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Department of Community and Government Services Nunalingni Kavamatkunnilu Pivikhaqautikkut Ministère des Services Communautaires et gouvernementaux

August 11, 2021

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
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licensing@nwb-oen.ca

Re: CGS Response to Comments Received on Amendment Application for Water License 3BM-TAL1926 Hamlet of Taloyoak

Dear Richard,

The Municipality of Taloyoak is pleased to submit a response to comments received from Crown-Indigenous Relations and Northern Affairs Canada (dated July 23, 2021) regarding an application to amend municipal water license 3BM-TAL1926.

It should be noted that comments were also received from Environment and Climate Change Canada (ECCC) (dated July 23, 2021) that did not require a response from the proponent.

1. Monitoring stations in the management plans

Comment:

In the Sewage Lagoon facility Hamlet of Taloyoak-Operation and Maintenance Manual and Solid Waste Facility Operation and Maintenance Mannual, as well as the QA/QC Plan Sewage Lagoon Facility, the following stations are not aligned with the NWB water licence 3BM-TAL1926 Part I item #2.

Recommendation:

(R-01) CIRNAC recommends that the Hamlet of Taloyoak add station "Tal-6 Effluent Final Discharge Point from Wetland area to ocean" in their Sewage Lagoon facility Hamlet of Taloyoak- Operation and Maintenance Plan, Solid Waste Facility Operation and Maintenance Manual, as well as the QA/QC Plan Sewage Lagoon Facility. Additionally, they should update all monitoring stations in the table to reflect the current water licence.

Response:

The Government of Nunavut Department of Community and Government Services CGS will update the Sewage Disposal Facility OM Plan, Solid Waste Management OM Plan, and QA/QC Plan on behalf of the



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Municipality of Taloyoak to include TAL-6 and reflect the current water license. The documents will be submitted to Nunavut Water Board (NWB) with the 2021 Annual report.

2. Reclamation of old water intake pump house and utilidor

Comment:

Below is the concern from the water resource inspector as described in the Water Licence Inspection form dated August 13, 2020, Section 3 Item # 8:

The Inspector has brought up the requirement for the Licence Holder to work with the GN CGS to Remove and Reclaim the old Water Intake Pump House and Utilidor System in numerous previous Inspection Reports. The claim of a lack of funding to carry out the required Reclamation is neither adequate nor acceptable. The Licence Holder MUST find appropriate funding and complete Reclamation of the old Water Intake Pump House and Utilidor System PRIOR TO July 31, 2021, or the Inspector may have to consider further Enforcement Action.

Recommendation:

(R-02) CIRNAC recommends Community and Governments Services submit an Abandonment and Restoration Plan and reclaim the old Water Intake Pump house and Utilidor System.

Response:

The GN-CGS will work with the municipality to obtain funding to prepare the Abandonment and Restoration Plan as required by the water license. Licensed engineering and architectural services are required to determine what materials are present in the old facilities, the best approach and associated cost estimate for decommissioning, and to prepare the report. This must be completed prior to any decommissioning action. The plan will be submitted to NWB upon completion.

3. Discharge criteria in effluent

Comment:

Below are comments made by the proponent from the executive summary of their application:

- The proponent would like to have toxicity testing to removed entirely from the NWB licence.
- The proponent is requesting effluent quality limits to be removed from TAL-3.
- The proponent would like to only have criteria at TAL-6 and recommends using
 - cBOD = 100 mg/L
 - TSS = 120 mg/L



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CIRNAC has reviewed water quality from 2016-2020 annual reports. At TAL-3, the TSS and BOD discharge limits are respected, except 1 sample where TSS is 1 mg/L over the limit. The pH level was above the discharge limit for 3 of 5 samples, and it is known that algal blooms in lagoons can be the source of high pH. The annual report data shows that the wetland reduces the TSS, BOD and pH at TAL-6.

It is not clear why the proponent is requesting to remove discharge limits from TAL-3, since currently they mostly meet the requirements. The proponent has not provided any supporting information why in Taloyoak the proposed limits for TAL-6 would be protective of the environment.

Recommendation:

CIRNAC recommends before removing any requirements from the water licence, that Community and Government Services demonstrate to the NWB with site specific information how the proposed TSS and BOD criteria are an acceptable standard for TAL-3.

Response:

The proponent notes that CIRNAC has not objected to the proposal to remove the acute toxicity testing requirement from this water license.

TAL-3 is located at the discharge point of the existing natural lagoon, upstream of the wetland. CIRNAC states that because samples have met the TAL-3 effluent quality limits under the existing condition, there is unclear evidence as to why the proponent wants to remove these parameters for the upgraded wastewater treatment infrastructure which will include an upstream impermeable lagoon.

