Environment Canada **Environnement Canada**

Environmental Protection Operations
Qimugjuk Building 969 P.O. Box 1870
Iqaluit, NU X0A 0H0
Tel: (867) 975-4639
Fax: (867) 975-4645

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Richard Dwyer
Licensing Trainee
Nunavut Water board
P.O. Box 119
Gjoa Haven, NU X0E 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369 *Via email at licensingtrainee@nwb.nunavut.ca*

RE: NWB3CAP – Hamlet of Cape Dorset – Submission of P Lake Area Sewage Lagoon System & Complete Construction Tender

On behalf of Environment Canada (EC), I have reviewed the information submitted with the above-mentioned application. The following specialist advice has been provided pursuant to Environment Canada's mandated responsibilities for the enforcement of the *Canadian Environmental Protection Act*, Section 36(3) of the *Fisheries Act*, the *Migratory Birds Convention Act,* and the *Species at Risk Act*.

Environment Canada is pleased to see the Hamlet of Cape Dorset taking steps to implement a new sewage treatment system for the community. Due to structural failures in the existing three-cell lagoon system, the Hamlet is proposing to construct a new anaerobic annual retention lagoon, which will discharge effluent into P Lake, which will serve a short retention 'secondary' treatment lagoon. Effluent will then flow out through an existing wetland to Telik Inlet. The new lagoon will have a depth of 3.5 m, with a 1.0 m freeboard and a 0.5 m allowance on the lagoon bottom for sludge accumulation. The new sewage treatment system is designed to meet the following effluent criteria at the final discharge point in Telik Inlet:

- 45 mg/L BOD_5
- 45 mg/L TSS
- 10^4 Fecal Coliform/100 mL

These discharge criteria are a significant improvement over the effluent quality guidelines for marine embayed areas that are currently being followed in Nunavut (120 mg/L TSS and 180 mg/L BOD).

Environment Canada is pleased to provide the following comments and recommendations to the Nunavut Water Board for consideration:

Hydrology

- Section 3.4 of the "Cape Dorset Sewage Treatment System" report indicates that there is significant recharge from P Lake in June and July. It is stated that the use of P Lake for sewage treatment is not practical unless the recharge water is directed away from the proposed lagoon, and that diversion ditches will be implemented as part of the design. However, the 95% Review Drawings included in the submission do not seem to include diversion ditches around either the new lagoon cell or P Lake. In order to prevent failure of the berms due to spring freshet flows, EC strongly recommends that diversion ditches be included in the design to redirect recharge around the lagoon and P-Lake.
- Environment Canada requests confirmation that there is no talik or fault beneath P Lake that would facilitate the movement of contaminants into the groundwater.

Baseline Water Quality Sampling

- Section 4.2.2.2 indicates that the baseline water quality measurements from P Lake were compromised due to faulty equipment and delays in transit. Environment Canada recommends that additional baseline water quality data from P Lake be collected as soon as possible to supplement the one sampling event (August 11, 2005) described in the report.

Quarry Operations

- Section 5.6.3 of the report discusses the granular supply required for the project. Environment Canada recommends that a minimum undisturbed buffer zone of one hundred metres (100) be maintained between any proposed quarry operations and the normal high water mark of any water body.

Treatment Efficiency

- Section 6.1 discusses the kinetic formula used to predict the level of treatment achieved by the lagoon system. Table 6.3 discusses the expected performance of lagoon systems under "short detention" and "long detention" systems. Further information is required regarding how Heinke *et al* defined short and long detention systems.
- It is noted that P Lake will only provide 1.5 – 3.5 days of additional retention time (as per Table 6.2). The BOD treatment efficiencies provided by P Lake vary significantly from Table 6.2 to Table 6.3. According to Table 6.2, the use of P Lake will only marginally improve the treatment efficiency of the primary lagoon cell (14% improvement when the C_i = 50 mg/L and t=3.5 days to 6% improvement when C_i=50 and t=1.5 days). This is substantially different from the 40% reduction in BOD predicted by Table 6.3.
- It is also noted that Table 5.2 of the report indicates that P Lake will provide a maximum of 2.7 days of retention time in 2006, with decreasing retention as time progresses. Why was a retention time of 3.5 days used in the kinetic formulas?
- **The proponent should provide further justification regarding the predicted improvements in treatment efficiency achieved through the use of P Lake as a secondary lagoon cell in both the short term and the long term.** Would similar discharge criteria be achieved at the final discharge point at the outlet of the wetland if P Lake were not included in the sewage treatment system?

