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Licence No./Licence n° 1666 S3
Issue Date/Date de délivrance August 6, 1996

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

THIS LICENCE IS ISSUED TO:

VILLAGE OF ST. CLAUDE: "the Licencee"
AERATED WASTEWATER TREATMENT LAGOON

STAGE 3 LICENCE

pursuant to section 13 of the Act, for the reconstruction of part of the existing Development being the operation of a wastewater collection system and the operation of an aerated wastewater treatment lagoon located on NE 1/4 of Section 15, Township 8, Range 7 WPM and with discharge of treated effluent to the Elm Creek drainage system via municipal and provincial drainage systems, in accordance with the Proposal for a Stage 3 Licence filed under The Environment Act on April 24, 1996 and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"aerated cell" means a cell of a wastewater treatment lagoon system in which mechanical or diffused-air aeration is used to supplement the oxygen supply;

"aerated wastewater treatment lagoon" means the component of this development which consists of an impoundment into which wastewater is discharged for treatment by mechanical aeration and storage;

"affected area" means a geographical area affected by an odour nuisance;

"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;

"average daily wastewater flow rate" means the volume of wastewater that is discharged to the wastewater treatment lagoon as determined by monitoring the wastewater flow at a lift station through which all the wastewater flows over a prescribed period of time;

“bentonite” means specially formulated standard mill grade sodium bentonite conforming to American Petroleum Institute Specification 13-A, Section 4 and Section 5;

“cut-off” means a vertical-side trench filled with impermeable material 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 facility;

“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 5 days at a temperature of 20°C;

“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;

“individual” means one person for each household or unique address;

“industrial use agreement” means an agreement to discharge industrial wastewater to municipal wastewater collection and treatment systems;

“industrial wastewater” means wastewater derived from an industry which manufactures, handles or processes a product and does not include wastewater from commercial and residential buildings;

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

“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 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), 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;

“secondary cell” means a cell of the wastewater treatment lagoon system which is the cell that receives partially treated wastewater from the aeration cell;

“septage” means the sludge removed from individual on-site wastewater disposal systems such as septic tanks;

“sewage” means household and commercial wastewater that contains human waste;

“sludge solids” means solids in sludge;

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

“sodium adsorption ratio” means an expression of the relative activity of sodium ions in exchange reactions with soil, indicating the sodium or alkali hazard to soil;

“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; and

“wastewater” means the spent or used water of a community or industry which contains dissolved and suspended matter.

GENERAL REQUIREMENTS

1. The Licencee shall direct all wastewater generated within the Village of St. Claude toward the aeration cells of the aerated wastewater treatment lagoon or other approved sewage treatment facilities.
2. The Licencee shall operate and maintain the aerated wastewater treatment lagoon in such a manner that:
 - (a) a minimum of 3 milligrams of dissolved oxygen per litre is detectable at all times in the top 2.5 metres of the liquid in the aerated cells;
 - (b) the organic loading on the wastewater treatment lagoon, in terms of the five-day biochemical oxygen demand, is not in excess of 355 kilograms per day;
 - (c) the depth of liquid in the aeration cells does not exceed 2.75 metres;
 - (d) the depth of liquid in the storage cell does not exceed 1.8 metres; and
 - (e) the disruption of conditions in the soil on properties adjacent to the wastewater treatment lagoon and the drainage route is prevented.

3. The Licencee shall:
 - (a) inspect the entire aeration system annually and make any necessary repairs;
 - (b) ensure that one of the aeration cells remains in operation at all times during the inspection and repair program; and
 - (c) ensure that each annual inspection and repair program is completed within 10 days.
4. The Licencee shall install and maintain a fence around the aerated wastewater treatment lagoon to limit access.
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 not construct, alter or operate the Development, or permit the Development to be constructed, altered or operated, in a way which causes or results in an odour nuisance, and shall take steps as the Director may require to eliminate or mitigate an odour nuisance.

