Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
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Your file - Votre référence
3AM-ARV1016

Our file - Notre référence
GCDocs # 99683171

May 3, 2022.

Mr. Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
sent via e-mail: licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada's technical review of Hamlet of Arviat Type A Water Licence renewal application for municipal undertakings – Type A Water Licence No. 3AM-ARV1016

Dear Mr. Dwyer,

Thank you for your May 2, 2022 invitation for comments prior to public hearing on the above referenced application. The Water Resources Division of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the application and the results of our review are provided in the enclosed memorandum for the Nunavut Water Board's consideration.

Comments have been provided pursuant to CIRNAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*.

If there are any questions or concerns, please contact me at (867) 975-4738 or by e-mail at Vincent.okonkwo@rcaanc-cirnac.gc.ca or Andrew Keim at (867) 975-4550 or Andrew.keim@rcaanc-cirnac.gc.ca.

Sincerely,

Vincent Okonkwo

Senior Environmental Assessment Specialist

Technical Review Memorandum

Date: May 3 , 2022

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

From: Vincent Okonkwo, Senior Environmental Assessment Specialist, CIRNAC

Subject: Crown-Indigenous Relations and Northern Affairs Canada's technical review of Hamlet of Arviat Type A Water Licence renewal application for municipal undertakings – Type A Water Licence No. 3AM-ARV1016

Region: ☐ Kitikmeot ☒ Kivalliq ☐ Qikiqtani

A. Background

Hamlet of Arviat is located in the Kivalliq region of Nunavut with a population of 2,772 (2016 census, Government of Nunavut).

On September 17, 2020, the Nunavut Water Board provided notification of the Government of Nunavut Community and Government Services' (GN-CGS) submission on behalf of the Hamlet of Arviat to renew their Type A water licence 3AM-ARV1016 for the use of water and deposit of waste for municipal undertakings on a 10-year term valid till 2031.

The Hamlet's water source is Wolf Creek, located 8 km southwest of the Hamlet, from which water is drawn to fill three reservoirs with a total capacity of 235,393 m^3. The water treatment plant and truck fill station next to the reservoirs was recently upgraded and commissioned in November 2019. The community's sewage is trucked to, and treated in a single cell sewage lagoon located approximately 2 km south of the community.

The capacity of the lagoon is approximately 37 960 m3 and emergency spring decants (to prevent over topping and ensure the security and stability of the lagoon walls, have been necessary for the last four year. The domestic solid waste facility is co-located with the sewage lagoon. The Hamlet also operates both a bulky metals facility and a hazardous waste facility.

The renewal application requests authorization to increase the annual withdrawal limit allowable in the current licence from 86,000 m^3 to 235,393 m^3 of water from Wolf Creek and continued use of the current infrastructure.

On November 19, 2021, GN-CGS requested on behalf of the Hamlet of Arviat an update to their water licence renewal application to include:

- An upgrade and expansion of the existing wastewater treatment facility; and
- Amendment of the effluent limit at the final effluent discharge point ARV – 4 of the wetland treatment area.

Consequent to the change in scope, the water licence renewal process was paused in April 2021, for the Nunavut Impact Review Board (NIRB) to screen the project and determine if further review is required. The screening was completed in August 17, 2021.

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	Over Capacity of the Solid Waste Management Facility
R-02	Lagoon Effluent Discharge Rate
R-03	Effluent Parameters Change Request
R-04	Lagoon Seepage Control
R-05	Monitoring Program Stations ARV-3, ARV-10 and ARV-11
R-06	Sludge Management Plan

B. DOCUMENTS REVIEWED

The following table (Table 2) provides a summary of the documents reviewed under the submission.

