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RE: NWB 3BM-QIK – Hamlet of Qikiqtarjuaq Water License Renewal Application

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*.

The Hamlet of Qikiqtarjuaq is applying to renew their water license to allow for the municipal use of water and deposit of waste. The renewal application includes upgrades to the water storage facilities, sewage lagoon and solid waste management facility. The Hamlet is applying for a 5 year license.

Sewage Treatment Facilities

The Hamlet currently operates a single cell facultative lagoon which decants once a year at the end of summer to a natural wetland, with eventual discharge into Davis Strait. However, the capacity of the lagoon is no longer adequate to provide sufficient sewage treatment, especially considering future population projections. The Hamlet is therefore proposing to improve the existing sewage treatment facilities through the addition of another lagoon cell and a 22 ha engineered wetland. The lagoon effluent will be decanted over land through an engineered exfiltration berm in a sheet flow fashion, allowing vegetation and other biological systems characteristic to wetland areas to develop. The water license application supplementary questionnaire states that "anticipated effluent quality (as determined by the Alberta Wetland Model, corrected for temperature parameters) will be below 25 mg/L for both BOD and TSS. Ammonia levels are anticipated to be below those required by Environment Canada to be non-acutely lethal to fish."

The proposed effluent quality for the Qikiqtarjuaq wastewater treatment discharge (<45 mg/L BOD₅, <45 mg/L TSS, <1 mg/L T-PO₄, <5 mg/L TKN, and <2 x 10² CFU/dL FC) are a significant improvement over the effluent quality guidelines for marine embayed areas that are currently being followed in Nunavut (120 BOD /180 TSS) and a step in the right direction towards meeting the requirements of Section 36(3) of the *Fisheries Act*. Wastewater effluents are the single largest source of pollution by volume to surface water and contain a large number of pollutants. **Municipalities must ensure that they remain in compliance with Section 36(3) of the Fisheries Act when discharging effluent from wastewater treatment facilities.** Environment Canada's has stated its intention to develop a regulation under the *Fisheries Act* to achieve effluent standards for wastewater treatment systems equivalent in performance to conventional secondary treatment, with additional treatment where required, that will apply to effluents released from all wastewater systems in Canada. This regulation will serve as the federal government's principal tool to implement the Canadian Council of Ministers of the Environment (CCME) Canada-wide Strategy for the management of wastewater effluents scheduled to be completed in 2006.

Environment Canada recommends that the following conditions be applied throughout all stages of the license:

- The proponent shall not deposit, nor permit the deposit of any wastes, chemicals 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.
- The proponent shall ensure that the excavation of the new sewage lagoon cell does not result in sedimentation of any surrounding water bodies. Preventative measures, such as the use of silt curtains/fences should be used to help mitigate any potential impacts. Any stockpiled material should be stored above the high water mark of any waterbody and in such a manner as to prevent sedimentation of surrounding waterbodies.
- A minimum 1 m of freeboard should be maintained within both cells of the sewage lagoon at all times.
- Based on the wetland model, the proponent has stated that “during the period between 2005 and 2027, the wetland area will evolve into a functioning microbial and terrestrial plant environment...It is anticipated that this wetland treatment area will be capable of providing treatment to the concentrations shown in Table 8.” Environment Canada requests clarification regarding how long the proponent anticipates it will take for the wetland to progress to a stage where the treatment efficiencies in Table 8 will be met. It would be helpful if the treatment efficiencies could be provided for years 1-5, 5-10, 10-15 and 15-20.
- Environment Canada recommends that in addition to the proposed compliance sampling at the outlet of the wetland treatment area, the proponent **monitor the quality of the effluent being discharged from the lagoon**. While not intended for compliance purposes, this monitoring data will help verify the accuracy of the models being used to predict effluent quality, and contribute to the creation of a northern body of knowledge regarding achievable municipal wastewater effluent criteria.
- The Operation and Maintenance Manual for the lagoon states that **desludging** will occur every 5-10 years or as required based on the determination of the sludge thickness. Environment Canada recommends that prior to desludging occurring, the proponent submit for approval a Sewage Sludge Management Plan that clearly outlines the chemical composition of the sludge, and how sludge will be stored, treated and eventually disposed of.
- **All** spills must be documented and reported to the NWT Spill Line at (867) 920-8130.

