



Conservation

Climate Change and Environmental Protection Division
Environmental Assessment and Licensing Branch
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CLIENT FILE NO.: 3506.10

November 23, 2011

Tannis Lodge, C.A.O.
R.M. of Lac du Bonnet
Box 100
Lac du Bonnet MB R0E 1A0

Dear Ms. Lodge:

Enclosed is revised **Environment Act Licence No. 1773 R** dated November 23, 2011 issued to the **Rural Municipality of Lac du Bonnet** for the construction, operation and maintenance of the Development being an expanded wastewater treatment lagoon with a hydraulic storage capacity of 137,500 cubic metres (376.7 cubic metres per day average), that is located in SE 19-15-12EPM in the R.M. of Lac du Bonnet in accordance with the proposal filed under *The Environment Act* on August 3, 2010 and subsequent information provided in letters dated December 23, 2010 and June 16, 2011.

In addition to the enclosed Licence requirements, please be informed that all other applicable federal, provincial and municipal regulations and by-laws must be complied with. A Notice of Alteration must be filed with the Director for approval prior to any alteration to the Development as licensed.

For further information on the administration and application of the Licence, please feel free to contact Robert Boswick, Environmental Engineer at (204) 945-6030.

Pursuant to Section 27 of The Environment Act, this licensing decision may be appealed by any person who is affected by the issuance of this Licence to the Minister of Conservation within 30 days of the date of the Licence.

Yours truly,

Tracey Braun, M. Sc.
Director
Environment Act

Enc.

c: Don Labossiere, Director, Environmental Operations
 Ross Webster, P. Eng. Genivar (email)
 Public Registries

NOTE: Confirmation of Receipt of this Licence No. 1773 R (*by the Licencee only*) is required by the Director of Environmental Assessment and Licensing. Please acknowledge receipt by signing in the space provided below and faxing a copy (letter only) to the Department by December 7, 2011.

On behalf of the R.M. of Lac du Bonnet

Date

****A COPY OF THE LICENCE MUST BE KEPT ON SITE AT THE DEVELOPMENT AT ALL TIMES****

LICENCE

Licence No. / Licence n° 1773 R
Issue Date / Date de délivrance April 8, 1994
Revised: November 23, 2011

In accordance with The Environment Act (C.C.S.M. c. E125)
Conformément à la Loi sur l'environnement (C.P.L.M. c. E125)

Pursuant to Sections 11(1) and 14(2) / Conformément au Paragraphe 11(1) et 14(2)

THIS LICENCE IS ISSUED TO: / CETTE LICENCE EST DONNÉE À:

RURAL MUNICIPALITY OF LAC DU BONNET;
"the Licencee"

for the construction, operation and maintenance of the Development being an expanded wastewater treatment lagoon with a hydraulic storage capacity of 137,500 cubic metres (376.7 cubic metres per day average), that is located in SE 19-15-12EPM in the Rural Municipality of Lac du Bonnet and with discharge of treated effluent from the wastewater treatment lagoon either onto land owned by or under control of the Licencee or into an existing drainage ditch that flows north into a municipal drain that flows northeast into the Lee River that flows into Lac du Bonnet in accordance with the proposal filed under The Environment Act on August 3, 2010 and subsequent information provided in letters dated December 23, 2010 and June 16, 2011 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 be able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the international standard ISO/IEC 17025, or otherwise approved by the Director;

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

"approved" means approved by the Director, or an assigned Environment Officer, in writing;

"appurtenances" means machinery, appliances, or auxiliary structures attached to a main structure to enable it to function, but not considered an integral part of it;

"ASTM" means the American Society for Testing and Materials;

"base" means the exposed and finished elevation of the bottom of any cell of the wastewater treatment lagoon;

"bentonite" means specially formulated standard mill grade sodium bentonite conforming to American Petroleum Institute Specification 13-A;