Table 2: Documents Reviewed

Document Title	Author, File No., Rev., Date
200914 2019 Annual Report	Hamlet of Arviat, 2019
210507 2020 Annual Report	Hamlet of Arviat, May 17, 2020
211119 NPC Letter File # 149528 Municipal Water Licence Amendment	Solomon Amuno, Senior Planner, Nunavut Planning Commission, April 16, 2021
211119 Plan for Compliance 2021	Hamlet of Arviat, June 30, 2021
210817 Cover Letter Screening Decision Report	Kaviq Kaluraq, Chairperson Nunavut Impact Review Board, August, 17 2021

Document Title	Author, File No., Rev., Date
211119 Cover Letter Water Licence Amendment	Elan Chalmers, Municipal Planning Officer, Government of Nunavut Community and Government Services, November 19, 2021
200916 Arviat Executive Summary English	Department Community and Government Services, Government of Nunavut, 2020
200901 Application for Water Licence Amendment	Nunavut Water Board, September 14, 2020
210329 Water Treatment Plant As-Built-Part 1	Hamlet of Arviat, January 21, 2021
210329 Water Treatment Plant As-Built – Part 2	Hamlet of Arviat, May 12, 2020
211119 Reservoir As Built	Hamlet of Arviat, May 12, 2020
200914 Arviat DWG Issued for Tender	Hamlet of Arviat, May 26, 2017
211119 Business Case for Arviat Wastewater	Nunami Stantec Ltd, April 23, 2021
210329 Hamlet of Arviat Environmental Emergency Contingency Plan	Hamlet of Arviat, January 2021
210329 Hamlet of Arviat Environmental Monitoring Program and QAQC Plan	Hamlet of Arviat, January 2021
210329 Sewage Treatment Facility O&M Plan	Hamlet of Arviat, March 2021
211119 Solid Waste Management Facility Operation and Maintenance Plan	Hamlet of Arviat, October 2021
210329 Operation & Maintenance Manual Arviat Water Treatment Plant	Hamlet of Arviat, January 26, 2021
211119 Effluent Parameters	Hamlet of Arviat, November 18, 2021
201027 Final Report Treatment Performance of Municipal Wastewater Stabilization Ponds in Nunavut	Center of Water Resources Studies Dalhousie University, September 18, 2015
201027 Review of Wastewater Research in Nunavut	Justine Lywood Plus Arctic Consulting, June 20, 2019
201027 Recommendations for the Development of Nunavut Municipal Wastewater Management Standards	Exp Services Inc, October 2017
200914 Wolf Creek 2019 Hydrologic Assessment	Palmer, March 4, 2020
190319 CIRNAC Inspection Report	Steve England CIRNAC, June 27, 2018
150715 AANDC Compliance Review Comments	Steve England CIRNAC, July 15, 2015
101231 Solid Waste Management Report	Nuna Burnside Engineering and Environmental Ltd, December 2010
101231 Sewage Disposal Facility Report	Nuna Burnside Engineering and Environmental Ltd, December 2010

C. RESULTS OF REVIEW

CIRNAC provides the following comments and recommendations for the Board's consideration:

1. Over Capacity of the Solid Waste Management Facility

Comment:
In section 5 of the solid waste management facility operation and maintenance plan, the licensee stated that:

"The site has exceeded its useful lifespan and has been considered over capacity for several years. Furthermore, leachate is not captured and may be impacting the surrounding environment. The Hamlet has done considerable work on the organization of the site since the time that this licence was last renewed, but a new solid waste site will be required to address the capacity and environmental concerns. The new solid waste management facility is currently in the schematic design phase, with expected construction in 2024".

On November 22, 2021, licensee sent a response letter to the NWB that a feasibility study was conducted on the solid waste facility and determined that the project cannot proceed as originally intended due to lack of adequate funding.

CIRNAC notes that overcapacity and leachate at the site has been a concern for several years. The licensee should have paid priority attention and fix the capacity issue considering the negative impact to the environment.

Recommendation:
(R-01) CIRNAC recommends that the licensee provide detailed steps taken to address the overcapacity issue at the solid waste management facility (SWMF) while waiting for the construction of a new facility.

2. Lagoon Effluent Discharge Rate

Comment:
The licensee stated that the controlled manual seasonal effluent pump out will be adopted to discharge effluent to the wetland treatment area, rather than the exfiltration berm currently in place.

CIRNAC note that the rate of discharge and the frequency of the effluent discharge will affect the concentration of the effluent parameters in the receiving environment.

Recommendation:

(R-02) CIRNAC recommends that Licensee clarify:

- The retention time of the effluent in the lagoon to achieve treatment goals before manual discharge by pumping.
- The pumping rate from the lagoon discharge point to the wetland treatment area.