CONSTRUCTION SPECIFICATIONS

7. The Licencee shall reconstruct and maintain the aerated wastewater treatment lagoon system with a continuous liner, including cutoffs, under all interior surfaces of the cells such that:
 - a) the cutoff shall be keyed into the underlying clay layer a minimum of 0.6 metre;
 - b) the cutoff shall be filled with a sand-bentonite mixture with a minimum of 3.0 percent bentonite by weight;
 - c) prior to placement in the trench constructed for the cutoff, the sand and bentonite shall be thoroughly mixed;
 - d) prior to placement of the sand-bentonite mixture in the trench, the trench shall be probed with a rod to check that soil from the trench wall has not fallen into the bottom of the trench;
 - e) the cutoff shall be a minimum of 0.75 metre in thickness having a hydraulic conductivity of 1×10^{-7} centimetres per second or less;
 - f) the cutoff shall be installed to an elevation of 2.4 metres above the base of the storage cell ;
 - g) the cutoff shall be installed to an elevation of 3.15 metres above the base of the aeration cells ; and
 - h) the underlying clay layer shall be continuous layer under the entire storage cell and shall be at least one metre in thickness and have a hydraulic conductivity of 1×10^{-7} centimetres per second or less.

DISCHARGE LIMITS, TERMS AND CONDITIONS

8. The Licencee shall not discharge effluent from the aerated 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; or
 - (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; or
 - (d) between the 1st day of November of any year and the 15th day of May of the following year, unless prior approval, by the Director, is given.

MONITORING AND REPORTING SPECIFICATIONS

9. 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.
10. The Licencee shall take and test undisturbed soil samples, in accordance with Schedule "A" attached to this Licence, from the liner in the aeration cells and the cut-off surrounding the storage cell; the number and location of samples and test methods to be specified by the designated Environment Officer up to a maximum of 10 samples for each cell of the aerated wastewater treatment lagoon.
11. The Licencee shall, not less than 2 weeks before each cell of the wastewater treatment lagoon is placed in operation, submit to the Director the results of the tests carried out pursuant to Clause 10 of this Licence for that cell.
12. The Licencee shall, prior to the discharge of effluent:
- (a) take samples of the wastewater in the cell which is to be discharged and have the samples analyzed for: biochemical oxygen demand, fecal coliform level, total coliform level, sodium, sodium adsorption ratio, chloride, and total nitrogen using methods from the latest edition of Standard Methods for the Examination of Water and Wastewater or using other methods approved by the Director; and
 - (b) provide a copy of the wastewater analysis reports to the Director within 30 days from the date of receipt of the reports.
13. The Licencee shall conduct an annual wastewater flow study by measuring the pumping capacity of each and every pump at a lift station through which all the wastewater flows, measuring the operating time for each pump over a period of not less than 10 days and calculating the average daily wastewater flow rate. The Licencee shall file a copy of the report including all field measurements with the Director.
14. 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 1st day of September, 1996, "as constructed drawings" of the aerated wastewater treatment lagoon.

15. The Licencee shall, on or before the 1st day of April, 1999:
- (a) complete the salinity reduction program, in accordance with Section 2 of Schedule "B" attached to this Licence;
 - (b) implement and maintain a salinity control program to ensure that the sodium level in the effluent does not exceed 200 milligrams per litre after the 1st day of April, 1999;
 - (c) upgrade the effluent drainage route by regrading and cleaning the drainage ditch from the wastewater treatment lagoon to the Elm Creek Main Drain;
 - (d) complete the Discharge Route Monitoring Program, in accordance with Section 4 of Schedule "B" attached to this Licence; and
 - (e) submit to the Director, detailed reports on all the work carried out on the above items.
16. Should the actions outlined in Clause 15 of this Licence not achieve a sodium content in the effluent of 200 milligrams per litre or less, or if crop damage along the discharge route occurs, the Licencee shall, on or before the 1st day of April, 2000, reduce the salinity of the wastewater to the following limits:
- (a) the sodium adsorption ratio in the effluent from the wastewater treatment lagoon shall not be in excess of 4 units;
 - (b) the sodium content in the effluent from the wastewater treatment lagoon shall not be in excess of 50 milligrams per litre; and
 - (c) the chloride content in the effluent from the wastewater treatment lagoon shall not be in excess of 68 milligrams per litre.

REVIEW AND REVOCATION

- A. This Licence replaces Licence No. 1666 S2 RR which is hereby rescinded.
- 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, 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.



Larry Strachan, P. Eng.
Director
Environment Act

Schedule "A" to Environment Act Licence No. 1666 S3

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.

