

**Licence No.: 2205**

**Licence Issued: July 18, 1996**

In accordance with the Manitoba Environment Act (C.C.S.M. c. E125)

THIS LICENCE IS ISSUED TO:

**DONALD NORMAN MORRISON; "the Licence"**

for the construction and operation of the Development being a wastewater treatment lagoon for treating wastewater from an indoor fish farming facility located in the SE 1/4 of Section 31, Township 16, Range 21 WPM and in accordance with the Proposal filed under The Environment Act on March 11, 1996 and subject to the following specifications, limits, terms and conditions:

### DEFINITIONS

In this Licence:

**"approved"** means approved in writing;

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

**"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;

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

**"cut-off"** means a vertical or slanted trench filled with compacted clay, or a wall constructed from compacted clay;

**"Director"** means an employee of the department appointed as such by the Minister;

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

**"fecal coliform"** means aerobic and facultative, Gram-negative, nonspore-forming, rod-shaped bacteria capable of growth at 44.5 degrees Celsius, 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 5 days at a temperature of 20 degrees Celsius;

**"hazardous waste"** means a product, substance or organism that meets the criteria set out in the Classification Criteria for Products, Substances and Organisms Regulation, Manitoba Regulation 282/87, and that is intended for treatment or disposal and includes recyclable material;

**"high water mark"** means the line on the interior surface of a lagoon cell 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;

**"livestock waste"** means solid and/or liquid excretions from livestock;

**"livestock"** means animals or poultry not kept exclusively as pets, excluding bees;

**"low water mark"** means the line on the interior surface of a lagoon cell which is normally reached when the cell is discharged;

**"mg/L"** means milligrams per litre;

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

**"pest"** means any injurious, noxious or troublesome, insect, weed, rodent, fungus, algae, or other plant or animal;

**"pesticide"** means any chemical or biological agent registered under the Pest Control Products Act of Canada and used or represented as a means for preventing, destroying, mitigating or controlling any pest;

**"primary cell"** means the first in a series of cells making up a wastewater treatment lagoon system which receives untreated or pretreated wastewater;

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

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

**"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 degrees Celsius, 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 liquids containing pollutants, as defined in The Environment Act, which are designated for discharge into the environment; and

**"wastewater treatment lagoon"** means an impoundment consisting of a series of lagoon cells into which wastewater is discharged for storage and for 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. Notwithstanding 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 and/or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, handling, treatment, and disposal systems related to the Development, 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 pollutants from the Development; and
  - 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 on liquid samples in accordance with the methods prescribed in the most current 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 Pollution Control Federation, or in accordance with an equivalent analytical methodology approved by the Director; and

- b. ensure that all analytical determinations are undertaken by an accredited laboratory.
3. The Licencee shall report all the information requested through the provisions of this Licence in a manner and form acceptable to the Director.

## **SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS**

### **Construction**

4. The Licencee shall, prior to the construction of the dykes for the new primary and secondary cells, remove all organic topsoil from the area where the dykes will be constructed.
5. The Licencee shall:
  - a. construct and maintain a continuous clay liner underlying the interior surface of each cell of the wastewater treatment lagoon, in such a manner that:
    - i. the liner is at least 1.0 metre in thickness;
    - ii. the liner has a hydraulic conductivity of  $1 \times 10^{-7}$  centimetres per second or less;
    - iii. the liner is constructed to an elevation of 2.4 metres above the floor elevation of the cell;
    - iv. the liner is properly sealed around any applicable influent, transfer and discharge piping to ensure the full integrity of the liner; and
  - b. construct and maintain any clay cut-off used in the dykes of the cell such that:
    - i. the cut-off is constructed of clay which has been mechanically compacted;
    - ii. the cut-off is at least 1.0 metre in thickness;
    - iii. the cut-off has a hydraulic conductivity of  $1 \times 10^{-7}$  centimetres per second or less;
    - iv. the cut-off is keyed into the underlying clay liner a minimum of 0.3 metres; and
    - v. the cut-off is constructed to an elevation of 2.4 metres above the floor elevation of the cell(s) of the wastewater treatment lagoon;
6. The Licencee shall, before introducing wastewater into any cell of the wastewater treatment lagoon, evaluate the hydraulic conductivity of the interior 1.0 metre of soil lining the inner surfaces of the primary and secondary cells in accordance with the requirements of Clause 7 of this Licence.
7. The Licencee shall demonstrate the degree of conformity of the clay liners to the hydraulic conductivity criteria specified in Clause 5 of this Licence by:
  - a. arranging with the designated Environment Officer a mutually acceptable date and time, between the 15th day of May and the 15th day of October of any year, for the required soil sampling specified in Clause 6 of this Licence;
  - b. taking and testing undisturbed soil samples, in accordance with Schedule 'A' attached to this Licence, from the liner and the cut-offs (if any), with the number and location of samples and the test methods to be specified by the designated Environment Officer up to a maximum of 10 samples for each cell of the wastewater treatment lagoon; and
  - c. submitting the results of the hydraulic conductivity tests to the Director not less than two weeks before each of the primary and secondary cells of the wastewater treatment lagoon receive any wastewater.
8. The Licencee shall:
  - a. install and maintain a fence around the entire wastewater treatment lagoon facility to control access, with the fence appropriately distanced from the outside toe of the perimeter dykes or the perimeter ditch so as to facilitate the access of vehicles or machinery for proper maintenance of the dykes and perimeter ditches; and
  - b. erect and maintain warning signs along the fence indicating the nature of the facility and advising against trespassing, with each side of the wastewater treatment lagoon facility provided with at least one or more such signs separated by no more than 150 metres as measured along the perimeter length of the fence.

