following criteria, the soil and/or sludge samples must be re-analyzed:

Cadmium	± 25 percent from the reference value (for values above $1 \mu\text{g/g}$)
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Cadmium	± 35 percent from the reference value (for values below 1 µg/g)
Copper	± 25 percent from the reference value
Chromium	± 25 percent from the reference value
Lead	± 25 percent from the reference value
Mercury	± 35 percent from the reference value
Nickel	± 25 percent from the reference value
Zinc	± 25 percent from the reference value