"cut-off" means a vertical-side trench filled with compacted clay or a sand and bentonite mixture or a wall constructed from compacted clay;

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

"effluent" means treated wastewater flowing or pumped out of the wastewater treatment lagoon;

"fecal coliform" means aerobic and facultative, Gram-negative, nonspore-forming, rod-shaped bacteria capable of growth at 44.5 °C, and associated with fecal matter of warm-blooded animals;

"five-day biochemical oxygen demand (BOD₅)" means that part of the oxygen demand usually associated with biochemical oxidation of organic matter within 5 days at a temperature of 20°C;

"five-day carbonaceous biochemical oxygen demand (CBOD₅)" means that part of the oxygen demand usually associated with biochemical oxidation of carbonaceous organic matter within 5 days at a temperature of 20°C, excluding the oxygen demand usually associated with the biochemical oxidation of nitrogenous organic matter;

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

"high water mark" means the line on the interior surface of the primary and secondary cells which is normally reached when the cell is at the maximum allowable liquid level;

"hydraulic conductivity" means the quantity of water that will flow through a unit cross-sectional area of a porous material per unit of time under a hydraulic gradient of 1.0;

"influent" means water, wastewater, or other liquid flowing into a wastewater treatment facility;

"in-situ" means on the site;

"low water mark" means the line on the interior surface of the primary and secondary cells which is normally reached when the cell is discharged;

"MPN Index" means the most probable number of coliform organisms in a given volume of wastewater which, in accordance with statistical theory, would yield the observed test result with the greatest frequency;

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

if the odour, smell or aroma

- d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director and within a 90-day period, from 5 different persons falling within clauses (a), (b) or (c), who do not live in the same household; or
- e) is the subject of at least one written complaint, received by the Director 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 received within a 90-day period, from 5 different persons who do not live in the same household.

"primary cell" means the first in a series of cells of the wastewater treatment lagoon system and which is the cell that receives the untreated wastewater;

"record drawings" means engineering drawings complete with all dimensions which indicate all features of the Development as it has actually been built;

"rip rap" means small, broken stones or boulders placed compactly or irregularly on dykes or similar embankments for protection of earthen surfaces against wave action or current;

"secondary cell" means a cell of the wastewater treatment lagoon system which is the cell that receives partially treated wastewater from the primary cell;

"septage" means the sludge produced in individual on-site wastewater disposal systems such as septic tanks;

"sewage" means household and commercial wastewater that contains human waste;

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

"sludge solids" means solids in sludge;

"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 Federation;

"total coliform" means a group of aerobic and facultative anaerobic, Gram-negative, nonspore-forming, rod-shaped bacteria, that ferment lactose with gas and acid formation within 48 hours at 35 °C, and inhabit predominantly the intestines of man or animals, but are occasionally found elsewhere and include the sub-group of fecal coliform bacteria;

"wastewater" means the spent or used water of a community or industry which contains dissolved and suspended matter; and

"wastewater treatment lagoon" means the component of the development which consists of an impoundment into which wastewater is discharged for treatment and storage.

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. The Licencee shall direct all sewage generated within the Rural Municipality of Lac du Bonnet and the surrounding area toward the wastewater treatment lagoon or other approved sewage treatment facilities.
2. In addition to any of the limits, terms and conditions specified in this Licence, the Licencee shall, upon the request of the Director:
 - a) sample, monitor, analyze and/or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, treatment, handling, disposal or emission systems, for such pollutants or ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, for such duration and at such frequencies as may be specified;
 - b) determine the environmental impact associated with the release of any pollutant(s) from the Development; or
 - c) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and analytical procedures being used, bioassay data, flow rate measurements and such other information as may from time to time be requested.

