

**REPORT ON HEARINGS
WHITESHELL COLONY FARMS LTD.
DOMESTIC WASTEWATER TREATMENT LAGOON**

**THE MANITOBA CLEAN ENVIRONMENT COMMISSION
APRIL 1990**

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WHITESHELL COLONY FARMS LTD.

DOMESTIC WASTEWATER TREATMENT LAGOON

BACKGROUND

On behalf of Whiteshell Colony Farms Ltd., the Manitoba Water Services Board submitted a proposal under the Environment Act on August 18, 1989, to construct and operate a domestic wastewater treatment lagoon. The Whiteshell Colony is located south of River Hills on the SE 33-12-11 EPM in the Rural Municipality of Whitemouth (see Figure 1). The proposal is that the lagoon will receive only domestic wastewater from residences on the Whiteshell Colony and will be constructed of on-site clay material, with discharge of treated effluent to lands owned by the Colony.

After a number of objections to the proposal were received by the Department of Environment following public advertisement, the Clean Environment Commission was requested by the Honourable J. Glen Cummings, Minister of the Department of Environment, to hold a public hearing on the matter and provide him with a report and recommendations.

Following public notification, the Commission convened a hearing at the Whitemouth Recreational Association facility in Whitemouth, Manitoba at 7:30 p.m. on January 15, 1990. Commissioners in attendance at the hearing were: Mr. Stan Eagleton, Chairperson; Mr. Leonard Flett; Mr. Edward Gramiak; and Ms. Betty Pawlicki.

