

VILLAGE OF SHOAL LAKE  
REPORT ON A SEWAGE LAGOON PROPOSAL

THE CLEAN ENVIRONMENT CLEAN

DECEMBER 9, 1988

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## VILLAGE OF SHOAL LAKE SEWAGE LAGOON PROPOSAL

### BACKGROUND

In 1961 the Village of Shoal Lake constructed a single cell sewage lagoon to treat the sanitary wastes of the Village. In 1968 a second cell was added to provide secondary treatment and add additional capacity to the system. These cells were located south of the Village in the Rural Municipality of Shoal Lake, east of Highway 21. Discharge from the lagoon cells was through a culvert under Highway 21, and hence via an open channel into Shoal Lake.

Shoal Lake is a relatively small prairie lake providing water-related recreational opportunities for residents of the area including cottaging and fishing. Most of the cottages and a beach are located near the south end of the Lake. The Village of Shoal Lake is located at the north end of the Lake.

In June of 1976, the Clean Environment Commission held a hearing in Shoal Lake, to review the operation of the lagoon system, because of the necessity for early discharge of the secondary cell resulting from hydraulic overload, caused by infiltration of the sewer system. At this hearing there was discussion of a possible alternative discharge route for lagoon effluent as well as the need for a third lagoon cell to take care of the hydraulic overload condition and provide for future expansion of the sanitary sewage treatment requirements of the Village. In connection with the lagoon discharge, it was noted that some ponding occurred on both sides of Highway 21 and that the discharge channels were not well defined.

The outcome of this hearing was that the Village of Shoal Lake was required, by order of the Commission, to effect improvements to their sewage collection and treatment system such that within a three year period, normal environmental requirements for the operation of a sewage lagoon would be met.

On February 8, 1988, the Manitoba Water Services Board registered a proposal under the Clean Environment Act for the expansion of the existing sewage lagoon system by the addition of a third cell. This registration proposed that the lagoon discharge route remain "as existing, across an open field, through a culvert crossing Highway 21, thence to the waters of Shoal Lake via open channel".

Following the Environment Department's advertisement of this proposal for licensing under the new Environment Act, a number of local citizens registered concerns with the Department, and the Rural Municipality of Shoal Lake passed a resolution approving of the addition of a third cell by the Village of Shoal Lake but disapproving of any discharge of treated wastewater into the Lake. The resolution recommended "that an alternative area of discharge be considered".

On August 24, 1988, The Honourable Ed Connery, Minister of Environment and Workplace Safety and Health requested the Clean Environment Commission to hold a hearing pursuant to Section 11(10) of the Environment Act and to provide a report and recommendations, pursuant to Section 7(3) of the Act.

## HEARING

The hearing took place at 10:00 a.m. on October 4, 1988 in the Community Hall in Shoal Lake. The hearing had been advertised in the Shoal Lake Star and the Winnipeg Free Press on September 27, 1988. Prior to this date all persons, organizations and government departments with a known or likely interest in the matter under consideration had been notified of the hearing by letter.

Attendance at the hearing included representatives of the Village of Shoal Lake, the Rural Municipality of Shoal Lake, the Burlington Beach Association of Cottage Owners, the Water Pollution Control and the Water Standards and Studies Sections of the Environment Department, the Manitoba Water Services Board, the Fishery Branch of the Department of Natural Resources, and the Environmental Health Services Branch of the Department of Health.

### The Village of Shoal Lake

Mayor O.W. Lewycky spoke on behalf of the Village of Shoal Lake. In addition, Mr. Les Ciapala provided technical assistance as representative of the Water Services Board for the project.

Mr. Lewycky outlined the history of the development and operation of the wastewater collection and treatment system and the present necessity to construct an additional third lagoon cell to provide more storage capacity. The existing cells (and proposed new cell) are located just outside the Village in the Rural Municipality of Shoal lake. The Village obtains its domestic water supply from two wells rather than from Shoal Lake. The Village operates a campground and recreation area at the North end of the lake. The Mayor stated that the Village wished to continue to utilize the existing lagoon discharge route for at least several more years.