3. The Licencee shall, unless otherwise specified in this Licence:
 - a) carry out all preservations and analyses on liquid samples in accordance with the methods prescribed in "Standard Methods for the Examination of Water and Wastewater" or in accordance with an equivalent analytical methodology approved by the Director;
 - b) have all analytical determinations undertaken by an accredited laboratory; and
 - c) report the results to the Director, in writing or in a format acceptable to the Director, within 60 days of the samples being taken.
4. The Licensee shall, in the event of a release, spill, leak, or discharge of a pollutant or contaminant in an amount or concentration, or at a level or rate of release, that exceeds the limit that is expressly provided under this Act, another Act of the Legislature, or an Act of Parliament, or in a regulation, licence, permit, order, instruction, directive or other approval or authorization issued or made under one of those Acts, immediately report the release, spill, leak, or discharge by calling 204-944-4888. The report shall indicate the nature of the release, leak, or discharge, the time and estimated duration of the event and the reason for the release, spill, leak, or discharge.
5. The Licencee shall comply with the provisions of the Department of Fisheries and Oceans Canada/Manitoba Natural Resources publication, "*Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat*" (May, 1996).
6. The Licencee shall obtain and maintain classification of the Development pursuant to *Manitoba Regulation 77/2003 respecting Water and Wastewater Facility Operators* or any future amendment thereof and maintain compliance with all requirements of the regulation including, but not limited to, the preparation and maintenance of a Table of Organization, Emergency Response Plan and Standard Operating Procedures.
7. The Licencee shall carry out the operation of the Development with individuals properly certified to do so pursuant to *Manitoba Regulation 77/2003 respecting Water and Wastewater Facility Operators* or any future amendment thereof.
8. The Licencee shall comply with the requirements of *Manitoba Regulation 62/2008 respecting Nutrient Management Regulation* or any future amendment thereof.
9. The Licencee shall limit the discharge of salts into the wastewater treatment lagoon such that the effluent would be suitable for the irrigation of agricultural crops.
10. 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, and each submission shall be clearly labeled with the Licence Number and Client File Number associated with this Licence.

11. The Licencee shall not cause or permit an odour nuisance to be created as a result of the construction, operation, or alteration of the Development, and shall take such steps as the Director may require to eliminate or mitigate an odour nuisance.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

12. The Licencee shall notify the assigned Environment Officer not less than two weeks prior to beginning construction of the Development. The notification shall include the intended starting date of construction.
13. The Licencee shall:
- conduct all ditch related work activities during no flow or dry conditions and not during the April 1 to June 15 fish spawning and incubation period;
 - not construct the wastewater treatment lagoon or wastewater collection system during periods of heavy rain;
 - place and/or isolate all dredged and construction material where it will not erode into any watercourse;
 - implement effective long-term sediment and erosion control measures to prevent soil-laden runoff, and/or silt from entering any watercourse during construction and until vegetation is established; and
 - routinely inspect all erosion and sediment control structures and immediately complete any necessary maintenance or repair.
14. The Licencee shall, during construction of the wastewater treatment lagoon, operate, maintain and store all materials and equipment in a manner that prevents any deleterious substances (fuel, oil, grease, hydraulic fluids, coolant, paint, uncured concrete and concrete wash water, etc.) from entering the wastewater treatment lagoon, the discharge route and associated watercourses, and have an emergency spill kit for in water use available on-site during construction.
15. The Licencee shall, prior to the construction of the dykes for the wastewater treatment lagoon:
- remove all organic topsoil from the area where the dykes will be constructed; or
 - remove all organic material for a depth of 0.3 metres and a width of 3.0 metres from the area where the liner will be constructed.
16. The Licencee shall construct and maintain all cells of the wastewater treatment lagoon with continuous liners, including cut-offs, under all interior surfaces of the cells in accordance with the following specifications:
- the liners shall be made of clay;
 - the liners shall be at least one metre in thickness;
 - the liners shall have a hydraulic conductivity of 1×10^{-7} centimetres per second or less at all locations; and

