Your file - Votre reference
3BM-GJO1318

September 5, 2014

Our file - Notre reference
IQALUIT-#843008

Robin Ikkutisluk
Licensing Administrative Assistant
Nunavut Water Board
GJOA HAVEN, NU X0E 1J0

Re: Aboriginal Affairs and Northern Development Canada Review of the Hamlet of Gjoa Haven's Proposed Abandonment and Reclamation Plan for their Former Sewage Lagoon, Water Licence #3BM-GJO1318

Dear Ms. Beaulieu:

Thank you for your email of August 6, 2014, concerning the above mentioned Abandonment and Reclamation Plan. A memorandum is provided for the Board's consideration. Comments and recommendations have been provided pursuant to Aboriginal Affairs and Northern Development Canada's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

Please do not hesitate to contact me by telephone at 867-975-4555 or email at david.abernethy@aandc-aadnc.gc.ca for further information.

Sincerely,

David Abernethy
Regional Coordinator
Water Resources Division
Resource Management Directorate
Aboriginal Affairs and Northern Development Canada
IQALUIT, NU X0A 0H0

Encl.

c.c.: Andrea Morgan, A/Manager of Water Resources, AANDC Nunavut
Erik Allain, Manager of Field Operations, AANDC Nunavut

Memorandum

To: Robin Ikkutisluk, Nunavut Water Board

From: David Abernethy, Aboriginal Affairs and Northern Development Canada

CC: Andrea Morgan (AANDC) and Erik Allain (AANDC)

Date: September 5, 2014

Re: Review of Proposed Abandonment and Reclamation Plan for Former Sewage Lagoon, #3BM-GJO1318

Licensee: Hamlet of Gjoa Haven
Project: Municipal water licence
Region: Kitikmeot

Comments:

A. Background

On August 5, 2014, the Nunavut Water Board (**"NWB"**) provided notification that it had received an Abandonment and Reclamation Plan for the Hamlet of Gjoa Haven's (**the "Licensee"**) former sewage lagoon from the Government of Nunavut's Department of Community and Government Services on the Hamlet's behalf. This plan was submitted pursuant to Part G, Item 1 of the Hamlet of Gjoa Haven's municipal water licence, #3BM-GJO1318.

Interested parties were asked to review this application and provide comments by September 6, 2014.

B. Results of review

On behalf of Aboriginal Affairs and Northern Development Canada (**"AANDC"**), the following comments and recommendations are provided:

1.	**Engineering Design Requirements for the Construction of Sludge Drying Beds, Leachate Collection System, etc.** **Comment:** The proposed Abandonment and Reclamation Plan does not include construction drawings stamped and signed by a Professional Engineer for the planned sludge drying beds, leachate collection system, and associated project components. These drawings are needed to allow for an understanding of the planned sludge management system. Following the construction of these structures, the Licensee should provide a Construction Summary Report along with as-built plans and drawings in accordance with licence requirements. **Recommendation:** Pursuant to Part E, Item 1 of the Licence, the Licensee should submit to the NWB for approval construction drawings stamped and signed by a qualified Engineer registered in Nunavut at least 60 days prior to the commencement of any construction of the sludge drying beds,

	leachate collection system, and other associated project components. These drawings should demonstrate how the structures will prevent migration of contaminants to groundwater and surface water. Furthermore, pursuant to Part E, Item 4 of the Licence, the Licensee should submit to the NWB a Construction Summary Report along with stamped as-built plans and drawings providing explanation to reflect any deviation from the construction drawings taking into account construction and field decisions and how they may affect the performance of the engineered facilities.
2.	**Sludge Drying Beds and Leachate Collection System Information Requests** **Comment:** Section 3.2 of the proposed Abandonment and Closure Plan states that sludge will be removed from the former sewage lagoon and placed on a sand layer within drying beds where it will freeze during the winter months and thaw during the following spring and summer seasons. As the sludge thaws, "water contained within the sludge will drain through the sand layer and be collected via a collection pipe." This leachate will be subsequently directed to the Hamlet's new sewage lagoon for additional treatment. Details pertaining to the design of the sludge drying beds and leachate collection system are not included in the application. **Recommendation:** The Licensee should provide the following information with respect to the design of the sludge drying beds and leachate collection system as an addendum or revision to the Abandonment and Reclamation Plan: a. hydrogeological study results, including soil characteristics and hydraulic conductivity of existing soils where the sludge drying pads will be constructed; b. sludge characteristics showing contaminant types; c. technical specification of sand/filter material; d. leachate collection system (under the drying pads) details; e. setback of sludge treatment system from surrounding water bodies; and f. materials and methods that will be used for the proposed construction activities
3.	**Alternate Sludge De-watering Techniques** **Comment:** Section 3.4.2 of the 2005 FSC Architects & Engineers Report referenced in the Abandonment and Reclamation Plan, *Abandonment and Restoration of Sewage Lagoons in Nunavut*[1], proposes an alternative to drying beds for de-watering sludge: leave the sludge within its existing containment area (i.e., the former sewage lagoon) following the removal of effluent. Allow the sludge to freeze over the winter and remove it either the next summer, or the next winter after it re-freezes. Provided that effluent released from the de-watered sludge is managed according to licensed effluent discharge quality limits, this may be a viable option for dewatering sludge. **Recommendation:** The Licensee should consider the practicality of de-watering sludge from the former sewage lagoon by allowing it to freeze-thaw in place as described in the 2005 FSC Architects & Engineers report titled, *Abandonment and Restoration of Sewage Lagoons in Nunavut*.