In response to questions, the Mayor stated that the Village was not in a provincial planning district, but was accustomed to a good working relationship with the Rural Municipality of Shoal Lake, which surrounds the Village. He advised that the major cottage development on Shoal lake is located on the southern part of the Lake about four miles south of the point of lagoon discharge and that most of the cottage owners are from the Village of Hamiota. He stated that some consideration had been given to an alternative discharge route for the lagoons, to discharge to the east of the lagoons rather than the existing more direct route west, under PTH 21 and thence more or less directly to the Lake. However, farmers in the area east of the lagoons had some objections to the alternative route.

Mr. Ciapala, explained the requirement for a third lagoon cell. He stated that the existing two cell lagoon operation still adequately handles the village's sewage load and produces a satisfactory quality of effluent, which meets the environmental standards of the present license; however, the sewage system is hydraulically overloaded and can not continue in operation, under the terms of the license, without the addition of a third cell. The proposed third cell would result in the production of an even higher quality of effluent.

In answer to a question, Mr. Ciapala confirmed that soil tests had been done on the site of the proposed third cell and that there should be no problem in constructing the new cell to meet the Environment Department's permeability standards.

At the conclusion of the hearing, in answer to questions, Mayor Lewycky and Mr. Ciapala stated that they did not have enough technical information at hand to say whether the discharge of the lagoon eastward could be accomplished with acceptable additional cost. Mr. Lewycky asked that approval for construction and operation of the proposed third cell be given now and indicated his willingness to examine, with others, any reasonable alternative to relieve the effects of lagoon discharge on the water quality of Shoal Lake. The Village wants to improve the water quality and, with regard to the sewage lagoon operations, would consider any reasonable method of

contributing to this. Alternatives could be identified and technical details provided with costs. The Village would evidently be prepared to pay its fair share of any reasonable added cost of an identified practical solution.

The Rural Municipality of Shoal Lake

Councillor Delmar Purdy spoke on behalf of the Rural Municipality of Shoal Lake.

He stated that the Rural Municipality was opposed to any lagoon effluent directly entering Shoal Lake. The cottage owners at Burlington Beach at the south end of the Lake had made their concerns known to Council. He alleged that the effluent was causing a problem in the Lake, creating a foam and affecting the water quality such that swimming lessons had to be cancelled.

He stated that water quality deterioration was particularly noticeable where the lagoon effluent entered the Lake and also that the present discharge route traversed a slough in which the discharge collected and became stagnant.

The local Lions Club was contributing a considerable sum of money towards water quality improvement in the Lake, supporting other quality improvement efforts by Habitat Canada and the Provincial Government. In view of these improvement programs, it didn't make any sense to continue the discharge of the Village lagoons into the Lake. The lagoons could be discharged instead to the east of the lagoons.

Mr. Purdy stated that a resolution of the Rural Municipal Council, dated July 5, 1988, approving construction of the addition of a third cell but disapproving of any discharge of wastewater into the Lake, was still the position of Council and that an alternative area of discharge should be considered.

In response to a question Mr. Purdy stated that the discharge of the lagoons eastward, as an alternative, might cause some flooding and ponding problems to farmer land owners but some of the affected land was hay meadow. He said that the Village might buy some of the affected land, and that Habitat Canada might be prepared to provide money to correct other potential problems in the eastward discharge of lagoon effluent. He conceded that some of the affected constituents of the Rural Municipality might be opposed to the suggested alternative discharge route.

In answer to another question, Mr. Purdy said that while the Rural Municipality of Shoal Lake was not objecting to the present lagoon discharge route on any legal basis, with regard to the traverse of property located in the Rural Municipality; however, there was one area that might be adversely affected if the property came under development. Mayor Lawycky pointed out that this land was also affected by the ponding of natural water drainage.

At the conclusion of the hearing, in answer to questions, Councillor Purdy confirmed that he thought discharge of the lagoon eastward would not be technically difficult and would likely be an acceptable method to provide the desired added protection of Shoal Lake. Although some farmers had expressed concerns, Mr. Purdy believed that if the Village, the Rural Municipality and Habitat Canada were willing to work together on the proposal, any problems might be resolved.

#### The Burlington Beach Association

Mrs. Louise Lall spoke for the Association.

Mrs. Lall stated that the Association objected to the discharge of any lagoon effluent into the Lake. The algae problem was extremely bad, and this condition was aggravated by nutrients from the lagoon discharge as well as runoff from farm land. Childrens' swimming programs and water skiing activities had been adversely affected as well as use of the Rural Municipality's campground.