- d) the liners shall be constructed to an elevation of 2.5 metres above the base of each cell.
17. The Licencee shall operate and maintain the wastewater treatment lagoon in such a manner that:
- a) the organic loading on the wastewater treatment lagoon, in terms of the five-day biochemical oxygen demand, is not in excess of 56 kilograms per hectare per day; and
 - b) the depth of liquid in the cells does not exceed 1.5 metres.
18. The Licencee shall not discharge effluent from the wastewater treatment lagoon:
- a) where the organic content of the effluent, as indicated by the five day biochemical oxygen demand, is in excess of 25 milligrams per litre;
 - b) where the fecal coliform content of the effluent, as indicated by the MPN index, is in excess of 200 per 100 millilitres of sample; or
 - c) where the total coliform content of the effluent, as indicated by the MPN index, is in excess of 1500 per 100 millilitres of sample.
19. The Licencee shall not discharge effluent from the wastewater treatment lagoon to the drainage ditches;
- a) where the total suspended solids content of the effluent is in excess of 25 milligrams per litre, unless the exceedance is caused by algae;
 - b) where the total phosphorus is in excess of 1.0 milligram per litre;
 - c) where, if effluent is chlorinated, the total residual chlorine content of the effluent is in excess of 0.02 milligrams per litre;
 - d) between the 31st day of October of any year and the 15th day of September of the following year;
 - e) when flooding from any cause is occurring along the effluent drainage route; or
 - f) when such a discharge would cause or contribute to flooding in or along the effluent drainage route.
20. The Licencee shall not discharge effluent from the wastewater treatment lagoon by spray irrigation between the 1st day of October of any year and the 15th day of May of the following year.
21. The Licencee shall, when discharging effluent by spray irrigation,:
- a) dispose of all effluent onto land owned by or under the control of the Licencee;
 - b) only discharge effluent to irrigate:
 - i) actively growing cereal, forage or oil seed crops;
 - ii) grasslands which will not be utilized for grazing:
 - A. by dairy cattle for at least 30 days after effluent is applied; or
 - B. by livestock other than dairy cattle for at least 7 days after effluent is applied;

- c) not harvest agriculture crops for at least 7 days after the crops are irrigated with effluent;
 - d) use any corn irrigated with effluent solely for making silage;
 - e) not apply effluent to particular lands for more than 10 continuous hours in any 24-hour period;
 - f) if ponding or surface runoff occurs during application, reduce the gross depth of effluent applied during any application of effluent so that ponding or surface runoff does not occur; and
 - g) if wind conditions cause the effluent to drift within the restricted zones outlined in Clause 22 of this Licence, stop the spray irrigation until the wind conditions subside.
22. The Licencee shall not discharge effluent, by spray irrigation:
- a) within 300 metres of any dwelling not owned or lawfully controlled by the Licencee;
 - b) within 100 metres of any surface watercourse or groundwater well;
 - c) within 150 metres of any adjoining property boundary if a continuous shelterbelt with a minimum heath of four metres is not provided; or
 - d) within 100 metres of any adjoining property boundary if a continuous shelterbelt with a minimum height of four metres is provided.
23. The Licencee shall install and maintain a fence around the wastewater treatment lagoon to limit access. The fence shall be a minimum of 1.2 meters high and have a locking gate, which shall be locked at all times when access to the lagoon is not immediately required by operational staff or for activities related to the dumping of sewage, septage, or wastewater into the wastewater treatment lagoon.
24. The Licencee shall construct and maintain an all-weather access road and a sewage dumping station for truck handled sewage. The dumping facility shall have a surface splash ramp with a smooth hard surface that can be easily washed free of solids.
25. The Licencee shall not discharge septage into the wastewater treatment lagoon between the 15th day of October of any year and the 1st day of June of the following year.
26. The Licencee shall, if in the opinion of the Director, significant erosion of the interior surfaces of the dykes occurs, repair the dyke and install rip rap as necessary. The rip rap shall be placed on the interior dyke surfaces from 0.6 metres above the high water mark to at least 0.6 metres below the low water mark to protect the dykes from wave action.
27. The Licencee shall provide and maintain a grass cover on the dykes of the wastewater treatment lagoon and shall regulate the growth of the vegetation so that the height of the vegetation does not exceed 0.3 metres on all dykes.
28. The Licencee shall annually remove by mechanical methods all reeds, rushes and trees located above the low water mark in every cell of the wastewater treatment lagoon.