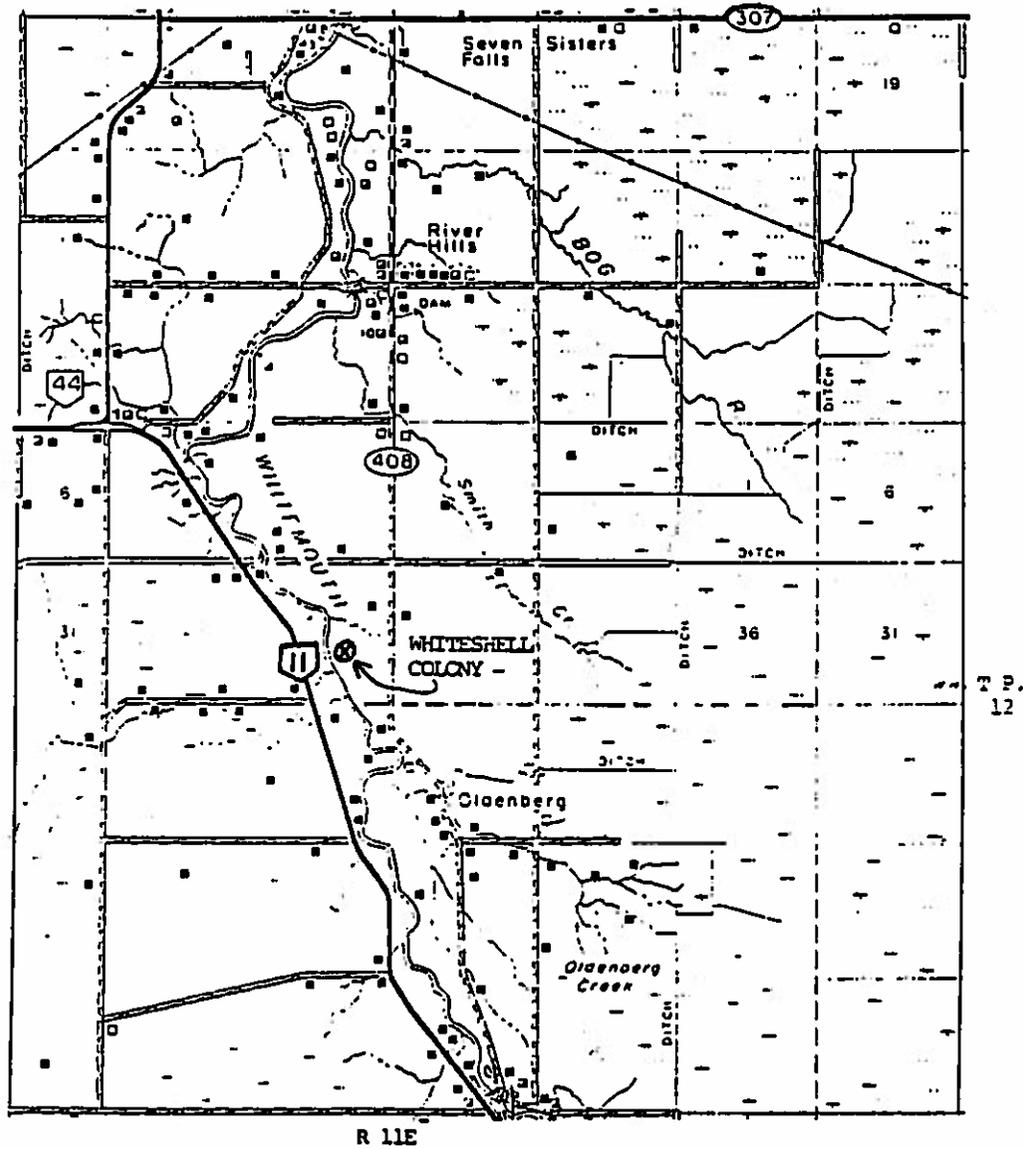


Figure 1: Location of Whiteshell Colony.

PRESENTATIONS AT THE HEARING

The Proposal

Ms. Stella Fedeniuk, P.Eng., representing the Manitoba Water Services Board, said that in June of 1988 the Whiteshell Colony requested the Manitoba Water Services Board to provide engineering and financial assistance in designing a two cell lagoon and gravity sewer system for collection, treatment and disposal of the Colony's domestic wastewater. On behalf of the Colony, Ms. Fedeniuk described the proposed construction and operation of the domestic wastewater lagoon. She stressed that this facility would be separate from the existing hog waste holding facilities on the Colony.

Colony domestic wastewater needs are currently handled in septic and collecting tanks. The wastes are trucked and subsequently spread on land owned by the Colony.

Site selection considerations for the proposed lagoon location were described. A groundwater pollution hazard appraisal indicated that a thick layer of clay underlying the site would prevent contamination of groundwater by seepage from the lagoon. The proposed site is at least 300 meters from the nearest occupied residence.

"Design Objectives for Standard Sewage Lagoons" prepared by the Department of Environment were applied in the design of the proposed facility. The lagoon was designed for a projected maximum population of 125 persons although there are presently 70 residents on the Colony. Domestic wastewater production at the Colony was estimated at 190 liters per capita per day.

Primary cell sizing was based on an assumed organic (i.e, biochemical oxygen demand - BOD) loading of 0.077 Kg per capita per day for a maximum population of 125 persons. The design of the primary cell was oversized to

PRESENTATIONS (cont.)

exceed the maximum BOD loading requirement of 56 Kg per hectare per day. Odour production from the facility should be thereby reduced. The secondary cell, in addition to half of the volume of the primary cell, is being designed to contain the volume of wastewater and extraneous flows from the Colony for a period of 200 days.

The bottom and inside faces of lagoon dykes will be lined with a minimum one meter thickness of compacted clay, taken from the excavation site. Sheep's foot rollers will be used to compact the clay. Soil samples collected in the vicinity of the lagoon indicate that following compaction the permeability of clays to be used for liner construction will be below the "Design Objectives" for soil hydraulic conductivity of 1×10^{-7} cm/sec. Maximum expected seepage loss from the proposed lagoon was calculated to be 5% of average daily flow for a worst-case scenario.

It is proposed that the Colony will dispose of effluent onto their own land. It was noted that the Colony currently soften their water which adds to the sodium concentration in the wastewater effluent, however, in the opinion of Manitoba Water Services Board staff, effluent salinity is not expected to pose a severe problem for land application if the receiving soil does not already have a salinity problem.

In answer to a question following this presentation, Ms. Fedeniuk said that originally the Colony had proposed discharging treated effluent directly into the Whitemouth River. After learning that a number of government departments considered discharge to the river to be undesirable, the Colony withdrew that option from consideration, and is now seeking a Licence only for land application of treated effluent. Although the construction design plans currently contain an overflow and discharge pipe from the secondary cell to facilitate discharge of treated effluent to the Whitemouth River, these features will not be constructed.

PRESENTATIONS (cont.)

In the unlikely future event that a discharge to the river is required, then a submission for prior approval must be made to the Department of Environment. It was noted that in other communities where land application of treated effluent is the disposal method, additional means of effluent discharge have not been required.

