Intervention to The Nunavut Water Board Regarding the Matter of The Municipality of Cape Dorset (Type B) Water License Amendment Application

Final Public Hearing –January 2008

Submitted by:

Environmental Protection Service
Department of Environment
Government of Nunavut

Executive Summary

The Department of Environment (DOE) of the Government of Nunavut has reviewed the Water License Application and supporting documents submitted by the Government of Nunavut, Community and Government Services (GN-CGS) on behalf of the Hamlet of Cape Dorset for the construction of a new waste water treatment lagoon in Cape Dorset. The review focused on those aspects of the Application which fall within the DOE's mandate (i.e., *Environmental Protection Act*, and associated regulations). The DOE provided its original comments on the Application to the Nunavut Water Board (NWB) in April 2006 as part of the Technical Meetings, with further comments being submitted to the board in May 2007. This Final intervention statement for the Public Hearing provides comment and recommendations on outstanding issues of concern in seven (7) of the twelve (12) topic areas to be reviewed at the Public Hearing. A summary of comments and recommendations are provided below.

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ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᖓ ᕿᒥᕐᕈᓚᐅᕐᒪᑕ ᐃᒪᕐᒧᑦ ᓚᐃᓴᑖᕋᓲᑎᒥᒃ ᐃᑲᔪᖅᓯᐃᔪᓂᒡᓗ ᑎᑎᕋᖅᓯᒪᔪᓂᒃ ᑐᓐᓂᖅᑯᓯᐅᕐᑯᔭᐅᓪᓗᑎᑦ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᖏᓐᓄᑦ, ᓄᓇᓕᖕᓂ ᒐᕙᒪᒃᑯᓐᓂᓪᓗ ᐱᔨᑦᑎᕋᖅᑎᒃᑯᓐᓄᑦ ᑭᒡᒐᖅᑐᐃᓪᓗᑎᑦ ᑭᙵᐃᑦ ᕼᐋᒻᒪᓚᒃᑯᖏᓐᓂᒃ ᓴᓇᔭᐅᓂᖓᓄᑦ ᓄᑖᖅ ᑭᓈᓗᖅᑲᕐᕕᒃᓴᑦ ᑭᙵᓂ. ᕿᒥᕐᕈᓂᐅᓚᐅᖅᑐᖅ ᑲᒪᒋᔭᖃᓪᓗᐊᑕᕈᒪᒧᑦ ᐱᓕᕆᐊᖑᓇᔭᖅᑐᓂᒃ ᑐᒃᓯᕋᐅᑕᐅᔪᒧᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑎᓕᔭᐅᔾᔪᑎᒋᓯᒪᔭᖏᑦᑕ ᐃᓗᐊᓂ (ᓲᕐᓗ, *ᐊᕙᑎᒧᑦ ᓴᐳᔾᔨᓯᒪᓂᕐᒧᑦ ᐊᑐᐊᒐᖅ*, ᐊᒃᑐᐊᓂᓕᖕᓄᓪᓗ ᒪᓕᒋᐊᓕᖕᓄᑦ). ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑐᓂᓯᓚᐅᖅᐳᑦ ᓇᖕᒥᓂᖅ ᐅᖃᐅᓯᒃᓴᓪᓚᑦᑖᖏᓐᓂᒃ ᑐᒃᓯᕋᐅᑕᐅᓯᒪᔪᒧᑦ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔩᑦ ᑲᑎᒪᔩᖏᓐᓂ ᐊᐃᕆᓕ 2006-ᖑᑎᓪᓗᒍ ᐃᓚᒋᑎᑕᐅᓪᓗᓂ ᐱᓕᕆᔾᔪᑎᓄᑦ ᑲᑎᒪᓂᐅᓃᓄᑦ, ᐅᖃᐅᓯᒃᓴᒃᑲᓐᓂᕐᓂᒃ ᑐᓂᖅᑯᑕᐅᓯᒪᔪᓂᒃ ᑲᑎᒪᔨᓄᑦ ᒪᐃ 2007-ᖑᑎᓪᓗᒍ. ᑭᖑᓪᓕᐹᖑᓗᓂ ᐅᖃᐅᔾᔨᐊᕐᓂᖅ ᑎᑎᖅᑲᐅᓗᓂ ᑭᒃᑯᓕᒫᓄᑦ ᑲᑎᒪᑎᑦᑎᓂᐅᓛᖅᑐᒧᑦ ᓴᖅᑭᑎᑦᑎᕗᖅ ᐅᖃᐅᓯᒃᓴᓂᒃ ᐱᖁᔨᕗᖕᒌᓕᐊᓇᔭᐅᖁᔭᐅᐊᓂᒡᓗ ᐅᔾᔨᕐᓇᕐᓂᖅᐹᓂᒃ ᐃᓱᒪᒋᔭᒃᓴᐅᕙᒃᑐᓂᒃ ᐃᓱᒪᓘᑕᐅᓯᒪᔪᓂᒃ 7-ᓂᒃ 12-ᖑᑎᓪᓗᒋᑦ ᐅᖃᐅᓯᒃᓴᐃᑦ ᕿᒥᕐᕈᔭᐅᔭᕆᐊᖃᓚᐅᖅᑐᑦ ᑭᒃᑯᓕᒫᖅᑎᑦᑎᑎᓪᓗᒋᑦ. ᐅᖃᐅᓯᐅᓚᐅᖅᑐᑦ ᐱᖁᔨᕗᖕᒌᓕᐊᓇᔭᐅᓚᐅᖅᑐᓪᓗ ᐅᓂᒃᑲᐅᓯᖕᒋᑦ ᐱᔭᒃᓴᐅᕗᑦ ᐊᑖᓃᑦᑐᓂᒃ.