29. The Licencee shall implement an ongoing program to remove burrowing animals from the site of the wastewater treatment lagoon.
30. The Licencee shall locate all fuel storage and equipment servicing areas established for the construction and operation of the Development a minimum distance of 100 metres from any waterbody, and shall comply with the requirements of *Manitoba Regulation 188/2001 respecting Storage and Handling of Petroleum Products and Allied Products Regulation* or any future amendment thereof.
31. The Licencee shall maintain the discharge route of the wastewater treatment lagoon such that it effectively performs its intended service.
32. The Licencee shall, when discharging treated wastewater to the existing drainage ditches and municipal drains, discharge the wastewater treatment lagoon over at least a two-week period, while accelerating discharge as necessary to maintain normal operation of the wastewater treatment lagoon, such that increased nutrient uptake from the wastewater effluent may occur along the discharge route.
33. The Licencee shall actively participate in any current or future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for the Lee River, the Winnipeg River, Lac du Bonnet, Lake Winnipeg, and associated waterways and watersheds.

MONITORING AND REPORTING

34. The Licencee shall, prior to each effluent discharge campaign, obtain grab samples of the treated wastewater and have them analyzed for:
 - a) the organic content as indicated by the five-day biochemical oxygen demand and expressed as milligrams per litre;
 - b) the organic content as indicated by the five-day carbonaceous biochemical oxygen demand and expressed as milligrams per litre;
 - c) the fecal coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample; and
 - d) the total coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample.
35. The Licencee shall, prior to each effluent discharge campaign to the drainage ditches, obtain grab samples of the treated wastewater and have them analyzed for:
 - a) the total suspended solids content expressed as milligrams per litre;
 - b) the total phosphorus content expressed as milligram per litre; and
 - c) if the effluent has been chlorinated, the total residual chlorine content as determined at the wastewater treatment lagoon site at the time of sampling and expressed as milligrams per litre.

36. The Licencee shall:
 - a) during each year maintain records of:
 - i) reports of visual inspections conducted at a minimum of once per month;
 - ii) wastewater sample dates;
 - iii) original copies of laboratory analytical results of the sampled wastewater;
 - iv) effluent discharge dates;
 - b) make the records being maintained pursuant to sub-Clause 35 a) of this Licence available to an Environment Officer upon request; and
 - c) keep the maintained records of any one calendar year available for inspection for a period of three years following the respective calendar year in which they were recorded.
37. The Licencee shall maintain a record of all septage, sewage and wastewater hauled to the wastewater treatment lagoon, including the number of loads on a daily and weekly basis, the volume of each load, the name of the hauler, and the source of the contents of each load according to the type of waste and the name and location of each property serviced. The Licencee shall submit an annual report of all the waste hauling information to the Director by the 15th of January of the following year.
38. The Licencee shall maintain a record of:
 - a) the time and duration of each effluent application by irrigation;
 - b) the volume discharged during each effluent application by irrigation; and
 - c) the time, duration and amount of natural precipitation events during the irrigation session.
39. The Licencee shall arrange with the designated Environment Officer a mutually acceptable time and date for any required soil sampling between the 15th day of May and the 15th day of October of any year, unless otherwise approved by the Environment Officer.
40. The Licencee shall take and test undisturbed soil samples, in accordance with Schedule "A" attached to this Licence, from the liner of the wastewater treatment lagoon; the number and location of samples and test methods to be specified by the designated Environment Officer up to a maximum of 30 samples.
41. The Licencee shall, not less than 2 weeks before the wastewater treatment lagoon is placed in operation, submit for the approval of the Environment Officer the results of the tests carried out pursuant to Clause 40 of this Licence.
42. The Licencee shall immediately notify the Director each time the operating depth of any cell of the wastewater treatment lagoon exceeds the maximum operating depth for that cell as specified in this Licence.
43. The Licencee shall, if reporting is required pursuant to Clause 42 of this Licence in two consecutive years:

- a) engage the services of a qualified consultant, acceptable to the Director, to undertake an investigation of the Facility and related infrastructure, to determine the ability or inability of the existing system to meet the hydraulic loading capacity of the community. The investigation shall include but not be necessarily limited to:
 - i) diagnosis of the cause(s) of the recent exceedances of maximum operating depth;
 - ii) sources of infiltration into the wastewater system including the municipal infrastructure;
 - iii) current hydraulic loading of the system; and
 - iv) lack of storage capacity due to sludge build-up within existing cells and the organic loading on the primary cell in terms of the five day biochemical oxygen demand;
- b) provide to the Director, within four months of the notification given pursuant to Clause 42, an engineering report describing in detail the results and observations concluded by virtue of the investigation; and
- c) provide to the Director, within four months of the report provided pursuant to Sub-clause b) of this section, a remedial action plan in the form of a detailed engineering report describing recommended modifications, repairs or upgrading works to overcome excessive hydraulic loading of the system.

44. The Licencee shall:

- a) prepare updated "record drawings" for the Development and shall label the drawings "record drawings"; and
- b) provide to the Director, within four months of the Environment Officer's approval of the reports required by Clause 40 of this Licence, two copies of the "record drawings".

45. The Licencee shall, during the first year of operation of the Development following the construction of the expanded wastewater treatment lagoon that a discharge to drainage ditches must occur, obtain and analyze grab samples of the effluent during each effluent discharge campaign and report the results of the analysis, in accordance with Schedule "B" attached to this Licence.

REVIEW AND REVOCATION

- A. Licence No. 1773 is rescinded upon approved commissioning of the altered wastewater treatment lagoon in accordance with this Licence.
- B. 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.
- C. If the Licencee has not commenced construction of the Development within three years of the date of this Licence, the Licence is revoked.

- D. 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.


**Tracey Braun, M. Sc.
Director
Environment Act**

File: 3506.10

Schedule "A" to Environment Act Licence No. 1773 R

Soil Sampling:

1. The Licencee shall provide a drilling rig, acceptable to the designated Environment Officer, to extract soil samples from the liner which is not placed or found at the surface of the lagoon structure. This includes all wastewater treatment lagoons constructed with clay cutoffs at the interior base of the dyke or with a clay cutoff in the centre of the dyke. The drill rig shall have the capacity to drill to the maximum depth of the clay cutoff plus an additional 2 metres. The drill rig shall be equipped with both standard and hollow stem augers. The minimum hole diameter shall be 5 inches.
2. For lagoon liners placed or found at the surface of the lagoon structure, the Licencee shall provide a machine, acceptable to the designated Environment Officer, capable of pressing a sampling tube into the liner in a straight line motion along the centre axis line of the sample tube and without sideways movement.
3. Soil samples shall be collected and shipped in accordance with ASTM Standard D 1587 (Standard Practice for Thin-Walled Tube Sampling of Soils), D 4220 (Standard Practice for Preserving and Transporting Soil Samples) and D 3550 (Standard Practice for Ring-Lines Barrel Sampling of Soils). Thin-walled tubes shall meet the stated requirements including length, inside clearance ratio and corrosion protection. An adequate venting area shall be provided through the sampling head.
4. At the time of sample collection, the designated Environment Officer shall advise the Licencee as to the soil testing method that must be used on each sample. The oedometer method may be used for a sample were the Environment Officer determines that the soil sample is taken from an undisturbed clay soil which has not been remoulded and which is homogeneous and unweathered. The triaxial test shall be used for all samples taken from disturbed and remoulded soils or from non homogenous and weathered soils.
5. The Licencee shall provide a report on the collection of soil samples to the designated Environment Officer and to the laboratory technician which includes but is not limited to: a plot plan indicating sample location, depth or elevation of sample, length of advance of the sample tube length of soil sample contained in the tube after its advancement, the soil test method specified by the Environment Officer for each soil sample and all necessary instructions from the site engineer to the laboratory technician.
6. All drill and sample holes shall be sealed with bentonite pellets after the field drilling and sampling has been completed.