Sampling Program

- Section 7.1 provides an overview of the proposed sampling protocol for the sewage treatment system. The report recommends that water samples be taken weekly during periods of open water over several years in order to obtain data for trend analysis. It is stated that the program could be scaled down after the first year to remove sample locations that are not considered essential, such as the lagoon inflow and along the wetland path. Environment Canada recommends that the sampling program only be scaled back if the results obtained during the first **two** years of operation are consistent. It is recommended that the monitoring program be continued for 2 years in order to allow time for any sediment resulting from construction to be flushed through the system and not influence actual treatment results.
- Section 7.3 indicates that if a boat were available, samples could be taken from the middle of the wetlands. Environment Canada requests clarification regarding the amount of standing water present in the wetlands. If enough water is present to require a boat for sampling, is there a possibility that fish are present in the wetlands?

General

- The proponent shall not deposit, nor permit the deposit of any fuel, chemicals, wastes or sediment into any water body. According to the Fisheries Act, Section 36(3), the deposition of deleterious substances of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results

from the deposit of the deleterious substance, may enter any such water, is prohibited.

- In order to protect the integrity of the wetland system, signage should be posted along the wetland notifying local residents that the area is a component the sewage treatment system in order to prevent ATVs from using the area. Signage should also be posted at P Lake notifying residents that the lake is also part of the sewage treatment system
- Environment Canada strongly recommends that an Operation and Maintenance Plan be developed for the new lagoon system. Additionally, a Spill Contingency Plan should be developed for the system to address both releases from the system as well as contingency plans in the event that weather/road conditions prevent sewage trucks from making it to the lagoon.
    - If the existing 3 celled lagoon is to be used as a back-up to the new system, EC requests that as-built drawings of the repair work that was completed in 2005 (as outlined in the letter submitted by Mr. Tom Rich, Government of Nunavut to Craig Broome, Environment Canada, dated April 28, 2005) be submitted. Environment Canada has been requesting this information since 2004, but to date it has not been received.
- The proponent should develop and submit an abandonment and restoration plan for the existing three-celled lagoon, including the disposal of any sludge contained within.

- Section 35 of the *Migratory Bird Regulations* states that **no person shall deposit nor permit to be deposited, oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.** Therefore, Environment Canada recommends that the proponent ensure that all spills are thoroughly cleaned-up.
- Paragraph 6(a) of the *Migratory Bird Regulations* states that **no one shall disturb or destroy the nests of migratory birds.** Environment Canada recommends that all activities be conducted outside the migratory bird breeding season, which extends from approximately 15 May to 1 August. These dates are approximate, and if active nests (i.e., nests containing eggs or young) are encountered outside of these dates, the proponent should avoid the area until nesting is complete (i.e., the young have left the nest).

If there are any changes in the proposed project, EC should be notified, as further review may be necessary. Please do not hesitate to contact me with any questions or comments with regards to the foregoing at (867) 975-4639 or by email at colette.spagnuolo@ec.gc.ca.

Yours truly,

Original signed by

Colette Spagnuolo
Environmental Assessment / Contaminated Sites Specialist

cc: (Stephen Harbicht, Head, Assessment and Monitoring, Environment Canada, Yellowknife)
(Jimmy Nobel, Enforcement / Emergencies Officer, Environment Canada, Iqaluit)