



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
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Your file - Votre référence
3BM-IGL1520 / 3AM-IGL----
Our file - Notre référence
CIDM#1285605

June 12, 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 Technical Review
Comments on Municipality of Igloolik Application for dual Renewal and
Amendment of Type B Water Licence No. 3BM-IGL1520 to Type A Water
Licence 3AM-IGL----**

Dear Mr. Dwyer,

Thank you for your May 15, 2020 invitation to conduct a technical review of the referenced application and supplemental information, submitted by the Government of Nunavut Community Government Services on behalf of the Municipality of Igloolik, for dual renewal and amendment of Type B Water Licence No. 3BM-IGL1520 to Type A Water Licence 3AM-IGL----.

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*. Comments have been provided 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: June 20, 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 Technical Review Comments on Municipality of Igloolik Application for dual Renewal and Amendment of Type B Water Licence No. 3BM-IGL1520 to Type A Water Licence 3AM-IGL----

Region: ☐ Kitikmeot ☐ Kivalliq ☒ Qikiqtani

A. BACKGROUND

The Municipality of Igloolik, located in the Qikiqtani Region of Nunavut, currently holds a Type B Water Licence, No. 3BM-IGL1520, set to expire March 30, 2020. This licence allows for Municipal Undertakings and covers activities regarding potable water withdrawals from the primary water source of South Lake, for over-winter storage of potable water in the reservoir, for the operation of truck fill stations, for wastewater collection and treatment, and for the operation of waste management sites. On February 16, 2016 the Nunavut Water Board (NWB) approved Amendment No. 1 to licence No. 3BM-IGL1520 for the expansion and rehabilitation of the Sewage Lagoon Facility.

On September 1, 2017 the NWB approved Amendment No. 2 to licence No. 3BM-IGL1520 for the expansion of an existing potable water supply reservoir from 79,000m³ to 102,800 m³. The actual volume of the reservoir upon completion, according to the 2019 Annual Report (Annual Report, 2019), is 126, 440m³. Amendment No. 2 also included the replacement of an intake line that transmits water from the hamlet's primary water source, South Lake, to the Hamlet's water supply reservoir, the construction of a new truck-fill station, and the inclusion of Fish Lake as an alternative water source to the scope of the Existing Licence. The Cover Letter attached to Amendment No. 2 to Water Licence 3BM-IGL1520 (Letter to Shawn Stuckey and Bhabesh Roy, 2016) explains on page 3 the reason for adding Fish Lake as an alternate water source and for increasing the storage capacity of the reservoir:

Details included in the Application to amend the Existing Licence indicate that in 2015 the Hamlet experienced a shortage in the reservoir's over-winter water storage due to anoxic conditions at the South Lake water source. To protect the public's safety, the Government of Nunavut – Department of Health (GN-DOH) advised that use of the South Lake water source should be temporarily discontinued. The Hamlet accepted the GN-DOH advise, and it decided to use Fish Lake as its water supply source until the integrity of the South Lake source was restored.



The Hamlet indicated in its Application that to minimize the possibility of similar shortages in the future, it is proposing, as stated above, to expand the reservoir's annual over-winter storage capacity from 79,000 m³ to 102,800 m³ as well as upgrade some of the other structures/equipment associated with the Water Supply Facilities.

On January 31, 2020, on behalf of the Hamlet of Igloolik, the Government of Nunavut Community and Government Services (GN-CGS) applied to the Nunavut Water Board (NWB) to renew the Type B licence for a 5 year term. GN-CGS provided supplemental information on February 25, February 26, and March 2, 2020, to also amend the Type B licence to a Type A licence, 3AM-IGL----, and to extend the term to 10 years. As outlined in Schedule 2 of the *Nunavut Waters Regulations*, a Type "A" water licence is required for the storage of more than 60,000 cubic metres of water and/or the used of at least 300 cubic metres of water per day. According to the Cover Letter attached to Amendment No. 2 to Water Licence 3BM-IGL1520 (Letter to Shawn Stuckey and Bhabesh Roy, 2016):

It should be noted that the Board did not apply [the Type "A"] requirement at the time the Existing Licence was issued due to a number of factors including the nature of the storage facility involved (the Regulations are based on storage utilizing dams or dikes – Column 2, Item 3 of Schedule 2) and the fact that the Hamlet's direct water usage from the source or its reservoir did not exceed the threshold outlined in Schedule 2 of the Regulations. The Licensee is advised, however, that if there is any proposed increase in direct source water use related to the Existing Licence in future, the associated renewal or amendment application for this potential increase in use may potentially be treated as a Type "A" application and processed in accordance with the relevant thresholds established in the Regulations.