3. Effluent Parameters change Request

Comment:

In section 9, Table 3 of the Sewage Treatment Facility Operation and maintenance Plan, the requested change to effluent parameter had Biochemical Oxygen Demand (BOD_5) limit as 120 mg/L and Total Suspended Solid (TSS) as 100 mg/L.

In paragraph 3 of the November 18, 2021, change in effluent parameters rationale document, licensee stated that:

"The effluent will no longer be able to rely on dilution and quick passage through the wetland to meet its treatment objectives. As such, the Licensee is requesting that the effluent parameter limits be changed to cBOD/TSS of 100/120 mg/L in the upcoming licence amendment".

CIRNAC note that the two parameters, BOD and TSS was interchanged in the two documents. This creates confusion to the reviewers and required clarifications from the licensee.

Recommendation:

(R-03) CIRNAC recommends that the licensee clarify the change in parameters being requested in the two documents and update the documents accordingly.

4. Lagoon Seepage Control

Comment:

The licensee proposed to use an impermeable synthetic liner as a seepage control mechanism in the lagoon to replace the exfiltration berm currently in use.

In section 6.1.3.5, of the business case for Arviat waste water, the licensee stated that:

"*Climate is the principal factor controlling the formation and persistence of permafrost. As the climate warms, shallow permafrost is also expected to warm (CSA PLUS 4011:19). Permafrost warming can lead to a deepening of the active layer and thawing of permafrost ground ice. The loss of volume caused by the melting of ground ice generates settlements and subsidence. It is well recognized that permafrost degradation can adversely affect buildings with shallow foundations (e.g., settlements and cracking) and/or provoke localized settlements and subsidence".*

CIRNAC note that localized thawing of the permafrost shallow region during warm climate could lead to the stretching of the impermeable liner thereby compromising its integrity to control the seepage as intended. It will be helpful if the licensee provide detail plans on how they intend to prevent effluent from seeping pass the liner in the event of localized thawing of the permafrost shallow region, this could lead to the ground water contamination if not checked.

Recommendation:
(R-04) CIRNAC recommends that licensee provide detail plan on how they intend to prevent seepage of the effluent into ground water in the event of localized thawing of the permafrost.

5. Monitoring Program Stations ARV-3, ARV-10 and ARV-11

Comment:
In section 2.0, Table 1 of the Arviat Environmental Monitoring and QAQC Plan 2021, ARV-3 monitoring station is currently at **"Not Active"** status while stations ARV-10 and ARV-11 reads **"Not Active please delete from licence".**

Monitoring station ARV-3 was designed to monitor raw sewage effluent concentration at the truck offload point and monitoring stations ARV-10 and ARV-11 was intended to monitor effluent from the final discharge point of the hydrocarbon impacted soil storage and treatment facility and effluent discharge from dewatering contaminated soil areas respectively.

CIRNAC note that no rationale was provided by the licensee as reason the stations were not active and required to be taken out from the water licence.

Recommendation:
(R-05) CIRNAC recommends that the licensee provide rationale:

- On the "Not Active" status of the stations; and
- For the "please delete from licence" request for ARV-10 and ARV-11 monitoring stations.

6. Sludge Management Plan

Comment:
Part D, Item 5(e) of the Type A Water Licence states that:

"A Sludge Management Plan that addresses sludge assessment and disposal methods. The Plan shall be incorporated in to the Sewage Disposal Facility Operations and Maintenance Manual referred to in Part F Item 1b".

Section 6, of the Arviat Sewage Treatment Facility Operation and Maintenance Plan contained the sludge management as stipulated by the water licence but the licensee did not provide detailed plan on how and where the sludge could be disposed.

Recommendation:

(R-06) CIRNAC recommends that the licensee update section 6 of the sewage treatment facility operation and maintenance plan to include sludge method of disposal as required by the water licence.

D. REFERENCES

Department of Crown-Indigenous Relations and Northern Affairs Act. (2019).

Nunavut Waters and Nunavut Surface Rights Tribunal Act. (2019).

Nunavut Water Board, August 23, 2010:Type A Water Licence No: 3AM-ARV1016, P 9, 15, 16, 17.