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RE: 3BM-BAK1015 - Abandonment and Restoration Plan for the Hamlet of Baker Lake's Water License

Environment Canada (EC) has reviewed the information regarding the above mentioned Abandonment and Restoration Plan for the Hamlet of Baker Lake's Water License, as submitted to the Nunavut Water Board (NWB). The following specialist advice has been provided pursuant to Environment Canada's mandated responsibilities under the *Canadian Environmental Protection Act*, and Section 36(3) of the *Fisheries Act*.

This Abandonment and Restoration (A&R) Plan has been developed for use at the sewage disposal, water treatment, and solid waste facilities in the community of Baker Lake, Nunavut. Based on the information provided, EC would like to provide the following comments for the NWB's consideration.

General

Meeting the requirements of the Fisheries Act is mandatory, irrespective of any other regulatory or permitting system. Section 36(3) of the Fisheries Act specifies that unless authorized by federal regulation, no person shall deposit or permit the deposit 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. The legal definition of deleterious substance provided in section 34(1) of the Fisheries Act, in conjunction with court rulings, provides a very broad interpretation of deleterious and includes any substance with a potentially harmful chemical, physical or biological effect on fish or fish habitat.

Many of the aspects of closure remain very conceptual at this point which is appropriate given the timeline for closure provided for the sewage facilities (at least twenty years). Given that the berms from the sewage facility may be used as cover material for the solid waste facility, it is assumed that the solid waste facility will be closed at the same time or later, however this should be made clear. Please identify the life expectancy of the solid waste facility and the water treatment plant.

Throughout the Plan, references are made to returning the various areas discussed to their original or pre-development states or conditions. However, at no point are these conditions or states described. If the intent is to return the areas to their original states it must first be

established what that state was. Please include a detailed description of the original condition or state for each area.

Background; Sewage Disposal, Water Treatment and Solid Waste Disposal Facilities

Section 2.3
EC understands from this section that the Baker Lake solid waste facility undertakes open burning on a weekly basis. In principal, EC does not encourage the open burning of waste as a means of final disposal and encourages the Hamlet consider alternative options for reducing the volume of waste managed at their solid waste facility. Going forward with this practice, the Hamlet should be aware that the only solid wastes conditionally suitable for open burning include paper products, paperboard packaging and untreated wood. Plywood, painted wood or other treated wood should not be disposed of in this manner. More details regarding materials suitable for open burning and open burning practices are provided in the following links to Nunavut's Municipal Open Burning Policy and EC's brochure regarding open burning, respectively:

- http://www.gov.nu.ca/env/Open%20burning.pdf
- http://www.ec.gc.ca/gdd-mw/684B44DD-5780-4F73-BC58-A97E31A19EDC/COM1170_Open_Burning_Brochure_e_v6_for%20web.pdf

EC recommends that all non-combustible construction and demolition waste (i.e., plastics, tar paper, floor coverings, shingles, insulation, wiring, and tents) be thoroughly removed prior to burning. Further, all residual waste from open burning (i.e. nails and bottom ash) should be collected, contained and disposed of in a segregated area of the solid waste facility.

Section 2.3 also indicates hazardous wastes, including batteries, paint, antifreeze and waste oil are stored in the bulk metal/hazardous waste storage area. EC recommends the use of secondary containment, such as self-supporting insta-berms for storage of all hazardous waste in this area.

Sewage Disposal Facility Abandonment and Restoration Plan

Section 3.3
This section indicates that soils within and adjacent to the sewage disposal facility will be analyzed for a suite of parameters to determine any type and extent of contamination. EC recommends the Plan be updated to include the suite of parameters that will be analyzed.

Section 3.4
The sequence of events could be better defined in the implementation schedule. For example, before removing the holding cell berms (3.4.3(f)), it is necessary to remove and properly dispose of the liquid effluent (3.4.3(g)) followed by an assessment, removal and disposal of sewage sludge (3.4.2(b)).

Section 3.4.2(b)
Several disposal options have been identified for sewage sludge, depending on the characteristics of the sludge at the time of abandonment and restoration. EC recommends that clarity be provided to determine how the suitability of the disposal methods would be determined. With respect to option (ii), EC suggests sludge dewatering be undertaken to reduce the moisture content of sludge before its disposal in the municipal landfill.