CIRNAC provided comments, information requests, and recommendations pertaining to both the renewal and the amendment to Water Licence 3BM-IGL1520 on March 24, 2020. These can be found in Table 1.

Table 1: Summary of Information Requests (IR-) and Preliminary Recommendations (R-)

IR or R	Subject
R-01	As-Built Drawings
R-02, R-03	Scope of Licence to Include Roads Management and Watercourse Crossings
IR-01	Inclusion of Items from Licence Amendments in Compliance Plan
IR-02	Operation and Maintenance Manual for the Water Supply System
IR-03, IR-04	As-Built Drawings
IR-05	Consolidation and Storage of Hazardous Waste
IR-06	Data from the Monitoring Program



The GN-CGS, on behalf of the Hamlet of Igloolik, responded to information requests on April 17, 2020 indicating that most of the information requested will not be made available until travel restrictions are lifted in Nunavut. CIRNAC recommended that the documents be made available at the technical review stage for review of the information prior to the Public Hearing.

CIRNAC provides the following technical review comments based on the information that has been provided. A summary of the subjects of recommendations can be found in Table 2. Detailed technical review comments can be found in Section C. A general comment regarding the review process can be found in Section D.

Table 2: Summary of Recommendations

Recommendation	Subject
R-01, R-02	1. Hazardous Waste Leachates
R-03	2. Operational Procedures in the Operation and Maintenance Manual Volume I
R-04, R-05, R-06	3. Upgrades and Updates of Operation and Maintenance Manual Volume I
R-07	4. Filter Strip Wetland Rehabilitation
R-08	5. Health and Safety
R-09	6. Spill Contingency Plan
R-10, R-11	7. Geothermal Monitoring
R-12	8. Water Flow Meters
R-13	9. Types of Waste Approved in Licence
R-14	10. Information Requests Not Yet Provided

**B. DOCUMENTS REVIEWED**

The following table (Table 3) provides a summary of the documents reviewed under the Application Package for Renewal of 3BM-IGL1520 and the Supplemental Information Package for Amendment of 3AM-IGL----. Documents referenced in the text which were not supplied by the proponent as part of the application can be found under Works Cited in Section E.

Table 3: Documents Reviewed

Appendix	Document Title	Author, File No., Rev., Date
Application Package for Renewal of 3BM-IGL1520, Submitted on 01/31/2020		
Appendix A	NPC letter, RE: 149222	Nunavut Planning Commission, 2019-12-20
Appendix B	Certificate of Analysis – Municipality of Igloolik 2019	Community Government Services, 2020-01
Appendix C	Cover Letter	Bhabesh Roy, M.A.Sc., P.Eng for Community and Government Services, 2020-01-31
Appendix D	Cover Letter (Signed)	Bhabesh Roy, M.A.Sc., P.Eng for Community and Government Services, 2020-01-31
Appendix E	Hamlet of Igloolik 2019 Annual Report	Community Government Services, 2020-01
Appendix F	Igloolik Water Licence Plan of Compliance	Community Government Services, 2020-01-31
Appendix G	Type “B” Renewal Water Licence Application	Gregory Morash, Hamlet of Igloolik, 2020-01-31
Supplemental Information for Amendment of 3AM-IGL----, Submitted on 25/02/2020		
Appendix H	Type “A” Water Licence Application	Gregory Morash, Hamlet of Igloolik, 2020-02-25
Appendix I	NPC letter, RE: 149222	Nunavut Planning Commission, 2019-12-20
Supplemental Information for Amendment of 3AM-IGL----, Submitted on 03/02/2020		
Appendix J	Operation & Maintenance (O&M) Manual for the Sewage Lagoon (Volumes I & II)	Exp. Services for the Government of Nunavut, Revised 2020-02
Appendix K	Drawings and plans for sewage lagoon, water reservoir and intake pipe line	Exp. Services for the Government of Nunavut , Revision 6, 2015-11-12
Correspondence from GN-CGS, Submitted on 17/04/2020		
Appendix F	Igloolik Water Licence Plan of Compliance - Revised	Community Government Services, 2020-04-15
	GN-CGS Response to Comments	Community Government Services, 2020-04-17