In response to a question, Mrs. Lall stated that non of the cottages had septic fields which discharged indirectly to the Lake. All were served by either outhouses or holding tanks which were pumped out by a septic tank cleaning service.

#### The Department of Natural Resources

Mr. Bill Howard, Regional Fisheries Manager represented the Department of Natural Resources.

Mr. Howard stated that the continuing discharge of lagoon effluent to Shoal Lake was of concern to the Fisheries Branch. Shoal Lake is highly enriched by the nutrient loading and winter fish kills have occurred in 40 percent of the winters over the past 25 years. Some summer fish kills have also been reported in the past when green algae concentrations collapsed. Lagoon effluent itself is usually of a quality that is non-lethal to fish but effluent phosphorus levels, which often range between 1 and 10 mg/l, may accentuate algae growth and other aquatic re-growth, the oxidation of which can use up all available dissolved oxygen, resulting in fish suffocation.

Shoal Lake has had to be regularly restocked but restocking numbers are limited and the size of the introduced fish is small. Growth of the fish in the Lake to reach a stage enabling natural reproduction is necessary if reasonable fishing is to be expected. No intensive fish surveys have been conducted on this Lake.

Mr. Howard outlined a major initiative and investment program directed toward the improvement of the Lake fishery jointly funded by the Manitoba Habitat Heritage Corporation (\$25,000) and the Lions Clubs (\$20,000). An area at the north end of the Lake has been diked off, drained, and deepened to serve as an aeration basin. The long-term water quality of the Lake is one factor that will ultimately determine the success or failure of this project.

Nutrient loading from the Shoal Lake Village sewage lagoons has been calculated to provide approximately 10 percent of the externally introduced nutrient load and the Fisheries Branch would prefer alternatives to the direct discharge of effluent to the Lake. Mr. Howard outlined the following possibilities.

1. Additional treatment of the effluent. Although costly, this would reduce the phosphorous loading to Shoal Lake.
2. Discharge of effluent to the east of the lagoons. In this regard, Mr. Howard believed that Mr. Roy Bullion of the Habitat Enhancement Land Use Project had made some initial contact with the affected landowners. Marshlands, such as those that exist east of the lagoons, have proven to be good nutrient sinks and water purifiers. The land in question is currently used as pasture. The Village of Shoal Lake could approach the land owners for access easement or purchase of the land. If there were concerns about the effects of water ponding on livestock, the area could be fenced off or the rate of discharge of the lagoons could be reduced to allow for greater soil absorption or effluent uptake by vegetation, and evaporation.
3. The effluent could be applied by irrigation methods to the marshlands as well as to some neighboring fields and haylands although alkalinity of the soil in the area might limit irrigation possibilities.
4. Ponding was already occurring just below (to the west of) the lagoon in its present discharge mode. This land is located between the lagoons and the highway. This had been noted earlier in the hearing in a negative sense. If the present discharge channel was blocked, more water would be ponded in this area, allowing for an extended period of evaporation, plant uptake of nutrients and soil absorption. Such ponding would allow pumping of the liquid to nearby farmlands whose owners might approve of such irrigation. In addition there was

some Crown land located three kilometres south to which the pond contents might be pumped.

Mr. Howard conceded that all of the options involved extra expense but good environmental protection and lake rehabilitation is never easy or cheap.

Mr. Howard was questioned by Mayor Lewycki and Mr. Ciapala with regard to the size of the ponding area west of the lagoons that would be required to remove the effluents phosphorus by natural means. Mr. Howard was not able to estimate the area that would be required but advised that to succeed, a ponding area would have to be shallow to provide a suitable environment for growth of bulrushes or other suitable aquatic plants. The phosphorus removal principle had been successfully employed in other areas.

#### The Environment Department

The Environment Department was represented by Mr. Doug Peterson, Head of Water Pollution Control Programs and Mr. Al Beck an Environment Officer with the Water Standards and Studies Section.