Water Reservoir

The existing water reservoir will be expanded by constructing a new berm for the expanded reservoir and removing the existing berm along the northwest fence. The entire reservoir will be relined with a new liner.

Environment Canada recommends that the following conditions be applied throughout all stages of the license:

- The Hamlet should ensure that measures are in place to prevent the release of sediment and minimize erosion during excavation for the expansion of the reservoir. Any stockpiled material should be stored above the highwater mark of any waterbody and in such a manner as to prevent sedimentation of surrounding waterbodies.
- The proponent shall not deposit, nor permit the deposit of any wastes, chemicals 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.
- The Hamlet should ensure that **the existing liner which is to be removed receives proper disposal.**
- The Hamlet should prepare **a contingency plan outlining water storage plans during the period when the reservoir will not be operational due to the expansion and relining.**

- The Operations and Maintenance Manual for the Water Storage and Treatment Facility currently references the wetland treatment area for the sewage lagoon in Section 3.0. This reference is inappropriate and should be removed prior to implementation to reduce potential confusion for the operator.

Solid Waste Management Facility

Design improvements are proposed for the existing landfill, including reducing the slope of the tipping face, constructing a 2 m high perimeter berm around the waste cells in areas where a berm does not exist, constructing a water retention area to the west of the landfill cell to allow for temporary storage and testing of leachate/runoff from the landfill, and replacing the fencing along the western edge of the landfill. Operational changes are also proposed to improve the organization and development of the landfill.

Environment Canada recommends that the following conditions be applied throughout all stages of the license:

- The proponent shall not deposit, nor permit the deposit of any wastes, chemicals 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.
- The document "Detailed Design Report for the Improvements to the Water Reservoir, Sewage Lagoon, and Solid Waste Disposal Facility" discusses the possibilities for disposal of hazardous waste materials. Environment Canada recommends that until the materials are disposed of, they are stored in such a manner as to prevent the deposit of deleterious substances into waters frequented by fish.
- The Hamlet should note that the *Canadian Environmental Protection Act* and Section 36(3) of the *Fisheries Act* are also applicable to the management of hazardous wastes in Nunavut, and must be adhered to.
- The Detailed Design report states that the landfill perimeter berm will preferably be constructed using material from within the landfill cell itself. **The proponent should ensure that the materials used to construct the berm are free of contamination,** as the berm will potentially be subject to erosion due to wind and water.
- The water retention area within the landfill will be designed to contain a 100 mm storm event or snow runoff. Given that the landfill is being designed to accommodate 20 year projections, Environment Canada requests **confirmation that a sump of this size** is adequate to contain the applicable storm event, such as a 1:10 year event.
- The Hamlet should ensure that the depth of **the final cover material** applied over the abandoned waste disposal site (currently used as the Bulky Metals Disposal Area) is sufficient to promote the development of permafrost into the waste disposal area in order to help contain any contamination and prevent mobilization.
- Figure 5 included in the geotechnical evaluation of the landfill indicates the presence of an abandoned tank in the current leachate collection sump. Environment Canada recommends that **this tank be removed and any petroleum impacted soils** removed from the leachate collection sump. Contaminated soils should receive proper treatment prior to disposal.
- Environment Canada recommends that **groundwater monitoring wells** be installed downstream of the solid waste landfill and the existing metals dump area. While it is understood that diversion ditches will be installed around the landfill to redirect surface runoff, groundwater monitoring wells will help verify that historical contaminants that may be present in the landfill or metals dump are not migrating off site as a result of precipitation or snowmelt. One well should be installed upstream of the landfill to obtain background data, and at least one downstream of the landfill and one downstream of the metals dump. These wells should be **monitored annually during the summer and the results submitted to the NWB.**

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, EA-North, Environment Canada, Yellowknife)