PROPOSAL FOR A STAGE 3 LICENCE FOR THE ST. CLAUDE LAGOON

1. INTRODUCTION

Licence No 1666 S2 RR requires that the Village of St. Claude provide a detailed plan to reduce the salinity of its waste water to within the following limits

- (a) the sodium absorption ratio of the effluent from the wastewater treatment lagoon shall not be in excess of 4 units;
- (b) the sodium content in the effluent from the wastewater treatment lagoon shall not be in excess of 50 milligrams per litre; and
- (c) the chloride content in the effluent from the wastewater treatment lagoon shall not be in excess of 68 milligrams per litre.

Over the past three years the sodium and chloride levels of the waste water have averaged 250 mg/l and 280 mg/l respectively. These figures represent a 9 fold decrease in the sodium and chloride content of this discharge water since the late 1980s at which time it was concluded that this sodium and chloride content was causing damage to the agricultural land adjacent to the lagoon and along the discharge route.

It should be noted that the limits called for require a further 5 fold decrease in sodium content to a level near the sodium level of the Village's water supply (30 mg/l Na⁺). This level would only be attainable by banning all zeolite-salt softeners (difficult to enforce and politically impossible).

2. SALINITY REDUCTION PROGRAM

Based upon collected data on flow rates and sodium levels, it is estimated that the total sodium discharge is about 70 kg/day. Of this, it is estimated that 20 kg/day come from the Beatrice Plant and 45 kg/day come from the residential water softeners. The balance comes from the municipal water supply. The proposed salinity reduction program has two parts:

1. Beatrice Milk Plant Sodium Reduction Program
2. Residential Water Softener Salt Reduction Program

2.1 Beatrice Milk Plant Sodium Reduction Program

In addition to the earlier elimination of the use of highly saline well water used for equipment washdown, Beatrice has been investigating the replacement of sodium based detergents with potassium based detergents. Starting in February 1996, all the detergents used in the 'cold side' of the plant (milk receiving, pasteurizing, packaging, storage) were switched over. This has resulted in a 10% reduction of their overall sodium discharge.

Further reductions in sodium discharge are not economically feasible under current technology (only sodium hydroxide will clean evaporator and dryer economically). No further reductions are being considered at this time.

2.2 Residential Water Softener Salt Reduction Program

Residential zeolite-salt water softeners contribute about 90% of the sodium originating from residential sources. The remainder comes from the municipal water supply.

It has been estimated that about two thirds of the 250 houses in St. Claude have water softeners. Of these, it is estimated that 50% utilize clock-type softener controls which are less efficient (use more salt) than the more modern flow-regulated type softeners. It is therefore planned to implement a Residential Water Softener Salt Reduction Program with the following components:

1. **Residential Softener Inspection** - every house connected to the municipal sewer will be visited and, where a water softener is being used, the softener inspected to determine make and type and ensure that the settings and operation are satisfactory. May-June 96

2. **Residential Water Softener Upgrading** - all residents with the older style clock-type softener controls will be offered approximately 50% rebate (\$200) to upgrade their water softener controllers to the flow-regulated type. If the up take on this offer is inadequate, the Village Council may impose a ban on all clock-type control heads. June-Sept 96

It is anticipated that this program should result in a 10-30% reduction in the sodium discharge from residential sources. Further reductions beyond this level will require the imposition of a ban on softeners or the installation of a central water treatment plan - both unfeasible options at this time.

3. DISCHARGE ROUTE UPGRADING

As a result of public consultation between the Village, Rural Municipality of Grey and the residents and landowners along the discharge route, the problem of ponding of the discharge water at three locations along the first six miles was identified. The RM of Grey has entered into a cost sharing agreement with Manitoba Highways to recontour the ditch to overcome this ponding problem. Upgrading work on this ditch up to the point where it enters the Elm Creek Main Drain will be undertaken as soon in 1996 as conditions permit. In addition to responding to a public concern over the discharge route, this work will effectively extend the discharge route and increase the potential for dilution thereby reducing any impact from the effluent.