Mr. Beck outlined the concerns that have existed about the water quality of Shoal Lake for over 30 years. The Shoal Lake improvements Committee was formed in the mid 1950's and some positive action was taken over the years to try to upgrade the water quality. A swimming area was constructed at the north end of the Lake (now being utilized for the aerated improvement project mentioned by Mr. Howard) and both copper sulphate and hydrated lime treatments have been used. The Water Standard and Studies Section became involved two years ago at the invitation of the Reeve and Council of the Rural Municipality. A water sampling and analysis program was initiated and subsequent studies determined that the Lake has a very rich supply of plant fertilizers and is in an hyper-utrophic condition. A draft of a report on the studies was under internal review. An over-supply of phosphorus was the primary cause of the current algae problem. The major portion (77-78 percent) of the phosphorus enters Shoal Lake from the north end

via the Oak River (most of this would be due to run-off from farmland). Natural deposition (dust, leave, etc.) accounts for 10 percent and rural dwellings along the edge of the Lake 2 percent. The sewage lagoon discharge is the source approximately 10-11 percent of the gross external loading. This portion of the total Lake loading would produce more the 1,000 tonnes of blue-green algae, which is a substantial amount.

Mr. Beck considered the elimination of the load from the sewage lagoon effluent would be a significant positive step to begin rehabilitation of the Lake.

Mr. Peterson outlined the role that his Section has played in the consideration of the new lagoon proposal. With regard to alternatives to discharge of lagoon effluent to the Lake, the Department of Agriculture had advised that use of the lagoon effluent for irrigation was not economical and that there were soil salinity concerns, so that disposal of effluent by irrigation did not seem to be a logical alternative. With regard to the use of marshland or sloughs for improvement of water along the discharge route, Mr. Peterson pointed out that aquatic growth in the sloughs, which would utilize the phosphorus, would have to be harvested and removed; otherwise, when the plants died and decayed the nutrients would be released back to the water. The other method which could be used for phosphorus removal would be the application of a chemical precipitant to the sewage lagoon.

#### The Department of Municipal Affairs

This department was represented by Mr. Al Shier, Senior Brandon District Planner of the Municipal Planning Broad.

Mr. Shier advised that the existing sewage lagoon cells were located in an area of the Rural Municipality that had been sub-divided into lots since 1887. He also advised that the lagoon effluent drainage route appeared to go across private property.

Mr. Shier pointed out that the sub-divided land still had the

potential for future development but, should this be contemplated, there would be a conflict with the recommended distance between a residence and a sewage lagoon. Two houses may already be within that distance. In addition there had been a request, earlier in the year, for approval to develop about 20 lots for residential purposes. Mr. Shier was concerned that the Rural Municipality of Shoal Lake had no land use controls in place with which to control development in relation to sewage lagoon proximity and this could lead to future problems. However, there are some measures which the Rural Municipality could take to avoid the potential future problems.

With regard to the drainage route crossing private land, Mr. Shier suggested that if the use of the present drainage route was to be continued, the Village should consider acquiring the property or obtaining an easement or access agreement with the landowners.

In answer to a question Mr. Shier advised that the Village and the Rural Municipality had discussed the possibility of forming a planning district for some years but there was still no formal indication that this would be done.

#### The Department of Health

Dr. N.S. Rihal, representing the Environmental Health Branch of the Department of Health confirmed that there were no health concerns with the lagoon effluent entailed in the present lagoon operation which produced an effluent of a satisfactory quality and that the additional cell should further improve the quality of the lagoon effluent.

In answer to a question about any groundwater or health related concerns that might arise if the lagoons were to be discharged in an easterly direction, Mr. Peterson stated that a plan to use a new discharge route would require the submission of a new proposal by the proponent and this would be investigated by the Environment Department with regard to any concerns for possible groundwater contamination or other factors that might then be relevant.

## CONCLUSIONS

Aside from hydraulic overload, and the resulting lack of a adequate storage capacity, the existing two cell sewage lagoon of the Village of Shoal lake is producing a satisfactory effluent in accordance with normal standards of the Environment Department. The Village has proposed the addition of a third cell which will correct the storage problem, allow for future town growth, and produce an even better quality effluent. Local concerns were registered against the continued discharge of lagoon effluent to Shoal Lake, because of its adverse effect on the quality of the Lake's water; however, none of the concerns opposed the construction of the proposed third cell.

The Commission concludes that approval by license should be given to the construction of the third cell, provided that it is constructed in accordance with standard Environment Department specifications. This can only result in an improvement of effluent quality.