[1] FSC Architects and Engineers. *Abandonment and Restoration of Sewage Lagoons in Nunavut, Final Report*. Prepared for Aboriginal Affairs and Northern Development Canada. Project # 2004-1180. March 8, 2005.

4.	**Annual reporting requirements** **Comment:** Sections 3.4.1, 3.4.2, and 4.2 of the proposed Abandonment and Reclamation Plan identify monitoring activities that should be followed when reclaiming the former sewage lagoon. These include: • the quality of effluent reporting form the former sewage lagoon to the surrounding wetland; • visual inspections of the sludge drying beds; • visual inspections of effluent collection basins; and • sample analysis of de-watered sludge. **Recommendation:** All monitoring information collected as part of the former sewage lagoon's reclamation, including the operation of the sludge drying bed and leachate collection system should be included in annual reports submissions to the NWB pursuant to Part B, Item 1 of the licence. At a minimum, the following information should be provided: • When applicable, monthly water quality sample results of effluent released from the former sewage lagoon to the receiving environment (must satisfy Part D, Item 2 and Part H, Item 2 of the licence); • Inspections of sludge drying beds, inspections of effluent collection basins, and sample analysis of dewatered sludge o As stated in section 3.4.2 of the plan, sludge drying beds and collection basins should be monitored regularly to check for leakages of effluent of sludge from the beds and to assess when sludge is undergoing freeze-thaw conditioning. Effluent collection basins should be inspected regularly once the sludge begins to thaw.
5.	**Sludge Remediation Criteria** **Comment:** Section 3.4.2 of the Abandonment and Reclamation Plan provides remediation criteria for sludge to be used as a landfill cover material. This criteria is drawn from a 2005 FSC Architects and Engineers report that was prepared for AANDC, titled, *Abandonment and Restoration of Sewage Lagoons in Nunavut, Final Report*.[2] The proposed remediation criteria is only a portion of the remediation criteria summarized in the report that was sourced from the *Guidelines for the Discharge of Domestic Wastewater in Nunavut* (dated 2000). Although a copy of these guidelines cannot be located, the remediation criteria is consistent with those included in the 2002 Government of Nunavut *Environmental Guideline for Industrial Waste Discharges*.[3] This guideline was subsequently revised in April 2011 and April 2014. The April 2014 revision is titled *Environmental Guideline for Industrial Waste Discharges into Community Solid Waste and Sewage Treatment Facilities*.[4] The Government of Nunavut guideline may not be a suitable choice for selecting discharge criteria because it is intended for the management of industrial wastes. The 2014 revision defines process residuals as "solid, semi-solid or sludge waste resulting from an industrial operation" (i.e., not domestic sewage sludge) and defines solid waste as "not including biomedical waste, hazardous waste, or sewage sludge."[5]

[2] Ibid.
[3] Government of Nunavut, Department of Sustainable Development. *Environmental Guideline for Industrial Waste Discharges*. Prepared by the Environmental Protection Service. January 2002.
[4] Government of Nunavut, Department of Environment. *Environmental Guideline for Industrial Waste Discharges into Community Solid Waste and Sewage Treatment Facilities*. April 2014.
[5] Ibid, p. 2.

	Alternate sewage sludge discharge criteria should be considered. The criteria for category 'B' compost specified in Section 3 of the 2005 Canadian Council of Ministers (CCME) of the Environment *Guidelines for Compost Quality*[6] is more reasonable because it is applicable to the disposal of recovered sewage sludge. Category 'A' compost can be used in any application, such as agricultural lands, residential gardens, horticultural operations, the nursery industry, and other business. Category 'B' compost is for restricted use because of the presence of foreign matter and/or higher trace elements. Section 2.2 the 2005 FSC Architects and Engineers references criteria that are consistent with the CCME guidelines. **Recommendation:** The category 'B' compost criteria presented in Section 3 of the 2005 CCME *Guidelines for Compost Quality* should be considered for the remediation of recovered sewage sludge. More specifically, the criteria for: • trace elements in compost and cumulative trace element additions to soil; and • pathogen limits (fecal coliforms and salmonella) may be suitable licence requirements.

Prepared by David Abernethy and Amjad Tariq

[6] Canadian Council of Ministers of the Environment. *Guidelines for Compost Quality*. Reference # PN1340. ISBN 1-896997-60-0. 2005