



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
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Your file - Votre référence
3BM-REP1520
Our file - Notre référence
CIDM#1290383

October 21, 2020

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
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**Re: Crown-Indigenous Relations and Northern Affairs Canada Review of the
Licence Amendment and Renewal Application for the Hamlet of Naujaat, Type
B Water Licence No. 3BM-REP1520**

Dear Mr. Dwyer,

Thank you for the September 21, 2020 invitation to review the referenced licence amendment and renewal application, submitted by the Government of Nunavut Community of Government Services (GN-CGS) on behalf of the Hamlet of Naujaat, for Type B Water Licence No. 3BM-REP1520.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the application package pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*. Please find CIRNAC comments and recommendations in the attached Technical Memorandum.

If there are any questions or concerns, please contact me at (867) 975-4282 or bridget.campbell@canada.ca.

Sincerely,

Bridget Campbell,
Water Resources Coordinator



Technical Review Memorandum

Date: October 21, 2020

To: Richard Dwyer – Manager of Licensing, Nunavut Water Board

From: Bridget Campbell – Water Management Coordinator, CIRNAC

Subject: Crown-Indigenous Relations and Northern Affairs Canada Review of the Licence Amendment and Renewal Application for the Hamlet of Naujaat, Type B Water Licence No. 3BM-REP15202

A. BACKGROUND

The Hamlet of Naujaat is located within the Kivalliq Region, Nunavut, on the northern shore of Repulse Bay, on the south shore of the Rae Isthmus, at the geographical coordinates 66° 31' N and 86° 14' W. The Hamlet operates a water supply facility and solid and sewage waste management facilities under the Type B Municipal Licence No. 3BM-REP1520.

The Government of Nunavut Community of Government Services (GN-CGS) is applying, on behalf of the Hamlet of Naujaat, for the 5 year renewal and amendment of licence. Currently the sewage treatment only involves a wetland. Proposed amendments include changes to the sewage drop off area and the inclusion of a pre-treatment lagoon to be installed northwest of the current sewage drop-off area. Effluent is proposed to be pumped from the lagoon annually to receive secondary treatment from the existing wetland system. The construction of the sewage lagoon is scheduled to begin in 2021. The application also suggests that there are also future plans to expand or move the solid waste disposal facility which documentation and correspondence will be provided when available.

CIRNAC provides the following comments and recommendations pertaining to the application package. A summary of the subjects of recommendations can be found in Table 1. Documents reviewed as part of this submission can be found in Table 2 of Section B. Detailed technical review comments can be found in Section C.



Table 1: Summary of Recommendations

Recommendation Number	Subject
R-01	Scope of Application
R-02	Compliance Plan
R-03	Water meter for Recording Waste Water / discharge
R-04	2019 Annual Report Monitoring Results
R-05	Spill follow-up Actions
R-06	Geothermal Analysis
R-07	Construction Mitigation Techniques
R-08	Sludge Solids Removal from Lagoon
R-09	Management Plans
R-10	Discharge Criteria and Effluent Requirements
R-11	Proposed Mode of Operation

B. DOCUMENTS REVIEWED

The following table (Table 2) provides a summary of the documents reviewed under the submission of the Interim Closure and Reclamation Plan.

Table 2: Documents Reviewed

Document Title	Author, File No., Rev., Date
Application for Water Licence Amendment for Water Licence 3BM-REP1520	Community and Government Services, September 16, 2020
Attachment: Naujaat Map	
Letter Re: 149379 Municipal Water Licence Amendment and Renewal	Nunavut Planning Commission, July 29, 2020
Letter Indicating Permission to Represent	Municipality of Naujaat, July 30, 2020
Executive Summary	Community and Government Services, September, 2020
Naujaat 100% Submission	EXP, April, 2020
Naujaat Design Update	EXP, March 20, 2020
Plan for Compliance	Hamlet of Naujaat, 2020
Hamlet of Naujaat 2019 Annual Report	Hamlet of Naujaat, 2020
Appendix A: REP-6 Effluent Quality Limits	
Appendix B: Weekly Inspections at Monitoring Program Stations	
Appendix C: Certificate of Analysis August 1, 2019	
Appendix D: Hazardous Materials Spill Database, Naujaat 2019	
Appendix E: Naujaat 2019 Sampling Results Summary	
Appendix F: CIRNAC Inspection Report	



C. RESULTS OF REVIEW

1. Scope of Application

Comment:

The Executive Summary provided as part of the application to amend water licence indicates that a new sewage lagoon is proposed, and (pg. 1) that “There are also future plans to expand or move the solid waste disposal facility which documentation and correspondence will be provided when available.” It is not clear whether the expansion or relocation of the solid waste disposal facility is part of the current application, and whether the documentation will be made available prior to a Technical Meeting. Without the appropriate documentation, interveners cannot effectively evaluate the impacts of the project on water resources and the strategies to mitigate potential impacts. Documentation should include plans and drawings for the new landfill and a Final Closure Plan for the existing landfill, which has been reported to be at capacity (Hamlet of Naujaat 2019 Annual Report, pg. 2). Hazardous Waste should be specifically addressed in the Final Closure Plan.

Recommendation:

(R-01) CIRNAC recommends that GN/CGS clarify the scope of the application and the expected timelines for document submission. If the scope of the application does include the solid waste disposal facility, CIRNAC recommends that GN/CGS provide;

- I. Plans and drawings for the new landfill; and
- II. Final Closure Plan for the existing landfill.

2. Compliance Plan

Comment:

The Compliance Plan submitted as part of the amendment application contains a section which refers to the compliance status of each licence condition, and a section which refers to the plan of compliance. The section referring to the plan of compliance spans from page 21 to page 60 repeating the same phrase, “Continue as is one new licence has been issued and parts and items have been revised by all parties.” There are some additions to cells, where no indication is made of which term is being referenced. This makes the plan difficult to follow.

Recommendation:

(R-02) CIRNAC recommends that GN/CGS review the Compliance Plan, and match specific plans to corresponding licence conditions.



3. Water Meter for Recording Waste Water/Sewage Discharge

Comment:

The Hamlet of Naujaat 2019 Annual Report indicates on page 1 that “No meter exists to measure the sewage discharge volume, therefore water consumption volume is considered as equal volume to the Sewage discharge volume.” With the installation of the sewage lagoon, measures are required to record the sewage discharge volume expelled by the pumps. A second measurement along the water treatment train can be helpful in identifying leaks and meter malfunction or falling out of calibration should they occur.

Recommendation:

(R-03) CIRNAC recommends that the Nunavut Water Board include a condition for recording sewage lagoon outflow volumes using a meter, in the approved water licence.

4. 2019 Annual Report Monitoring Results

Comment:

The Hamlet of Naujaat 2019 Annual Report includes in *Appendix E: Naujaat 2019 Sampling Results Summary* the sample results for monitoring stations REP-2, REP-2A, and REP-6. Part H Item 1 of Licence No. 3BM-REP1520 provides a full list of monitoring stations. Results for the remaining monitoring stations in this list are not available in the 2019 Annual Report. Incomplete monitoring results affects the effective review of water use and waste disposal impacts.

Recommendation:

(R-04) CIRNAC recommends that GN-CGS provide all of the required monitoring results, or provide rationale for why results are not available for other monitoring stations.

5. Spill Follow-Up Actions

Comment:

The Hamlet of Naujaat 2019 Annual Report provides a list of unauthorized discharges on page 2. The heading of this section also indicates a requirement for a summary of follow-up action taken. A summary of follow up actions taken was not included in this section of the 2019 Annual Report.

Recommendation:

(R-05) CIRNAC recommends that GN-CGS provide details of the follow up actions taken for each event, or direct CIRNAC to where this information can be located.



6. Geothermal Analysis (when will this occur & what alternative has been chosen)

Comment:

The Naujaat Design Update (EXP, 2020) indicates that a Geotechnical Investigation was conducted by EXP Services Inc. beginning in 2012. In reference to the Geotechnical Investigation Report (EXP, 2013), the Naujaat Design Update states the following (pg. 7):

Successful design of the alternative of a synthetic liner in the berms requires definition of the long-term extent of thaw below the lagoon and within the berms. This indicates the need for a geothermal analysis. The alternative of maintenance of a frozen core within the berms requires a geothermal assessment to confirm the viability and implications of this alternative.

The Naujaat Design Update (EXP, 2020) also indicates that a geothermal assessment was conducted by Naviq Consulting Inc., and that a frozen core within the berms is not feasible for the proposed lagoon. It is not clear whether a geothermal analysis has been conducted to define the long-term extent of thaw below the lagoon and within the berms.