With regard to the discharge of lagoon effluent, the situation is not as straight forward. The quality of the Lake is suffering and deteriorating principally as a result of nutrients, introduced into the Lake by the Oak River, the land draining directly into the Lake, and the Village of Shoal Lake sewage lagoon. It was estimated in a study by the Environment Department that the sewage lagoon is responsible for only approximately ten percent of the gross external loading of phosphorus; however, in view of current concerns and efforts to improve the water quality of the Lake by the local Lions Club, the Fisheries Branch of the Department of Natural Resources, the Manitoba Habitat Heritage Corporation, the Habitat Enhancement Land Use Project and Ducks Unlimited, it is reasonable that the contribution of the lagoon effluent to water quality deterioration should be addressed at this time.

Four possible methods of reducing or eliminating the discharge of phosphorus (the critical nutrient) from the lagoons to the Lake were discussed at the hearing. The most promising of these appeared to be the discharge of lagoon effluent in an easterly direction, away from the Lake, into another runoff channel which ran southward through the Rural Municipality of Shoal

Lake traversing low meadow and marsh land that did not drain to Shoal Lake. This possibility had been discussed by representatives of the Village, the Rural Municipality, and the Habitat Enhancement Land Use Project; however, at the time of the hearing the technical details and costs of this alternative were not known. The concern of some farmers, whose land lay along the alternative discharge route, was also identified. It was evident that if this alternative was to be fully explored the Village and its Consultant, the Manitoba Water Services Board, should undertake an investigation collaberatively with all of the other agencies that have an interest in the matter

If the foregoing, or the other discussed means of phosphorus or effluent removal proves to be impractical, then the chemical treatment of the new proposed third cell addition by the Village would be necessary to achieve an adequate level of phosphorus reduction prior to discharge of the lagoon, via the present discharge channel, into the Lake.

## RECOMMENDATIONS

The Commission recommends that Licence No. 610 be varied to include the following requirements:

1. Construction of a third lagoon cell, by the proponent subject to construction standards satisfactory to the Environmental Control Programs Branch.
2. Investigation by the Village of the various means to either direct the discharge of lagoon effluent out of the Shoal Lake watershed or effect a reduction of the phosphorus content of the lagoon effluent prior to its discharge to the Lake.
3. Effective April 1, 1991, effluent from the Village lagoons shall either be diverted, so that it will not flow into Shoal Lake, or be treated prior to release, such that the phosphorus content of the lagoon effluent is not in excess of 1.0 milligrams per litre.



## L I S T   O F   E X H I B I T S

1. Rural Municipality of Shoal Lake Resolution of Council, July 5, 1988.
2. Clean Environment Commission Licence No. 610, issued for the Village of Shoal Lake, sewage lagoon system, July 9, 1976.
3. Louise Lall, President, Burlington Beach Association of Cottage Owners, Letter, July 5, 1988 with Petition, 72 names.
4. Honourable Ed Connery, Minister of Environment and Workplace Safety and Health, Memorandum, August 24, 1988.
5. R.D. Thomasson, Chairman, Resource Allocation Working Group, Communications, Economics & Planning, Department of Natural Resources, Memorandum, July 8, 1988.
- 5.A. Don Toews, Chief, Sport Fishing Section, Memorandum, July 7, 1988.
- 5.B. Jack Harrigan, Natural Resources Officer, Letter, July 7, 1988.
6. Al Beck, Environmental Officer, Water Standards & Studies, Department of Environment & Workplace Safety & Health, Memorandum, June 29, 1988, and Brief, October 6, 1988.
7. Doug Peterson, Head, Water Pollution Control, Department of Environment & Workplace Safety & Health, Brief.
8. Mr. T. Pearce, Planner, Municipal Planning Branch, Department of Municipal Affairs, Memorandum to Mr. Peterson, June 4, 1988..
9. Mr. J.R.D. Partridge, Chief, Land Utilization & Soil Survey, Manitoba Department of Agriculture, Memorandum to Mr. D. Peterson, October 3, 1988.
10. Copy of Aerial Photograph of the Shoal Lake Village sewage lagoon system.
11. The Manitoba Water Services Board, Submission for Approval of Proposal forms, February 8, 1988.
12. Department of Municipal Affairs, Plan of Development in the vicinity of the Shoal Lake Village sewage lagoon.
13. Mr. Bill Howard, Fisheries Biologist, Dept. of Natural Resources, Brief, October 3, 1988.