4. DISCHARGE ROUTE MONITORING PROGRAM

All of these actions taken together will not reduce the sodium concentration of the lagoon discharge water to the 50 mg/l target level. They should, however, reduce the sodium content to below 200 mg/l, very much lower than the level which prevailed in the 1980s when very high levels of sodium and chloride in the discharge water affected farmland in the area adjacent to part of the discharge route. To ensure that these reduced levels are not still having a detrimental effect, a **Discharge Route Monitoring Program** is planned for at least the next three years. The components of this program are:

1. *Establishment of the Current Salinity Profile along the Discharge Route* - EM 38 measurements will be taken along a 150 meter wide band north and south of PTH 2 from the St. Claude Lagoon eastwards for a distance of six miles. This will be done in May/June 1996. Soil samples will also be taken and chemical analysis carried out to calibrate the EM 38 readings.
2. *Measurement of the Current Chemistry of Drinking Water Wells along the Discharge Route* - water samples will be taken from all shallow drinking water wells along the south side of PTH 2 to determine the current water quality.
3. *Monitoring of any Effect on Crops in this Band* - visual inspection from the ground and possibly by aerial photography will be carried out along this band in mid-July 1996 to determine any visible evidence of the salinity mapped in (1).
4. *Autumn 96 Remeasurement of the Salinity Profile along the Discharge Route* - EM 38 measurements will be repeated along the discharge route as in (1) to determine what season effects can be detected.
5. *Spring/Fall 1997 & 1998 Remeasurement of the Salinity Profile along the Discharge Route* - EM 38 measurements will be repeated in either the spring or the autumn of the next two years to determine if there is any detrimental change in the salinity profile along the discharge route.

6. *July 1997 & 1998 Remeasurement of Drinking Water Quality* - shallow wells along the discharge route will be retested to detect any change in water quality.
7. *July 1997 & 1998 Monitoring of any Effect on Crops in this Band* - visual inspection as in 2. Above will be repeated in each of the following two years.

Dr. Walter Michalyna, a soil scientist involved in the environmental impact assessment of the St. Claude sewage lagoon at the time of the Clean Environment Commission hearing (1989), has been contracted to oversee the Lagoon Discharge Route Monitoring Program. Additional details of the testing programs are given in Attachment 1.

The findings of each seasons measurements will be compiled into a brief report for the residents and landowners along the discharge route and, if needed, a meeting held each autumn to review the results. Any related complaints by the residents or landowners will be noted and made a part of this report which will then be made available to Manitoba Environment.

csc/csc

ATTACHMENT 1

Village of St. Claude

Proposed Effluent Discharge Route Monitoring Procedure

1. General

- a) Monitoring procedure, soil sampling and reporting by PFRA to be consistent with the 1989 report prepared by Walter Michalyna and the April 10, 1996 letter from Walter Michalyna to Stuart Clark.
- b) EM 38 Conductivity meter to be used for all field measurements.
- c) EM 38 readings to be taken with the meter in the vertical position and horizontal position at every test site -- readings to be recorded as vertical reading over the horizontal reading (e.g. 38/18).
- d) Readings to be taken in spring and fall of 1996 and in either spring or fall in 1997 and 1998, as determined by Walter Michalyna, PFRA and Village of St. Claude representative.
- e) PFRA to inform all affected landowners along the discharge route immediately prior to performing tests. Walter Michalyna to inform all affected landowners along the discharge route immediately prior to field inspections.

2. Cross-section locations and identification

- a) EM 38 readings to be taken along the north-south road from the north edge of the lagoon to Highway #2; along Highway #2 from the NE of 15-8-7W1 to the NE of 16-8-6W1 (i.e. Haywood curve); and from the NE of 16-6-6W1 to the NE of 21-6-6W1 (i.e. the Elm Creek Drain) at intervals given below and perpendicular to the lagoon on the north side at locations given below (see attached sketch).

- b) For land location NW 15-8-7W1, EM 38 readings to be taken perpendicular to the north-south road every 100 meters from the north edge of the lagoon to Highway #2. EM 38 Readings also to be taken every 100 meters perpendicular to Highway #2 from the NE of 15-8-7W1 to the NE 13-8-7W1 and from the middle of section 18-8-6W1 to the middle of section 17-8-6W1 and every 200 metres from the NE of 13-8-7W1 to the middle of section 18-8-6W1; from the middle of section 17-8-6W1 to the NE 16-8-6W1; and from the NE 16-8-6W1 to the NE 21-8-6W1. Distances will be measured on a vehicle odometer and corrected for error at mile roads (i.e. re-set trip odometer at every mile road so any error does not compound). Locations of every cross-section to be recorded relative to hydro poles with the hydro poles counted or marked so a cross-section can be re-located for subsequent measurements and soil sampling.