1. Seepage and Geothermal Analysis

AMEC, a sub-consultant for the proponent, has provided assurances based on geothermal analysis, that if correctly installed, there is an unlikely occurrence of seepage under the berm. However; based on hamlet concerns aired at the technical meeting in November 2007 and the views of AMEC themselves, DOE has provided recommendations for monitoring of berm freeze-back and contingency planning should the berm not freeze-back as planned.

2. Operation and Maintenance

The proponent has supplied an operation and maintenance manual for the proposed infrastructure. DOE has paid special attention to the spill contingency planning section of this document and compared the proponent's state of preparedness for spills with standards within our regulations. General recommendations for improving spill contingency planning are provided.

3. Discharge Criteria

DOE has provided guidance on discharge criteria to NWB that is consistent with *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories 1992*.

4. Sludge Management

A proposal to monitor sludge accumulation and quality is outlined in the O&M manual submitted by the proponent. The objective of sludge management is to ensure effluent quality is maintained, but also to ensure that sludge quality remains suitable for land disposal. DOE has requested that the proponent provides more detail on land spreading proposals and sludge quality objectives.

5. Use of current treatment system as a contingency measure

The proponent intends to use cell 1 of the old three cell lagoon system as a contingency disposal area for sewage effluent on days when trucks are unable to access the new facilities. DOE supports this approach; however, requests that the proponent and NWB ensure these facilities are appropriate and will not result in discharges of contaminants to the environment. Use of the contingency lagoon should be documented in annual reports to the NWB.

6. Abandonment and Reclamation

DOE believes that NWB should issue a license containing terms and conditions for abandonment and restoration of the proposed facilities at closure the end of their useful life. Plans for existing sewage disposal infrastructure should also be submitted to NWB within 1 year of issuing the new license.

7. Monitoring

The proponent has proposed a monitoring plan that includes sampling to monitor compliance with license effluent standards, and process sampling to ensure enhanced understanding of the treatment process. DOE concurs with the monitoring scheme proposed**.**

Legislative Authority

The Department of Environment (DOE), Government of Nunavut, derives its regulatory mandate from the *Environmental Protection Act* (EPA). The EPA essentially prohibits the discharge of a contaminant into the environment, except under certain regulated terms and conditions as dictated (as in a Water Licence) by Federal or Territorial Legislation.