C. TECHNICAL REVIEW COMMENTS

1. Hazardous Waste Leachates

Comment

The Igloolik Water Licence Plan of Compliance, revised April 15, 2020, indicates that the condition under Part F Item 1 has been met, which requires the Hamlet to submit the following:

- a) Sewage Disposal Facility Operation and Maintenance (O&M) Plan (including the Sewage Sludge Management Plan;
- b) Solid Waste Disposal Facility Operation and Maintenance (O&M) Plan; and
- c) Spill Contingency Plan.

The Operation and Maintenance manuals, Volumes I and II, submitted in the application are intended for use at the Wastewater Treatment Facility (Sewage Lagoon). The Spill Contingency Plan (SPC) attached to the O&M manual Volume I has also been written specifically for the Sewage Lagoon. An O&M manual and SCP have not been submitted for the Solid Waste Disposal Facility. Leachate created at the current solid waste facility is currently considered an unauthorized discharge and is a concern to CIRNAC. It is unclear whether there is a plan in place to address this concern.

Windblown garbage and possible migration of hazardous waste leachate has the potential to impact a small lake downgrade from the location of the burn and cap, and the non-engineered hazardous waste facility. It is understood that the Government of Nunavut Community Government Services (GN-CGS) is planning to build an engineered waste management facility, and that the feasibility study will soon be shared with CIRNAC for review. This facility is intended to improve conditions by properly sorting and storing wastes, and preventing the waste from being transported via wind or surface water flow.

While planning and construction of the engineering facility are under way, the hazardous waste still poses a risk to a nearby water body. Leachate from the landfill is considered an unauthorized discharge which warrants follow-up action. The Annual Report (page 2) states that the proponent is “waiting for a new facility to remediate this issue”. CIRNAC seeks clarity regarding the methods by which GN-CGS intends to prevent leachate seepage and windblown garbage from migrating into water bodies until the new facility is operational, as required by PART D, Item 12 of the licence.

Recommendation

(R-01) CIRNAC recommends that GN-CGS follow the conditions of the current licence by submitting an O&M manual and SCP for the Solid Waste Disposal Facility when the facility



has been constructed. In the meantime, CIRNAC recommends that GN-CGS provide details pertaining to its strategy to prevent leachate seepage and windblown garbage from migrating into water bodies, including earthworks or infrastructure planned, if applicable.

(R-02) CIRNAC recommends that an O&M manual be submitted for the Truck Fill Station and Potable Water Reservoir, once construction has been completed.

2. Operational Procedures in the Operation and Maintenance Manual Volume I

Comment

Section 2.3 of the Operation and Maintenance (O&M) Manual Volume I “...details the proposed operations of the sewage treatment system for the Hamlet” (page 7) and outlines which tasks are to be carried out on a daily, weekly, and monthly basis. The O&M manual however does not provide step by step procedures detailing how each task should be accomplished.

Recommendation

(R-03) CIRNAC recommends that the operational procedures, including sampling procedures, be clearly outlined step by step in the O&M Manual Volume 1 for the Wastewater Treatment System (Sewage Lagoons), and/or a page reference should direct the reader to where in the document these steps may be found. These procedures should be written in the present tense for infrastructure which is currently in place, and include:

- a) information pertaining to who is responsible to carry out specific tasks;
- b) the order and frequency in which tasks should be performed; and
- c) any special instructions related to the tasks.

