

Licence No.: 2595 R

Licence Issued: July 25, 2003

Licence Revised: August 20, 2003

IN ACCORDANCE WITH THE ENVIRONMENT ACT (C.C.S.M. c. E125)

THIS LICENCE IS ISSUED PURSUANT TO SECTION 11(1) TO:

MANITOBA HYDRO; "the Licencee"

for the construction and operation of the Development being a wastewater treatment lagoon located on NE 7-64-4 WPM in the Province of Manitoba at the Jenpeg Hydroelectric Generating Station and with discharge of treated effluent into a drainage ditch which flows northward to an existing wetland that flows toward the northeast and empties into Cross Lake, in accordance with the Proposal filed under The Environment Act on March 10, 2003 and subsequent information provided in letters or other written correspondences dated March 21, 2003, May 27, 2003 and July 15, 2003 and the revised plans dated July 15, 2003 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;

"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;

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

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

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

"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 or the line of the exterior of the perimeter dykes which is reached during local flooding;

"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;

"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;

"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;

"rip rap" means small, broken stones or boulders placed compactly or irregularly on dykes or similar embankments for protection of earth 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;

"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 storage and treatment by natural oxidation.

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 wastewater generated within the Jenpeg Hydroelectric Generating Station 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 Licencee shall operate and maintain the wastewater treatment lagoon in such a manner that the release of offensive odours is minimized.
5. The Licencee shall, in case of physical or mechanical breakdown of the wastewater collection and/or treatment system:
- a. notify the Director immediately;
 - b. identify the repairs required to the wastewater collection and/or treatment system;
 - c. undertake all repairs to minimize unauthorized discharges of wastewater; and
 - d. complete the repairs in accordance with any written instructions of the Director.
6. The Licencee shall, during construction and operation of the Development, report spills of fuels or other contaminants to an Environment Officer in accordance with the requirements of *Manitoba Regulation 439/87*, or any future amendment thereof, respecting *Environmental Accident Reporting*.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

7. 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.
8. The Licencee shall, prior to the construction of the dykes for the wastewater treatment lagoon:
- a. remove all organic topsoil from the area where the dykes will be constructed; or
 - b. 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.
9. The Licencee shall construct and maintain the wastewater treatment lagoon with a continuous liner under all interior surfaces of the cells in accordance with the following specifications:
- a. the liner shall be made of clay;
 - b. the liner shall be at least one metre in thickness;
 - c. the liner shall have a hydraulic conductivity of 1×10^{-7} centimetres per second or less at all locations; and
 - d. the liner shall be constructed to an elevation of 2.5 metres above the floor elevation of both the primary and the secondary cells.
10. The Licencee shall operate and maintain the wastewater treatment lagoon in such a manner that:
- a. the organic loading on the primary cell, as indicated by 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 primary cell and secondary cell does not exceed 1.5 metres.
11. The Licencee shall not discharge septage into the wastewater treatment lagoon.
12. The Licencee shall:
 - a. advise the Director of the commissioning date of the wastewater treatment lagoon;
 - b. after all required soil sampling and testing requirements have been met and within 8 months of the commissioning date for the wastewater treatment lagoon, fill both the primary and secondary cells with water, to an elevation of 0.75 metre above the floor elevation of each respective cell;
 - c. after the wastewater treatment lagoon has been commissioned for a period of 8 months, maintain the liquid depth in the primary cell at an elevation of not less than 0.75 metre above the floor elevation of the primary cell, at all times; and
 - d. after the wastewater treatment lagoon has been commissioned for a period of 8 months, maintain the liquid depth in the secondary cell at an elevation of not less than 0.3 metre above the floor elevation of the secondary cell at all times.
13. 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.
14. 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 metres high and have a locking gate, which shall be locked at all times except to allow access to the wastewater treatment lagoon.
15. The Licencee shall, if, in the opinion of the Director, significant erosion of the interior surfaces of the dykes occurs, place rip rap on the interior dyke surfaces from 0.6 metre above the high water mark to at least 0.6 metre below the low water mark in the primary cell and to at least 0.15 metre below the low water mark in the secondary cell to protect the dykes from wave action.
16. 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 metre on all dykes.
17. 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.
18. The Licencee shall implement an ongoing program to ensure that burrowing animals are removed from the site of the wastewater treatment lagoon.
19. 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 30 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;
 - 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;
 - d. between the 1st day of November of any year and the 15th day of June 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 locate 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*, or any future amendment thereof, respecting *Storage and Handling of Petroleum Products and Allied Products*.

MONITORING AND REPORTING

21. 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 fecal coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample; and
 - c. the total coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample.
22. The Licencee shall:
 - a. during each year maintain records of:
 - i. wastewater sample dates;
 - ii. original copies of laboratory analytical results of the sampled wastewater; and
 - iii. effluent discharge dates;
 - b. make the records being maintained pursuant to sub-Clause 22 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.
23. 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.
24. 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 20 samples.
25. The Licencee shall, not less than 2 weeks before the wastewater treatment lagoon is placed in operation, submit to the Director the results of the tests carried out pursuant to Clause 24 of this Licence.
26. The Licencee shall actively participate in any future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for Cross Lake and associated waterways and watersheds.
27. The Licencee shall:
 - a. prepare "as constructed drawings" for the Development and shall label the drawings "As Constructed"; and
 - b. provide to the Director, on or before the 31st day of December, 2003, two sets of "as constructed drawings" of the wastewater treatment lagoon.

DECOMMISSIONING OF SEWAGE TREATMENT PLANT

28. The Licencee shall remove all liquid and sludge wastes from the existing sewage treatment plant that is operating under Licence No. 1148 and place them into the primary cell of the wastewater treatment lagoon once it is commissioned.
29. The Licencee shall decommission the existing sewage treatment plant that is operating under Licence No. 1148

in accordance with the activities described in Section 2.9.1 of the March 2003 Jenpeg Wastewater Treatment Lagoon Environment Act Proposal.

**DECOMMISSIONING OF EARTHEN WASTEWATER
CONTAINMENT FACILITY**

30. The Licencee shall, on or before the 31st day of December, 2003, submit a plan whereby sludge generated at the sewage treatment plant that is currently operating under Licence No. 958 would be redirected to an alternate acceptable disposal location to the Director for review and approval.
31. The Licencee shall, on or before the 31st day of December, 2003, submit a plan for assessing the contents and decommissioning the cells of the earthen wastewater containment facility located at this site to the Director for review and approval.

REVIEW AND REVOCATION

- A. Environment Act Licence No. 2595 is hereby rescinded.
- B. Environment Act Licence No. 1148 is rescinded upon approved commissioning of the wastewater treatment lagoon.
- C. 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.
- D. If the Licencee has not commenced construction of the Development within three years of the date of this Licence, the Licence is revoked.
- E. 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.: 4917.00

Schedule "A" to Environment Act Licence No. 2595 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 were the sample was taken, which ever 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.