A contaminant is defined as: *any heat, noise, vibration, or substance that, when discharged into the environment:*

- *endangers the health, safety or welfare of persons,*
- *interferes or is likely to interfere with normal enjoyment of life or property,*
- *endangers the health of animal life, or*
- *causes or is likely to cause damage to plant life or to property;*

In reviewing Water License Applications, DOE observes, in addition to the EPA, a number of Regulations and Guidelines that have been adopted under the EPA. These regulations and guidelines include, but are not restricted to, *Spill Contingency Planning and Reporting Regulations*, *Environmental Guideline for the General Management of Hazardous Waste, Environmental Guideline for Industrial Projects on Commissioner's Lands, Environmental Guideline for Industrial Waste Discharges* and the *Environmental Guideline for Site Remediation*.

1. Seepage/Geothermal Assessment

The hamlet has constructed a new sewage lagoon capable of holding a volume of 96,000 m^3 of effluent. Through participation in the September 2008 technical meeting in Iqaluit, DOE became aware of concerns expressed by residents of Cape Dorset about the integrity of the lagoons retaining structures, specifically the downstream berm. Water building up in the lagoon over the summer of 2007 appears to be passing through the berm. DOE does not have the engineering expertise to critique the dam designs with any degree of credibility; however, the August 2007 correspondence from Dillon to AMEC concluded that "*geothermal analysis indicates the unlikely occurrence of seepage under the berm if the liner will be installed in accordance with drawing specifications*". AMEC also note that the geothermal modeling is based upon predicted berm temperatures and that actual berm temperatures may differ. AMEC suggests that thermistor strings be installed in wells drilled across the berm in order to confirm the freeze-back. The November 13 correspondence from GN-Community and Government Services to the NWB includes a commitment to install and monitor these thermistors. AMEC also state that if actual berm temperatures differ greatly from predicted, then a contingency plan should be implemented. DOE can find no evidence of such a contingency plan having been prepared.

Recommendation to NWB- DOE recommends a license condition that requires thermistors to be installed within the berm in order to monitor temperatures and provide assurances of freeze-back. The condition should also require a contingency plan to be developed by the proponent in case permafrost does not form within the berm or thawing occurs at some stage during operation. The prior preparation of a contingency plan will allow for prompt action should the berms be shown to leak.

2. Operations and Maintenance/Contingency Planning

The *Spill Contingency Planning and Reporting Regulations* for Nunavut developed under the *Environment Protection Act* include the requirement for a contingency plan to be prepared and filed for facilities where petroleum, chemicals and other contaminants are stored. Under the *Spill Contingency Planning and Reporting Regulations*, any person storing contaminants in an aboveground storage facility with a capacity equal to or greater than 20,000 litres or kilograms, is required to file a plan. Although these quantities represent the minimum requirements for filing a plan, we recommend anyone who stores any quantity of contaminants prepare a plan. The regulations require that a plan be submitted before the facility is used. Within the *Operation and Maintenance Manual, Sewage Treatment System, November 9, 2007 (O&M Manual)* the proponent has developed a basic spill plan, however, in order to be of use to operational staff, DOE recommends that the plan comprehensively address the following.

- ***The date the contingency plan was prepared*.**

- ***The name and address of the person in charge, management or control***. This is an on-site person responsible for managing the facility. This person would be initially responsible for clean-up activities.

- ***The name and address of the owner if different from the person in charge***. This is the person ultimately responsible for the facility, usually the owner.

- ***The name, job title and 24 hour telephone number for the persons responsible for activating the contingency plan*****.** This ensures the employee discovering the spill can activate a response and provides a 24 hour point of contact for the authority investigating the spill.

- ***A description of the facility including the location, size and storage capacity***. This is important if persons are unfamiliar with the facility or area. The description could include a map and/or diagrams.

- ***A site map that is intended to illustrate the facilities relationship to other areas that may be affected by the spill*****.** The map should be to scale and be large enough to include the location of your facility, nearby buildings or facilities, roads, culverts, drainage patters, and any nearby bodies of water.

- ***The steps to be taken to report, contain, and clean up and dispose of a contaminant in the case of a spill****.*
  - ***a) Reporting***: Notification of all parties involved. This can include internal and external reporting procedures as well as a copy of the spill report.
  - ***b) Clean up***: Removal of the contaminant from the environment, a detailed of actual containment and clean up techniques. (2 steps: contain and remediate; be aware of fire)
  - ***c) Disposal*****:** Is the treatment of the contaminant such that it is no longer a threat to the environment. Plans may include location of disposal sites approved to accept wastes, means of storage prior to disposal and other approvals required. (Waste Manifest document)

- ***The means by which the contingency plan is activated*****.** This should outline internal company procedures to activate appropriate response equipment and personnel.