Cross-sections will be identified as station/section (e.g. station 400/15-8-7W1). There will be approximately 80 cross-sections along the roads and Highway.

- c) EM 38 readings to be taken perpendicular to the lagoon (i.e. north-south) every 100 metres along the north dikes as measured on a vehicle odometer from the east side of the secondary cell to the west side of the primary cells.

Cross-sections will be identified as station/lagoon (e.g. station 400/lagoon). There will be approximately 4 cross-sections along the lagoon, not counting station 0 at the east boundary of the lagoon (which will be picked up by the "road" cross sections).

3. Heading locations and identification

- a) At every cross-section on the north-south road from the northeast corner of the lagoon to Highway #2, EM 38 readings will be taken on both sides of the road. At every cross section on Highway #2, EM 38 readings will be primarily taken on the south side. On the north side of Highway #2, EM 38 readings will be taken until they are consistently approaching readings of 40. (It is expected that readings on the north side of the Highway to approach 40 in the first few miles.) EM 38 readings will be resumed on the north side of Highway #2 opposite sloughs on the south side of Highway #2 - readings will be continued on the north side in these areas if they are above 40. EM 38 readings will be taken on the the side of the road north of Haywood curve that picks up the drainage from the south side of Highway #2.
- b) At every cross-section on the lagoon EM 38 readings will be taken on the north side only.

- c) EM 38 readings will be taken on the RM or Highway property line and every 25 metres into the field, measured by pacing out the distance. Readings should be taken into the field to a distance of 150 metres and beyond if necessary until readings are approaching 40. Cross section lines will be at a "best guess" of a 90 degree angle to the road or Highway. Readings will not be taken directly under power lines. The operator will move out a distance from the power lines until the reading stabilizes.
- d) EM 38 readings will be taken at the toe of the dike and every 25 metres north into the field, measured by pacing out the distance. Readings should be taken into the field to a distance of 150 metres and beyond if necessary until readings are approaching 40. Cross section lines will be at a "best guess" of a straight north direction (perpendicular to the lagoon dikes in most locations).
- e) EM 38 readings will be identified under the cross section identifier as vertical reading over horizontal reading; followed by the distance north, south, east or west of the road, Highway or dike (e.g. a reading of 38 with the meter in the vertical position, 18 for a reading with the meter in the horizontal position at a location North of the Highway 50 metres from the property line would be identified "38/18 N 50").
- f) If a slough is encountered, readings will be taken to the edge of the slough at the measured distance.
- g) If bush is encountered, readings will be taken as far into the bush as possible.
- h) If buildings are encountered, the cross section should be moved a distance north, south, east or west parallel to the road or highway to a point where readings can be taken - the distance paced out in the field, recorded as an uneven station and marked by hydro poles similar to the other stations. The vehicle should not be moved so that the next even station can be located.

4. Soil sampling locations and identification

- a) Soil will be sampled and bagged in four selected re-established cross sections. One section along the north south road, one along the first mile of the Highway heading east, and two more in the remaining four miles of Highway.

- b) Cross sections that show high, medium and low EM 38 readings will be chosen for soil sampling. Three samples will be taken in each of the high, medium and low reading areas of the cross section chosen. The distance north or south of the property line will be paced out, recorded and labelled on the sample bag. Samples will be taken from 0 to 15 cm, from 50 to 60 cm and from 100 to 120 cm. There will be 36 samples in all for four cross-sections.

- c) All soil samples to be bagged and identified as follows: "St. Claude Effluent Discharge Route, station xxx - section-township-range north/south/east/west xx metres, depth" (e.g. St. Claude Effluent Discharge Route, Station 100 - 15-8-6W1 S 85, 50-60).

- d) Samples will be taken to the Village office who will take care of shipment to the laboratory and payment for analyses. The Village will obtain a saturated paste, electroconductivity (EC) on all samples and a soluble salt analysis on selected samples (as determined by Walter Michalyna).

Glen Brandt, PFRA

04/25/96 THU 09:11 FAX 204 822 8841

MORDEN RES CENT

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*Village of St. Claude
Effluent Discharge Route Monitoring Area.*