Since the proposed lagoon location is approximately 200 meters from the river, concern was expressed about possible dyke failure with the drainage of wastewater to the river. Ms. Fedeniuk noted the lagoon is being designed and will be constructed to prevent erosion and dyke failure and thus the chances of failure are minimal.

When questioned about the level of assistance the Manitoba Water Services Board provides to Hutterite Colonies installing sewage lagoons, Ms. Fedeniuk said that in addition to providing design services, the Board also provides construction supervision and would participate in inspections of lagoon construction after completion. The Colony is charged for such services but will receive some financial assistance from the Board to design and construct the lagoon, consistent with standard assistance provided by the Board within its rural development policy.

With regards to land application of effluent, information required by the Commission in considering the suitability of the proposal was not provided and Ms. Fedeniuk was requested to obtain further information concerning this aspect and provide it to the Commission following the hearing.

A preliminary report received from Manitoba Water Services Board following the hearing indicated that the Colony owned lands are suitable to receive treated effluent from the domestic wastewater lagoon. The evaluation of predicted effluent salinity is not completed although it was later reported by MWSB that the Colony utilizes both river and groundwater. A portion of the water supply is softened, requiring 40 Kg of salt per week. Although not fully confirmed, it is anticipated that the concentrations of salts in the

PRESENTATIONS (cont.)

effluent will not be above recommended limits for application to agriculture lands. The question of suitable land availability to accommodate both hog lagoon and domestic wastes had not been fully evaluated.

Site specific soil testing will be required to confirm that the alternative lagoon site proposed by the "Save the Whitemouth River Committee" is suitable, however, Ms. Fedeniuk expected that the land has similar geological characteristics to the location already analyzed and chosen as the recommended lagoon site. Moving the lagoon location would significantly increase construction costs. The estimated cost of construction at the originally proposed site is \$45,000 whereas the relocated site would cost an additional \$75,000.

Local Concerns

Ms. Marilyn Lloyd introduced a presentation by members of the Save the Whitemouth River Committee. The Committee was formed in November of 1989 by local citizens concerned about pollution problems occurring along the Whitemouth River. She said that many residents use the river as a source of water supply and also for recreation. In recent years water quality has been impaired, inhibiting the use of river water for these purposes. Ms. Lloyd introduced three other members of the Committee who each spoke about various aspects relating to the Whiteshell Colony proposal.

Mr. Leon Clegg has lived approximately one-quarter of a mile due east of the Colony since 1975 in a non-farm residence surrounded by Colony owned land. Mr. Clegg said that liquid manure is routinely spread on the Colony owned fields surrounding his property, at times as close as 40 feet to his house.

Hog barns and lagoons to handle hog wastes were completed by the spring of 1988 on Colony land close to the proposed domestic lagoon site.

PRESENTATIONS (cont.)

Since operation of these facilities began, on many occasions Mr. Clegg has been unable to enjoy being outside in his yard because of odours originating from the Colony's hog operation.

During the first week in September, 1989, liquid was sprayed on the Colony field directly across the road from Mr. Clegg's yard. The liquid was sprayed 30 or 40 feet into the air, confining the Cleggs indoors for five days. At times, spray was wind blown onto Mr. Clegg's property.

Referring to statements in the proponent's proposal about odours from the lagoon during a two or three week period in the spring, Mr. Clegg disagreed with the conclusion that odours may not be noticed, considering the distance from nearby residents and the direction of the prevailing winds. He said that his residence and two other residences were not much further away than 300 meters from the proposed lagoon site. Mr. Clegg also noted that wind direction in the spring was quite variable.

At least 15 residences take their domestic water supply from the river downstream from the Colony. Following a spill from the Colony hog waste lagoons in July of 1988, several residents became ill. A considerable fish kill was also observed. In view of the history from spills, Mr. Clegg wondered about locating a further lagoon on the same property.

Effluent from the hog waste lagoons was said by Mr. Clegg to be spread on a relatively small area of land close to the Whitemouth River. He considered it likely that discharging a further lagoon onto this land would result in seepage to the river, especially in spring when the soil contains more moisture.

Mr. Gordon Emberley, read signed statements prepared by three area residents. These statements chronicled events and problems associated with the Whitemouth Colony hog operation. The events included the spill into the river in July of 1988 resulting from a failed dyke, dead hogs disposed on the

PRESENTATIONS (cont.)

river bank near the lagoon, poor water quality in the spring of 1989, and odour problems arising from the application of wastewater from the hog operation to the land.