- ***A description of the training provided to employees to respond to a spill*****.** A sound training program is necessary when dealing with an emergency situation.

- ***An inventory and the location of response and clean up equipment available to implement the plan*.** This includes your equipment as well as any to be used by another person responding to the spill on your behalf.

  SPILL KIT (FUEL)
  The kit can include but not limited to the following: shovel, pick-axe, drums, booms, absorbent pad/sheet, disposable protective gloves/coveralls, sorbent and containment materials, and disposal bags.

- **Also:** A list of local contractors or clean up specialists who may be called upon to assist in responding to spills. A list of emergency numbers such as fire, ambulance and police

Recommendation to the NWB- The license should stipulate that as part of an updated O&M manual, the proponent should be required to file a comprehensive spill contingency plan that is consistent with the GN regulations, prior to commissioning of the lagoon. It is also recommended that this plan be updated annually and when significant facility or operational changes occur.

3. Discharge Criteria

In our May 31, 2007, submission to the NWB, DOE stated "we would like to see effluent quality standards applied to this license at least equivalent to those outlined in the document, '*Guidelines for the discharge of treated municipal wastewater in the Northwest Territories'. F*or a marine discharge of 150-600 litres per capita per day (Lcd) with a mixing conditions similar to a bay or fjord these standards are; BOD 120 mg/l and TSS 180 mg/l".

During the July 11, 2006 technical meeting Dillon consultants confirmed that the wetland and waterfall are considered the receiving environment and not part of the treatment system. Additionally, page 12 of the November 9, 2007 *Operation and Maintenance Manual, Sewage Treatment System(O&M Manual)* states that the point of compliance for the water license is the discharge from the lagoon cell into P-Lake; therefore the receiving environment is in fact P-Lake and not Telik Inlet. This information leads DOE to revise its recommendation to the Board.

Page 8, Table 3 of the O&M Manual instructs compliance with standards as follows, BOD 120 mg/l, TSS 180 mg/l, Fecal coliforms $1x10^6$. DOE believes that these effluent criteria not to be in compliance with the above mentioned guidelines. The December 2006 Design Report states the waste water generation for a community on trucked water supply is low and roughly equal to water consumption. This means that the waste water flow rate from the lagoon will likely be less than 150 Lcd; this is confirmed in the sewage generation figures presented in the O&M manual, DOE therefore recommends the following.

Recommendation to the NWB- The license should stipulate discharge standards at least equivalence to those outlined in the document, '*Guidelines for the discharge of treated municipal wastewater in the Northwest Territories'.* For a discharge of < 150 litres per capita per day (lcd) and a residence time in P-lake of Tr (residence time) < 5 yr, the discharge criteria should be as follows:

BOD 80 mg/L
TSS 100 mg/L

Additionally, as the proposed discharge point is close to local harvesting and recreational areas, criteria for *fecal coliform* should also be applied; however, DOE is not the appropriate authority to determine these criteria.

4. Sludge Management.

In DOE's April 2006 submission to the NWB we made the following point '*one of the stated design parameters for the sewage system is ease of maintenance. Part of this maintenance should include removal and disposal of sewage sludge; this does not appear to have been considered. Estimates should be made of the quantities of sludge likely to be produced, the required frequency of extraction from the lagoons; and operational procedures developed for environmentally sound removal and disposal*'

The November 9, 2007 O &M manual submitted by the proponent states that sludge will be sampled annually, when effluent becomes non-compliant or 'more often if required'. The stated purpose of sampling is to ensure that the sludge remains of a quality suitable for land disposal, yet the O&M manual gives no guidance on what the target sludge quality is. Guidelines for disposal of sewage sludge exist in the draft document *Draft Guidelines for discharge of domestic Wastewater in Nunavut, 2000,* but these are not stated on the O&M manual. Additionally, there are no instructions in the O&M manual on how such a spreading of sludge would be managed to avoid degradation of land and water resources. For example, the above referenced guidelines state that "*sewage sludge may not be disposed of on the surface of the land* ", and only stabilized sludge can be disposed of on the land; this would require proper treatment in a landfarm prior to disposal of the treated soil.