3. Upgrades and Updates of Operation and Maintenance Manual Volume I

Comment

It is not clear from the O&M Manual Volume 1 what the current state, or stage of construction is for the Wastewater Treatment Facility sewage lagoons. The diagrams, maps and aerial photos are inconsistent. Section 1.1 is titled ‘Preceding Lagoon’ and refers to both the current and previous lagoon. The O&M manual identifies Airstrip Lake as a water source, which is not in alignment with the licence conditions. These details should be updated to clearly reflect the facility in its current state. Whenever upgrades are completed, the O&M manual should be updated to reflect all new changes.



Further, Section 1.4 (page 3) states that “all effects due to construction can be mitigated by applying suitable mitigation measures,” however there are no clear details of the referenced intended mitigation measures.

Recommendation

(R-04) CIRNAC recommends that GN-CGS revise the O&M manual Volume I to reflect the current state of the Wastewater Treatment Facility and its current operations, including details pertaining to operational procedures, any mitigation measures required or planned for implementation during construction activities, and the dates of major changes or upgrades.

(R-05) CIRNAC recommends that GN-CGS update the O&M manual with maps and site photos to clearly portray:

- a) the current infrastructure in place on site;
- b) the location(s) where site samples are to be collected and the pathway the operator should take to access those sites;
- c) where snow tends to accumulate and location for snow storage after removal; and
- d) location of safety equipment and spill kits on site.

(R-06) CIRNAC recommends that the GN-CGS submit Construction Summary Reports for the new infrastructure.

4. Filter Strip Wetland Rehabilitation

Comment

The Operation and Maintenance (O&M) manual Volume I (page 1) reports that:

The Geotechnical Report prepared as part of this project concluded that the slopes of the berms of the existing lagoon do not meet the factor of safety for static conditions nor under seismic loading. The report therefore considered the slopes inherently unstable and recommended that they should be rehabilitated.

It is not clear from this statement whether the slopes have been rehabilitated, and how this was, or will be, accomplished. Slopes which do not meet the factor of safety can reduce the effectiveness of the treatment of sewage, accelerate degradation of the wetland, and may increase risks to human health.

Recommendation

(R-07) CIRNAC recommends that GN-CGS clarify whether the filter strip wetland slopes at the wastewater treatment lagoons have been rehabilitated, the timeline for implementation, and the how this was, or will be, accomplished.



5. Health and Safety

Comment:

Untreated and treated sewage can pose risks to human health and safety. Section 2.5 of the Operation and Maintenance Manual Volume I refers to Health and Safety measures to be undertaken at the Wastewater Treatment Facility. This list contains numerous conditions which contain the word “should” and imply conditionality to these measures. CIRNAC recommends that any measures required to be undertaken by the employer, such as providing change rooms and washing facilities on site for staff (or an equivalent alternative measure) be completed and clearly indicated in the O&M manual, and employee responsibilities are clearly stated.

Recommendation:

(R-08) CIRNAC recommends that Health and Safety measures for employers and employees be undertaken and clearly outlined in the O&M manual.

6. Spill Contingency Plan

Comment:

The Spill Contingency Plan (SCP), Appendix C of the Operation and Maintenance Manual Volume I, references the requirements for Spill Contingency Plans according to the Environmental Protection Act (Environmental Protection Act, 1998). This plan includes many but not all of the outlined requirements. CIRNAC is of the opinion that the inclusion of the details outlined in Recommendation (R-) will make the SCP more robust and effective in the event of a spill.

Recommendation:

(R-09) CIRNAC recommends that GN-CGS update the SCP by undertaking the following actions:

- a) Clarify the size and storage capacity of each lagoon;
- b) Clarify the location(s) where spill kits are stored and include in site photo;
- c) Replace Figure 1 with a current site photo; and,
- d) Clarify the disposal method for spilled materials which have been temporarily contained, such as contaminated snow that has been contained in a tarp.



7. Geothermal Monitoring

Comment:

The Operation and Maintenance Manual Volume I states in Section 3.2 (page 11):

Berm monitoring will be vital during the early operational years to ensure the proper freeze-back of permafrost into the base soils and berm core. Temperature records from the berms will also timeline the permafrost levels on a yearly basis summarizing the characteristics of the active layer at the lagoon.