Mr. R. Brian Cooper, a geologist with AECL at Pinawa, evaluated the proposal and design report.

Soils investigations undertaken on behalf of the Colony were considered inadequate by Mr. Cooper since none of the three test holes were drilled at the specific lagoon site. The test holes indicated that above the basal clay layer there is a permeable layer of silty sand and clay, a condition that exists throughout the region. Because this unit is of varying thickness, it might extend below the bottom of the proposed lagoon and allow lateral seepage of effluent from the lagoon. Mr. Cooper recommended further soils investigations at the proposed lagoon site. In terms of construction of the lagoon, he recommended that a clay-backfilled cut-off trench extending from the bottom of the dyke liner to the top of the basal clay unit be installed. Mr. Cooper said that the geological information used for the groundwater appraisal should have been included with the proposal.

The lagoon site was stated in the proposal to have been selected because "the soils at the proposed site show the most promising conditions for a lagoon". There was no evidence in the proposal that geotechnical conditions at other sites were evaluated for comparison, and it was Mr. Cooper's contention that the main reason for selecting the proposed site was the proximity to the Colony buildings.

Odours from the lagoon were also considered to be a problem because of the proximity of residences, the wind speed and direction, and meteorological inversions which take place particularly from June to September.

Mr. Cooper was concerned about the operating regime of the lagoon. A full description of the requirements for operating the lagoon should be part of a meaningful environmental assessment.

PRESENTATIONS (cont.)

A series of recommendations was next presented by Ms. Lloyd:

1. Reconsider the location and design of the proposed sewage lagoon;
2. Eliminate any feature that will permit the discharge of effluent, either directly or indirectly into the Whitemouth River;
3. Consider an alternate location for the lagoon approximately 3 Km to the east of the Colony. This more isolated location would create less environmental impact. It has no access to the river and the prevailing winds would reduce the odour pollution;
4. The lagoon must be licensed with specific operating requirements and adequate ongoing inspections to ensure compliance with the law;
5. The hog waste should be relocated to the same area as the human waste;
6. Review the current operations of the Colony to ascertain whether the volume of manure and effluent is exceeding the absorption capacity of the acreage;
7. Finally, review the current operations of the Colony to ensure they are in compliance with the terms and conditions of the Environment Act.

In answer to questions, Ms. Lloyd said that the Committee was formed out of concern for the entire river. The Colony was not the sole polluter of the Whitemouth River, and once this issue is resolved the Committee intends to

PRESENTATIONS (cont.)

proceed with other activities. Mr. Clegg said that the surrounding land use is primarily agricultural. There are also quite a number of small residential acreages. The Committee did not object to the principle of treating domestic wastewater from the Colony in a lagoon, but rather were concerned about the lagoon location. Mr. Cooper said that the primary concern was that effluent might be discharged to the river.

Mr. Paul Steiner lives on a farmstead a few kilometers south of the Colony. He observed that the river upstream of the Colony is coloured in the spring, causing a concern about water quality. For at past twenty-five years, the Steiner family have been hauling household water during the spring in place of drinking river water. Mr. Steiner further added that odours are a normal part of living in an agricultural setting.

Ms. Colleen Therese-McGee, a local resident, lives downstream on the Whitemouth River near its confluence with the Winnipeg River. Their water supply is withdrawn from the river. Water quality is a concern because of their children. They were warned to forego using river water one night because of a spill. Other pollution sources along the river are also a concern. There would be less environmental concern if the Colony lagoon was set back further from the river.

Government Representatives

Councillor Glen Klapprat from the R.M. of Whitemouth said that the Colony will spray hog lagoon wastewater on land more remote from residences in the future. At present the R.M. has no mechanisms to control land use in the municipality, including hog barns and lagoons. Formation of a Planning District which would include zoning regulations is in formulation but will take two to three years to come into effect. He said that the provincial Departments of Environment and Health have jurisdiction right now over matters such as livestock operations and their impacts.

PRESENTATIONS (cont.)

Mr. Maris Rutulis, P.Eng. from Manitoba Natural Resources, Hydrotechnical Services commented on the general geology based on recorded well logs from the vicinity. Isolated pockets of sand and gravel or granite rubble lying on the granite bedrock form confined aquifers under artesian pressure. The water bearing pockets and some glacial till are all overlain by 10-15 meters of clay. The area is not a major aquifer region, and Mr. Rutulis said many dry holes have been drilled in the area.