## AN ORDER OF THE CLEAN ENVIRONMENT COMMISSION

UNDER THE CLEAN ENVIRONMENT ACT

RE: THE CLEAN ENVIRONMENT COMMISSION and THE VILLAGE OF SHOAL LAKE, Applicant,

WHEREAS pursuant to the provisions of The Clean Environment Act, the Village of Shoal Lake, filed an application with the Department of Mines, Resources and Environmental Management in connection with the operation of an existing sewage lagoon system located on the NW $\frac{1}{4}$  of Section 4-17-23 WPM in the Rural Municipality of Shoal Lake, Manitoba, with discharge of effluent across an open field, through a culvert crossing Hwy. 21 thence to the waters of Shoal Lake via an open channel;

AND WHEREAS in the absence of limits being prescribed by a Regulation under the said Act, the said application was referred to The Clean Environment Commission for the prescribing of limits;

AND WHEREAS a representation was made to the Commission by a person who is or who may be affected by an Order of the Commission prescribing limits in connection with the said operation;

AND WHEREAS the Commission held a public hearing in the Village of Shoal Lake on the 21st day of June, 1976;

AND WHEREAS evidence heard at the public hearing indicated that the said existing lagoon system is inadequate in terms of hydraulic capacity;

AND WHEREAS the said Commission considered the application on the 29th day of June, 1976;

## IT IS HEREBY ORDERED THAT

1. The Applicant shall arrange for a review of the said lagoon system and the preparation of an engineering report and design proposal for the alteration, modification or enlargement of the various sections of the said system consistent with meeting the limits in Clause 3 and 4 of this Order.

2. In the meantime the Applicant shall ensure that:
- (a) the said existing sewage lagoon system is maintained and operated in such a manner as to minimize any nuisance condition and/or hazard to human health;
  - (b) any effluent discharge route is maintained and operated in such a manner as to minimize the formation of stagnant pools, restrict the flow to the right-of-way of the discharge route, and prevent any overflow of effluent onto adjacent private property;
  - (c) there is no release or discharge of effluent from the said lagoon system during the period including the 1st day of November of any year and extending to and including the 15th day of May of the year following except with the express permission of the Environmental Management Division of the said Department.
3. The Applicant, shall on or before the 31st day of December, 1977, file with The Clean Environment Commission, with a copy to the said Environmental Management Division, the engineering report and design further to the requirement of Clause 1: the said report and design to be of such a nature that the altered, modified, or enlarged system will meet the following limits:
- (a) all the facilities for the treatment of sewage and the holding of effluent are so constructed, maintained and operated as to :
    - (i) prevent the contamination of groundwater;  
and
    - (ii) minimize the release of offensive odours;
  - (b) the biochemical oxygen demand (5-day BOD) loading on the primary cell of the said lagoon system shall not be in excess of 50 pounds per acre per day;

cont'd . . .

3. (c) the quality of the effluent, prior to any discharge, is such that:
  - (i) the five-day biochemical oxygen demand (BOD5) is not in excess of 30 milligrams per litre; and
  - (ii) the total coliform content, in terms of the MPN Index, is not in excess of 1500 per 100 millilitres of sample;
- (d) the effluent channel to Shoal Lake is constructed and maintained in such a manner as to minimize the formation of stagnant pools and to prevent the overflow of effluent outside the designated discharge channel;
- (e) there is no release or discharge of effluent during the period including the 1st day of November in any year and extending to and including the 15th day of May of the following year, except with the express permission of the Environmental Management Division of the Department of Mines, Resources and Environmental Management; and
- (f) there is no release or discharge of effluent when:
  - (i) the discharge route is in a condition of flooding; or
  - (ii) the release or discharge of effluent would or would be likely to cause flooding in the discharge route.

4. The Applicant shall ensure that on or before the 31st day of December, 1979, the alteration, modification or enlargement of the sewage collection, treatment and effluent disposal system serving the Village of Shoal Lake is completed and set in operation so as to meet the other requirements of this Order.

Order No. 610

Dated at the City of Winnipeg

this 9th day of July, 1976



Chairman,  
The Clean Environment Commission.

C-b-171.1