Recommendation:

(R-06) CIRNAC recommends that GN-CGS clarify whether the indicated need for a geothermal analysis has been met with an analysis. If so, CIRNAC recommends that the results of the analysis be provided for review/reference. If not, CIRNAC recommends that the rationale for its exclusion be provided.

7. Construction Mitigation Techniques

Comment:

The Naujaat Design Update (EXP, 2020, pg. 8) indicates that:

The SLEA determined that the project will have net positive effects for the community. No significant long-term effects are anticipated. Most effects are associated with construction, and these can be managed using appropriate mitigation techniques.

The construction mitigation techniques to be employed are not clear.

Recommendation:

(R-07) CIRNAC recommends that GN-CGS clarify which construction mitigation techniques they plan to implement during the construction of the sewage lagoon.



8. Sludge Solids Removal from Lagoon

Comment:

The Naujaat Design Update (EXP, 2020, pg. 15) indicates that “The sludge that is anticipated to accumulate over the 20-year design period can be accommodated within the allocated sludge storage zone located in the lowest 1.0 meters of the proposed lagoon.” It is not clear whether sludge will need to be removed from the lagoon during its 20 year operation, and if so, how the sludge will be removed, stored, managed, and disposed.

Sludge management and accumulation was identified by CIRNAC as a potential issue during the renewal application process for 3BMREP0409 in 2014 (CIRNAC, 2014). CIRNAC recommended that a sludge management plan be developed. A Sewage Disposal Facility Operation and Maintenance (O&M) Manual, with the inclusion of a sludge management section, was included as a condition in the current (expired) licence, No. 3BM-REP1520. An O&M Manual for the Sewage Disposal Facility was not submitted as part of the amendment application package.

Recommendation:

(R-08) CIRNAC recommends that GN-CGS provide the Sewage Disposal Facility O&M manual for review prior to a Technical Meeting.

9. Management Plans

Comment:

Water licence No. 3BM-REP1520 indicates the following required management plans:

- Operation and Maintenance (O&M) Manuals for all infrastructure, including
 - F-1: Sewage Disposal Facility (including sludge management section)
 - F-2: Solid Waste Disposal Facility (including hazardous wastes section)
 - F-6: Water Treatment facility;
- F-3: Solid Waste Management Plan;
- F-5: Spill Contingency Plan;
- F-7&8: Implementation Plan for Engineer’s Inspection Report Recommendations;
- G-1: Abandonment and Restoration (A&R) Plan; and
- H-12: Quality Assurance and Quality Control (QA/QC) Plan.

No management plans were submitted as part of the amendment application. The addition of a sewage lagoon to the community may pose changes to strategies for spill prevention and management, sludge management, and reclamation/restoration. It is not clear which



versions of these plans have been submitted and approved, or if they contain mitigation strategies for lagoon operation.

Recommendation:

(R-09) CIRNAC recommends that GN/CGS provide updates to relevant management plans (including Spill Contingency Plan, O&M Manual for sewage facility, and A&R Plans), and clarify which versions of all required plans have been approved and are in use.

10. Discharge Criteria and Effluent Requirements

Comment:

Water Licence No. 3BM-REP1520 states under the Section Header *Sewage* (pg. x) that:

... the Board has changed the effluent quality criteria for the regulated final discharge point from the Wetland to reflect the short time-period in which the municipality's accumulated annual sewage volume will be discharged. The discharge criteria adheres to the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories (1992), for a wastewater flow of greater than 600 litres per capita per day, discharging to an open coastline environment.

Water Licence No. 3BM-REP1520 sets the following criteria (pg. 9) for Monitoring Program Station REP-6 (Effluent discharged from the Upgraded Sewage Disposal Facility):

Parameter	Maximum Concentration of any Grab Sample
BOD5	80 mg/L
Total Suspended Solids	70 mg/L
Faecal Coliforms	1 x 10 ⁶ CFU/dl
Oil and grease	No visible sheen
pH	Between 6 and 9

According to the Naujaat Design Update (EXP, 2020, pg.12), the projected population for 2040 is 1,886. At the estimated 2,377m³/day rate calculated on page 19, the projected discharge would be 1260 litres per day (Equation 1), which would be greater than 600 litres per capita per day, and would qualify for the sewage discharge criteria currently set in the licence.