The thick clay layer makes it unlikely that any water from the surface will percolate to an aquifers. There could be some lateral movement of water in the silt layers in the upper one meter, referred to earlier in the hearing, but he said that this problem can be avoided through proper lagoon design. Mr. Rutulis stated that this is a good site for a lagoon from a groundwater protection point of view, and if built according to Environment Department guidelines, aquifer pollution will not occur.

Mr. Mike Van Den Bosch, P.Eng., an Environmental Engineer with the Manitoba Environment Department presented the Commission with comments received through the interdepartmental review of the proposal.

The Departments of Cultural Affairs - Historical Resources Branch, Municipal Affairs - Municipal Planning Branch, Highways and Urban Affairs had no concerns.

Natural Resources - Fisheries Branch recommended that effluent from the lagoon should be disposed by spreading on land owned by the Colony. At no time should effluent be discharged into the Whitemouth River.

Manitoba Environment commented that land to be irrigated with effluent should be identified showing the proximity to all residences in the immediate area. Suitability of the effluent for irrigation, with respect to salinity, has not been determined, and the expected effluent quality was not identified. It was noted that the proposal does not indicate if effluent

PRESENTATIONS (cont.)

quality will be tested prior to discharge. It was recommended that any discharge of effluent to the Whitemouth River should only be allowed following conditional approval by the Director.

Environmental factors that should be considered for licensing include the following:

1. The specification of organic and hydraulic loading limits;
2. Restricting the lagoon to domestic wastewater and requiring all domestic wastewater to be treated in the lagoon;
3. Requiring that emergency discharge to the Whitemouth River receive approval from the Director;
4. Requiring the specification of soil structure considerations;
5. Ensuring that soil structure requirements are met by means of a sampling program;
6. Outlining procedures to be followed if the sewage collection or treatment system breaks down;
7. Specifying effluent irrigation requirements including crop restrictions and application procedures;
8. Identifying methods of restricting public access.

Mr. Van Den Bosch answered a number of questions following this presentation. He said that any Licence issued would be a standing Licence and would not be time bound. The Licence would cover both the construction and operation phases. Mr. Van Den Bosch pointed out that the Colony's present practice of disposing untreated raw domestic sewage directly to the land is illegal.

PRESENTATIONS (cont.)

Mr. Van Den Bosch drew attention to recently developed formal guidelines for agricultural irrigation using treated municipal wastewater. He said that spray irrigation is the most commonly used method of disposal, and that detailed requirements for how effluent is applied, including buffer zones and effluent quality are normally specified when a Licence is issued.

Livestock waste facilities are not subject to the same environmental controls as domestic wastewater facilities. The Livestock Production Operation Regulation (93/88R) requires operators to register an operation by filling out a form. This is not a permit system - there is no rejection of any registration. There are requirements in the Regulation relating to disposal of dead animals and structures for holding livestock wastes. Livestock operations are not licensed under the Environment Act, and Mr. Van Den Bosch said they are not subject to the same degree of scrutiny or restrictions as developments like the proposed domestic wastewater treatment lagoon.

DISCUSSION

Although the hearing was convened to consider the domestic wastewater treatment lagoon proposal submitted on behalf of Whiteshell Colony Farms Ltd., a number of intervenors expressed concerns about environmental problems associated with from the Colony's hog operation particularly the collection, treatment and disposal of waste products and dead animal disposal. Intervenors were advised that the question of the livestock operations was outside of the purview of the present hearing process. Livestock operations are governed by Regulations under the Environment Act. A case, however, was made that requirements for the regulation of domestic wastewater seem much more restrictive than those for wastes from livestock operations which have a greater potential to cause environmental degradation.

DISCUSSION (cont.)

The major presentation at the hearing to ensure that domestic wastewater from the Colony was prevented from reaching the river was the "Save the Whitemouth River Committee". Not only did the Committee advocate the complete utilization of treated effluent on the agricultural land but they also recommended locating both the lagoons and the effluent irrigation tract at a distance further from the river to prevent spills and run-off to the river and lessen the impact of odour on nearby residents from this operation. This group was addressing water quality concerns along the entire reach of the river. They promised that the issue of wastewater from both human and livestock operations of the Colony was but one step in the clean-up of the river.