Soil Testing Methods:

1. Triaxial Test Method

- a) The soil samples shall be tested for hydraulic conductivity using ASTM D 5084 (Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter).
- b) Soil specimens shall have a minimum diameter of 70 mm (2.75 inches) and a minimum height of 70 mm (2.75 inches). The soil specimens shall be selected from a section of the soil sample which contains the most porous material based on a visual inspection. The hydraulic gradient shall not exceed 30 during sample preparation and testing. Swelling of the soil specimen should be controlled to adjust for: the amount of compaction measured during sample collection and extraction from the tube and the depth or elevation of the sample. The effective stress used during saturation or consolidation of the sample shall not exceed 40 kPa (5.7 psi) or the specific stress level, that is expected in the field location where the sample was taken, whichever is greater.
- c) The complete laboratory report, as outlined in ASTM D 5084, shall be supplied for each soil sample collected in the field.

2. Oedometer Test Method

- a) The soil samples shall be tested for hydraulic conductivity using ASTM D 2435 (Standard Test Method for One-Dimensional Consolidation Properties of Soils).
- b) Soil specimens shall have a minimum diameter of 50 mm (2 inches) and a minimum height of 20 mm (0.8 inches). The soil specimens shall be selected from a section of the soil sample which contains the most porous material based on a visual inspection. The soil specimen shall be taken from an undisturbed soil sample. The soil specimen shall be completely saturated.
- c) The complete laboratory report, as outlined in ASTM D 2435, shall be supplied for each soil sample collected in the field.

Schedule "B" to Environment Act Licence No. 1773 R

Canadian Council of Ministers of the Environment Initial Characterization of Wastewater

Facility Size: Very small (less than 500 m³/day)

Facility Type: Facultative wastewater treatment lagoon - intermittent discharge

Effluent Sampling:

During the first year of operation, for all discharge events not including those by irrigation:

1. Obtain a representative grab sample of the discharging effluent near the beginning of the discharge period and near the end of the discharge period (i.e. two samples for each discharge event.)
2. Determine the temperature of each sample at the time of sampling.

Effluent Analysis:

1. For each grab sample, have the grab sample analysed by an accredited laboratory for:
 - a) the organic content as indicated by the five-day biochemical oxygen demand and expressed as milligrams per litre;
 - b) the organic content as indicated by the five-day carbonaceous biochemical oxygen demand and expressed as milligrams per litre;
 - c) the total suspended solids content expressed as milligrams per litre;
 - d) the *Escherichia coli* (*E. Coli*) content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
 - e) the fecal coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
 - f) the total coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
 - g) if chlorine was used as a disinfecting agent, total residual chlorine expressed as milligrams per litre;
 - h) total ammonia nitrogen expressed as milligrams per litre;
 - i) nitrate-nitrite nitrogen expressed as milligrams per litre;
 - j) total kjeldahl nitrogen (TKN) expressed as milligrams per litre;
 - k) dissolved phosphorus expressed as milligrams per litre;
 - l) total phosphorus expressed as milligrams per litre; and
 - m) pH.

Effluent Reporting:

1. For each grab sample, report the results to the Director, in writing or in an electronic format acceptable to the Director within 60 days of the sampling date. The report shall include the sampling date, sample temperature, the dates of the effluent discharge, and copies of the laboratory analytical results of the sampled effluent.