Recommendation to the NWB- DOE recommends a license condition outlining terms and conditions for sludge disposal as contained in the document *Draft Guidelines for discharge of domestic Wastewater in Nunavut, 2000.* The proponent should be required to submit a plan demonstrating how they would comply with the guidelines for sludge management and removal.

5. Use of Current Treatment Systems as a Contingency Measure

According to the December 2006, Design Report submitted as part of the application, the road from the community to P-Lake will have a grade of 8-10% over a length of 1km. DOE is concerned that the length and gradient of this road may exacerbate the number of days when municipal vehicles are able to operate safely. Due to its proximity to the community, the old three cell lagoon offers a valuable contingency for sewage disposal if sustained weather conditions do not permit the use of the P-lake lagoon. This matter was raised by DOE at the November 2007 technical meetings and subsequently the proponent, in their O & M manual states that cell 1 of the lagoon system will be used. However, if this old lagoon is to be used as a contingency, then NWB should be assured that it is suitable for this purpose and will not result is discharge of contaminants to the environment. The use and success of this contingency measure should also be routinely documented.

Recommendations to NWB –If the old facilities are to be used, details of any repairs, upgrades and maintenance required should be provided to NWB. The annual report submitted by the proponent should document the number of days the contingency lagoon was used in the previous year, approximate volume of effluent stored, method of discharge and quality of discharge.

6. Abandonment and Restoration

The lagoon is projected to have a 20 year life-span and DOE acknowledges that submission of detailed abandonment and restoration plan (A&R plan) is premature at this stage. However; DOE believes that conditions relating the A&R should be contained within the proposed new license with end objectives to return the site to the pre-use conditions.

Additionally, existing license NWB3CAP0207 requires A&R plans to be submitted for existing facilities, '*at least 6 months prior to abandoning any facilities and construction of new facilities to replace the new ones*'. DOE is not aware of such a plan being submitted and unless being used for the contingency purposes described above, the proponent should submit an A&R plan for the old three cell lagoon and the 'honey bucket pit'. Disposal of any sludge and water within these cells in a manner that does not result in discharge of contaminants to the environment will be a key consideration of such a plan.

Recommendation to NWB- Similar to Part G, 1-4 of the existing license NWB3CAP0207, the new license should require that A&R plans for the P-Lake lagoon be submitted to NWB for approval at least 6 months prior to abandoning the facility. NWB should also require the submission of A&R plans for the old 3 cell lagoon and honey pit within 1 year of issuing the new license.

7. Monitoring

In our May 31, 2007 submission to NWB we stated 'DOE would like to see the license specify a monitoring station at the last point of effluent control. With a likely fall discharge period of approximately 60 days, samples taken for the purposes of monitoring effluent quality should be collected on the first and last day of discharge, and 30 days after the first day of discharge. DOE believes that the last point of effluent control is the outfall of the lagoon and for the general purposes of environmental protection, this sample location is indicative of the concentrations of contaminants entering the environment and therefore compliance with the potential license requirements, the '*Guideline*s *for the discharge of treated municipal wastewater in the Northwest Territories'* and the *Environmental Protection Act'*.

However, the applicant in the *P Lake Sewage Lagoon Water License Application Draft Report, December 21, 2006* outlines a more expansive monitoring program essential to '*model and understand the treatment process to aid with future expansions of the system'*. This program includes 8 sample locations along the effluent path with samples taken weekly during the open-water season. Parameters of interest include TSS, BOD, Ammonia nitrogen and Total phosphorus. The November 9, 2007 O&M Manual expands further on this monitoring program including additional samples of within P-Lake itself. DOE concurs with the benefits of such a monitoring program for operational and maintenance purposes. Additionally, data acquired on changes in effluent quality as is passes through the wetland could serve to contribute to the body of literature on treatment efficiencies of tundra wetlands in Canada's north.

Recommendation to NWB- NWB should include the sampling program outlined in the November 9, 2007, O&M Manual as a term and condition of the license to be issued.