Section 3.4.3 (a) and (c)
Cleaning the discharge spillways, dumping stations and riprap onsite with detergent and disinfectant may introduce harmful nutrients and chemicals to the immediate natural environment as well as downstream. EC requests that the A&R Plan be revised to identify which cleaning and disinfecting agents will be used and what protocols will be followed to minimize or eliminate potential impacts to the environment from use of these products. As a best practice, EC recommends earth-friendly products be selected for cleaning and disinfecting sewage facility equipment (i.e. cleaning products with low persistence and toxicity) and the Hamlet be required to provide MSDSs for the Board's review to ensure the cleaning products used are environmentally benign. As well, given this is an uncommon procedure, the inclusion of an example of another facility that undertook or plans to undertake this procedure would also be an asset.

Section 3.4.3(f)
At closure, this section indicates sand and gravel used in constructed berms will be analysed for contamination, and, if acceptable, used offsite, onsite or as cover material at the solid waste disposal facility. EC seeks clarification on what parameters will be analysed in the sand and gravel and what contaminant limits will be applied to determine its suitability for the suggested disposal options.

Section 3.6
The last paragraph indicates that "any contamination would be expected to result not from the sewage disposal, but from the nearby solid waste facility and subsequent leachate." It is unclear what the intent of this statement is. Sewage itself is a contaminant, and should not be disregarded. Other areas of the Plan appear to take this into consideration, such as the washing and disinfecting of items that have contacted sewage.
Please clarify what is meant by this last paragraph.

Solid Waste Facility Abandonment and Restoration

It is questionable that this solid waste facility functions as a natural attenuation landfill. In order for this type of landfill to function properly it must first be established what the leachate quality is and whether or not all components of the leachate will be broken down by the surrounding environment. Have any tests been done to analyse the leachate from this particular facility and to confirm that it is being naturally broken down? As well, the intent of a natural attenuation landfill is not to contain, but to treat landfill leachate; therefore, the statement that natural attenuation landfills also rely on permafrost is confusing.

Further, the last paragraph in section 3.6 states that the solid waste facility and subsequent leachate are responsible for contaminating an area close to the sewage facility. While questions are raised about this paragraph as a whole (see above), this section appears to indicate that the presence of leachate from the solid waste facility is known and has resulted in the contamination of a nearby area. If this is the case, it appears that neither the solid waste facility is functioning as a natural attenuation landfill nor is the permafrost below containing the leachate. Whether or not this solid waste facility is in fact a natural attenuation landfill would impact how the site should be closed. However, imperial evidence is required to support this designation before this information can be incorporated into the A&R Plan.

Section 5.3.1
This section indicates natural attenuation landfills rely on permafrost below the landfill to assist in containing spills. EC does not support the practice of relying on permafrost to contain spills. To this end, as outlined in our comments related to section 2.3, EC recommends the use of secondary containment for all hazardous waste contained in the hazardous waste storage area.

Section 5.4.1
This section indicates only minor levels of contamination are leaching from the municipal solid waste disposal area and, moreover, this leachate is being effectively treated by the sewage disposal facility. EC requests the Hamlet provide the analytical results to the Board for intervener review that supports this statement.

Section 5.4.2
It is imperative that the Hamlet start to implement greater control over this area of the solid waste facility. Waste in the bulk metal/ hazardous waste area should be separated into sub-areas, such as automobiles, scrap metal, appliances, etc. Further items of hazardous waste should be further segregated into types of waste, including but not limited to, batteries, paint and waste oil. By initiating controlled-access to this area, segregation would be easier to maintain, which in turn would aid in the development of a current hazardous waste inventory for the facility. As it is planned that all of the hazardous waste will ultimately be shipped offsite, knowing what is present will aid in closure of this area. EC recommends that segregation and controlled-access be priorities for this section of the solid waste facility to enable easier closure when required.

Section 5.4.2.1
This section indicates that, among other metal waste, only properly abandoned vehicles, snowmobiles and all-terrain vehicles are disposed of in the metal/ hazardous waste area. EC seeks clarification on what is meant by properly abandoned vehicles. Specifically, are all automobile wastes such as coolant, antifreeze, oil and battery acid drained from vehicles, reclaimed and properly contained in the hazardous containment area prior to disposal of the automobiles in the bulk metal area?

Section 5.5
This section indicates that the routine open burning of some waste materials reduces the moisture entering the solid waste disposal area and thus, the production of landfill leachate. EC reminds the Hamlet that the only materials suitable for open burning include paper products, paperboard packaging and untreated wood which by their nature have low moisture content. EC does not advise open burning of organic waste. As a long term goal to achieve moisture and leachate reduction at the municipal landfill, EC recommends the Hamlet consider a composting program to divert organic wastes from the landfill.

If there are any additional changes in the proposed project, EC should be notified, as further review may be necessary. Please do not hesitate to contact the undersigned with any questions or comments with regards to the foregoing at (867)669-4724 or by email at sarah-lacey.mcmillan@ec.gc.ca.

Yours truly,

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