Equation 1: Proposed Effluent Flow Rate (L/day)

$$\frac{2377m^3}{1\text{ day}} * \frac{1000L}{1m^3} * \frac{1}{1886\text{ people}} = 1260L/day$$



The Naujaat Design Update (EXP, 2020, pg. 5-6) suggests changing these criteria, and indicates under Section 2.4 *Regulatory Requirements*, that:

The GN position based on the research completed by Dalhousie University and ongoing discussions with Environment and Climate Change Canada (ECCC) regarding wastewater regulations in the north, is that effluent quality limits for a lagoon/wetland system discharging into a well flushed receiving environment should be **100mg/L cBOD₅ and 120mg/L TSS**. The Naujaat lagoon and wetlands area will be designed to achieve effluent quality below these limits.

The results of the research conducted by Dalhousie University and ECCC were not provided in the application for water licence renewal. The Naujaat Design Update (EXP, 2020, pg. 23) also indicates effluent objectives under Recommendation number 4, in Section 6 *Conclusions and Recommendations*, which differ from those outlined in Section 2.4, and from the licence discharge criteria:

4. The following effluent requirements have been set for this project.
 - a. BOD₅ - 100 mg/L
 - b. Total suspended solids - 120 mg/L
 - c. Faecal coliforms – 1 X10⁴/100mL
 - d. Oil and grease – no visible sheen
 - e. pH – between 6 and 9

The rationale for adding a lagoon to increase the treatment capacity of the sewage system while lowering the criteria for the treatment is unclear.

Recommendation:

(R-10) CIRNAC recommends that GN-CGS clarify the effluent objectives they propose for an amended licence, and provide clear rationale for the proposed effluent objectives based on the results from studies conducted by Dalhousie University and ECCC.

11. Proposed Mode of Operation

Comment:

The Naujaat Design Update (EXP, 2020) recommends that the sewage lagoon be operated with 1m freeboard above the required working volume, and (pg. 16) that:

Pumping the effluent from the lagoon is the most operator-demanding alternative. It is also the most dependable. This method requires that the pumps be installed and removed each year ... Pumping has been selected as the preferred method of decanting the lagoon in Naujaat.



By pumping the fluid over the edge of the berm, the 1m freeboard can be maintained, the volume and timing of decanting can be controlled by the operator, and the hose can be moved along width of the wetland to more evenly distribute the nutrient loading. The Naujaat Design Update (EXP, 2020, pg. 12) also conversely states that:

Decanting is initiated via a spillway when the elevation of the lagoon contents rises to the spillway crest. The outflow rate to the wetland would equal the influent rate during this portion of the decanting process.

It is not clear which method of decanting will be used, whether the lagoon will operate without the recommended 1m freeboard, and how the effluent will be distributed over the wetland surface area if the spillway is used.

Recommendation:

(R-11) CIRNAC recommends that GN-CGS clarify the proposed method of operating and decanting the sewage lagoon.



D. REFERENCES

Works Cited

Aboriginal Affairs and Northern Development Canada. Letter to NWB Re: Aboriginal Affairs and Northern Development Canada Review of the Hamlet of Repulse Bay's Application to Renew Water Licence #3BM-REP0409. September 19, 2014. CIDM 853166. Comment No. 4.

EXP Services Inc. Geotechnical Investigation, Sewage Lagoon Upgrades. April 2, 2013.

Project Number: OTT-00207086-A0. Retrieved from: [ftp://ftp.nwb-](ftp://ftp.nwb-oen.ca/registry/3%20MUNICIPAL/3B/3BM%20-%20Municipality/3BM-REP1520/1%20APPLICATION/2009%20Amend%20Renew/130402%203BM-REP0409%20Rev%20Geo%20Inv%20Rpt-Lagoon%20Upgrades%20Repulse%20Bay%20NU-ILAE.pdf)

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[Lagoon%20Upgrades%20Repulse%20Bay%20NU-ILAE.pdf](ftp://ftp.nwb-oen.ca/registry/3%20MUNICIPAL/3B/3BM%20-%20Municipality/3BM-REP1520/1%20APPLICATION/2009%20Amend%20Renew/130402%203BM-REP0409%20Rev%20Geo%20Inv%20Rpt-Lagoon%20Upgrades%20Repulse%20Bay%20NU-ILAE.pdf)

Nunavut Water Board Licence No. 3BM-REP1520. Hamlet of Repulse Bay (Naujaat).

Signed by Thomas Kabloona, Nunavut Water Board Chair, Nunavut Water Board. April 8, 2015.