9. The Licencee shall notify the Director in writing at least one week in advance of the date on which the constructed wastewater treatment lagoon is to be commissioned into use.
10. The Licencee shall prepare and submit to the Director two sets of 'as constructed drawings', labelled 'As Constructed', of the wastewater treatment lagoon and all appurtenances no later than one month after the completed construction of the proposed wastewater treatment lagoon.

### **Lagoon Operation**

11. Upon the date on which the new wastewater treatment lagoon is commissioned into use, and any time thereafter, the Licencee shall direct only wastewater released from the indoor fish farm facility into the primary cell of the wastewater treatment lagoon shown in Appendix 'A' attached to this Licence, unless otherwise approved by the Director.
12. The Licencee shall ensure that the following substances are not discharged to the wastewater collection system or the wastewater treatment lagoon:
  - a. pesticides;
  - b. hazardous wastes; and
  - c. livestock waste.
13. The Licencee shall operate and maintain the wastewater treatment lagoon in such a manner that:
  - a. the release of offensive odours is minimized;
  - b. 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
  - c. the depth of liquid in the primary cell or secondary cell does not exceed 1.5 metres.
14. The Licencee shall not release effluent from the wastewater treatment lagoon:
  - a. during the calendar period extending from the first day of November in any year up to and including the fifteenth day of May in the following year;
  - b. into any natural or manmade surface waterway or drainage system other than the wetlands located on the Licencee's property;
  - c. at a rate of discharge which would adversely affect the water level for any existing waterfowl nests located in the receiving natural wetlands; or
  - d. if the quality of any grab sample taken of the effluent is such that:
    - i. the organic content of the effluent, as indicated by the five-day biochemical oxygen demand, is greater than 30 milligrams per litre;
    - ii. the fecal coliform content of the effluent, as indicated by the MPN index, is greater than 200 per 100 millilitres of sample; or
    - iii. the total coliform content of the effluent, as indicated by the MPN index, is greater than 1500 per 100 millilitres of sample.
15. The Licencee shall ensure that the release of effluent from the wastewater treatment lagoon to the natural wetlands located on the Licencee's property does not create any flooding condition on adjacent neighbouring properties, or render any portion of a neighbouring property as unusable or inaccessible due to unnaturally elevated moisture conditions.
16. If in the opinion of the Director, significant erosion of the granular material covering the liner is occurring or has occurred in the course of the operation of the wastewater treatment lagoon, the Licencee shall make such repairs and/or place rip rap on the interior dyke surfaces from 0.6 metres above the high water mark to 0.6 metres below the low water mark to protect the dykes from wave action to the degree satisfactory to the Director.

### **Monitoring and Reporting**

17. 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;
- c. the total coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
- d. total phosphorous; and
- e. total nitrogen.

18. The Licencee shall:

- a. during each year maintain records of:
  - i. effluent sampling dates;
  - ii. original copies of laboratory analytical results of the sampled effluent;
  - iii. effluent discharge dates;
  - iv. the volume of effluent released (expressed as cubic metres).
- b. make the records being maintained pursuant to sub-Clause 18(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.

19. The Licencee shall, in case of a 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.

### **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 construction of the Development within three years of the date of issuance of this Licence, this 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.: 4165.00**

### **SCHEDULE 'A'**

### 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.