Procedures and records of data from berm monitoring, are provided in the O&M manual. Further, Appendix D of the O&M Manual Volume I contains a draft Geothermal Modeling Report, titled *Geothermal Analysis of Proposed Sewage Lagoon*, written by Naviq Consulting Inc. in May, 2010 as part of an analysis for building requirements for the (then proposed) sewage lagoons. It is not clear from the O&M manual whether berm monitoring has been or will be conducted, whether the geothermal model presented in the Geothermal Modeling Report has been updated with current site data to confirm predictions, or whether the recommendations set out in Section 6.0 have been fully implemented.

Recommendation:

(R-10) CIRNAC recommends that GN-CGS undertake berm monitoring, for temperature and settlement, over the first 3 years of operation of each lagoon, as suggested in the O&M manual, and that the data collected be submitted to the NWB.

(R-11) CIRNAC recommends that GN-CGS clarify how the recommendations presented by Naviq Consulting Inc. in the *Geothermal Analysis of Proposed Sewage Lagoon* (2010) have been implemented in the sewage lagoons, as part of the upgraded Wastewater Treatment Facility.

8. Water Flow Meters

Comment:

The proponent notes in the Operation and Maintenance (O&M) Manual Volume I (page 9) that “Wastewater volumes will be approximated by the monthly municipal water volumes. Sewage trucks are not equipped with flow meters and therefore the last form of reliable consumption measurement is made at the water treatment plant”. Further, the Annual Report (page 1) states that “The water consumption volume is considered equal to the discharge volume because there is no meter at the end of the discharge pipe” and further



states on page 2 that the “Hamlet is still waiting to install a flow meter and a Fish screen with the intake pipe which is used to extract water from the South Lake in every summer”.

CIRNAC considers it valuable for the proponent to have multiple flow meters along the water pathway to validate that flow measurements are accurate, to track water losses along the pathway to identify leaks, and to have a backup tool for measurements in the case that one breaks or fails. GN-CGS has identified the need to install more flow meters and CIRNAC supports the initiative.

Recommendation:

(R-12) CIRNAC recommends that flow meters are installed as soon as possible on the water intake at South Lake, and the wastewater train.

9. Types of Waste Approved in Licence

Comment:

The Application form submitted by the proponent indicates under Box 14: WASTE that sewage is the only type of waste applicable to this licence. As the proponent is intending to build a new, engineered waste management facility, CIRNAC recommends that all applicable types of waste to be treated and stored at the waste management facility be included in the water licence. Sewage, solids wastes, and hazardous wastes are identified in the current licence as having conditions pertaining to them.

Recommendation:

(R-13) CIRNAC recommends that the licence specifically outline, and include conditions for, all types of waste expected to be treated and stored at the proposed engineered waste management facility.

10. Information Requests Not Provided

Comment:

Information requested by CIRNAC as part of the Information Request stage of the application remains outstanding due to Covid-19 travel restrictions in Nunavut.

Recommendation:

(R-14) CIRNAC recommends that the information requested by CIRNAC, and time for review, be provided prior to conducting a Public Hearing.



D. GENERAL COMMENT

Despite measures and restrictions in place to reduce COVID-19 transmission, the proponent has been able to provide many of the documents requested for the technical review. We would like to thank them for their efforts and acknowledge the increased pressures and challenges brought on by these difficult times. CIRNAC is open to delaying further steps in this application process should it be requested by the proponent or by other parties.

E. REFERENCES

Works Cited

Community Government Services. (2019). *Annual Report*. Hamlet of Igloolik.

Environmental Protection Act. (1998). *Section 34*. Retrieved from Spill Coningency Planning and Reporting Regulations R-068-93: <https://www.justice.gov.nt.ca/en/files/legislation/environmental-protection/environmental-protection.r2.pdf>

Kabloona, T. (2016, September 1). Letter to Shawn Stuckey and Bhabesh Roy. *RE: Licence No. 3BM-IGL1520, Type "B" – Amendment No. 2*. Nunavut Water Board.