The problem with odour results from a land use conflict caused by the proximity of the spreading of livestock wastes to other residences. A Councillor from the R.M. noted that the establishment of a Planning District was underway. The advent of a Planning District should provide additional mechanisms to control further land use conflicts. The Councillor also noted that livestock wastes would be spread at a location more remote from nearby residences in future.

Although the hearing was about a domestic wastewater lagoon, in the Commission's view the Colony should undertake to ensure that the facilities for the livestock operation are maintained and operated to meet both the word and spirit of the requirements under the Environment Act Regulation and follow agricultural practice in the the application of wastes to the soil such that the soil integrity is preserved and any contamination of water bodies is prevented. Land spreading of livestock wastes should be as far removed as practicable from non-Colony residences in order to mitigate odours.

The Livestock Production Operation Regulation specifies that animal waste lagoons shall be constructed and maintained to prevent the waste from entering any body of water. The regulation also specifies procedures for the disposal of all dead livestock. In this regard Mr. Van Den Bosch said that if

DISCUSSION (cont.)

members of the public detect possible violations they should notify the regional Environment Officer or Natural Resources Officer as soon as possible.

CONCLUSIONS

After reviewing the evidence, the Clean Environment Commission concludes that the altered proposal represents an environmentally acceptable method for disposal of domestic wastewater from the Whiteshell Colony, subject to the terms, limits and conditions recommended in this report. Discharge of treated effluent to the Whitemouth River should be prohibited, and the installation of a pipe outfall from the secondary cell, as originally planned, should not be constructed.

Odour problems from the proposed lagoon are expected to be minimal. There will be no danger to groundwater supplies if the lagoon is constructed according to the recommendations in this report. Subsurface conditions under the site provide a further significant degree of protection. Land application of treated lagoon effluent is an environmentally acceptable method, providing the salinity of effluent and receiving soils is appropriate. There should be no negative environmental impacts if land application of domestic wastewater is undertaken as directed in this report.

It was recommended by some intervenors at the hearing that the site of the lagoon should be moved to what they believed to be an environmentally better location, more remote from the river and neighbouring residences. The Clean Environment Commission believes that the proposed site of the lagoon is satisfactory and that the operation will be environmentally acceptable if the following recommendations are imposed.

From this, and a number of other hearings, the Commission believes that the existing regulation dealing with livestock operations is inadequate, and recommends that the regulation be reviewed by the Department of Environment and amended as necessary.

RECOMMENDATIONS

The Clean Environment Commission recommends that a Licence under the Environment Act be issued to allow construction and operation of a domestic wastewater treatment lagoon on the Whiteshell Colony as described in the altered proposal prepared by the Manitoba Water Services Board, with discharge to agricultural lands only, subject to the following terms, limits and conditions:

1. The Applicant shall ensure that all domestic sewage is directed toward the wastewater treatment lagoon.
2. The Applicant shall ensure that no livestock waste is directed toward the wastewater treatment lagoon.
3. The Applicant 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 first day of October of any year and the 15th day of May of the following year unless prior approval by the Director, is given;

RECOMMENDATIONS (cont.)

lagoon for hydraulic conductivity by an insitu field test method as prescribed by the designated Environment Officer.

16. The Applicant 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 15.
17. The Applicant shall install a fence around the wastewater treatment lagoon to limit access by the public.
18. The Applicant shall notify the Director 7 days in advance of any effluent discharge.
19. The Manitoba Water Services Board shall submit to the Director by September 1, 1990, a final report that contains an evaluation of the suitability for the intended irrigation of the treated effluent and the lands that would receive it, and the report shall also address the question of suitable land availability to accommodate both hog lagoon and domestic waste lagoon effluents.

APPENDIX

L I S T O F E X H I B I T S

1. Stella Fedeniuk, P. Eng., Manitoba Water Services Board, Brief, (Location Plan and Groundwater Pollution Hazard Appraisal).

2. Save The Whitemouth River Commission, Presentation by a panel. Brief received by the Commission following the hearing.

3. Mike Van Den Bosch, P. Eng., Environmental Engineer, Water Pollution Control, Manitoba Environment, Brief, (dated January 10, 1990).

4. Mike Van Den Bosch, P. Eng., Environmental Engineer, Water Pollution Control, Manitoba Environment, Brief, "Manitoba Guidelines for Agricultural Irrigation Using Treated Municipal Wastewater (dated 1989).