This rationale does not take the functional reality of the existing natural permeable lagoon versus the proposed engineered lagoon into account. Presently, the natural lagoon is undersized. This means that wastewater deposited during the winter months becomes frozen on the lagoon or partway down the frozen wetland. During the spring freshet, much of this wastewater ice-block partially thaws and slides onto the frozen marine water body prior to any sampling. As such, the summer sampling regime does not represent a portion of the annual deposition of wastewater. This may be one reason for the low values of TSS and BOD at the sampling locations. Another possible reason is that the existing natural lagoon is subject to dilution from snowmelt and runoff conveyed from the upstream catchment area. As such, samples collected at this location may not be indicative of the actual treatment that occurs in the natural lagoon – they may be skewed due to dilution.

The proposed engineered lagoon will be sized to hold 12 months of wastewater and will be discharged during dry periods to avoid dilution in the natural lagoon and wetland and benefit from the vegetation which contributes to biodegradation of organics. Compared to the existing condition, the proposed lagoon will likely result in samples that have higher values for effluent parameters despite the more effective treatment processes that occur (i.e.,a longer storage and treatment period in the lagoon, along with longer residence time within the wetland). This will be the result of a sampling program that



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reflects the reality of the proposed wastewater treatment process; it is asserted that the existing sampling routine does not accurately reflect treatment processes that occur in the natural lagoon and wetland system.

The proponent is requesting the removal of effluent quality limits at TAL-3 because – since the proposed upgraded wastewater treatment infrastructure will consist of an engineered lagoon, the existing natural lagoon, and the wetland treatment area – enforcing effluent quality limits upstream of the wetland treatment area does not take the full wastewater treatment process into account. TAL-6 should be considered the 'compliance point' as it is located downstream of the unabridged wastewater treatment facility prior to deposition into marine waters. This proposed change is consistent with how most passive wastewater treatment facilities (i.e. lagoon and wetland systems) are regulated in Nunavut.

Engineering consultants who have worked on lagoon wetland systems in Nunavut have repeatedly stated that compliance cannot be reliably met at a point early in the treatment process rather than at the end. Furthermore, while there would be discharge control at the lagoon outlet location in the future condition, it would not be practical or possible to delay decanting if effluent parameters at this location were not met, the lagoon will need to be decanted to allow space for the next winter. This is especially impractical considering consultants and researchers have indicated that significant treatment occurs within the wetland, and exceedances at the lagoon outlet may not be indicative of exceedances at the end of the wetland, particularly before we have true data from the new proposed hydrologic regime.

It should be noted that the proponent has no objection to continued sampling at TAL-3 because this is a valuable indicator as to how the wastewater treatment facility is functioning. It is proposed that the results of these samples continue to be included in annual reports to the NWB, but that the effluent quality limits be removed.

TAL-6 is located downstream of the unabridged wastewater treatment facility at the discharge point to the marine environment. CIRNAC has stated that it is unclear how the proposed parameters would be protective of the environment.

The proponent would like to highlight information provided within the amendment application from the following two documents:

- Memo for Taloyoak Water License Amendment, Exp, April 12, 2021
- Recommendations for Municipal Wastewater Standards, Exp, November 2018

The April 2021 memo describes the historical precedence for the proposed parameters using site specific considerations, while the November 2018 report is the culmination of a decade of research into appropriate wastewater treatment technologies and effluent parameters for Nunavut. As is outlined in the November 2018 report, these proposed parameters were developed based on scientific studies and best-practice jurisdictional review.



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It is worth noting here that discussions between Environment Canada (currently known as Environment and Climate Change Canada, ECCC) and CGS informed the drafting of the existing parameters during the renewal of the 2014 water license – these discussions have been attached to the amendment application. At the time, the prevalent thinking was that southern Canadian wastewater treatment standards would be appropriate for Nunavut. That thinking has changed, and through ongoing discussions with ECCC and federal regulators, CGS is recommending that the proposed technology based TSS and BOD effluent targets be utilized to govern Nunavut-based marine wastewater discharge from passive wastewater treatment systems.

The proponent encourages the NWB and CIRNAC to recognize that the existing TSS and BOD effluent targets of 25 mg/L are not appropriate for passive wastewater treatment facilities in Nunavut and have been proven through sampling and research to be heavily due to dilution and bypassing of effluent prior to sampling. As is demonstrated in the application and attached documentation, practical and environmentally-sound parameters for lagoon and wetland treatment systems should equal 100 mg/L for BOD and 120 mg/L for TSS at the point of discharge to the well-flushed marine water body. Research has demonstrated that these limits can be reliably achieved while protecting the health of the receiving environment.

CIRNAC requested more information from a local source about the receiving marine environment tidal flats and whether the seawater in this area is well-flushed. Through phone discussions with local municipal staff on August 6, 2021, CGS was able to ascertain that the receiving environment is well-flushed. Specifically, municipal staff were unable to pull any memories of stagnant wastewater in the receiving marine water body despite the minimal changes in tides that occur. This local knowledge is consistent with the thinking that marine water bodies are inherently well-flushed due to wave and current movement. The proponent notes one issue was acknowledged by local municipal staff – the presence of the wastewater 'ice block' on the sea ice during the spring melt. This local knowledge reinforces the need for the proposed wastewater treatment facility, which will be adequately sized to hold wastewater until the controlled annual decant and provide treatment in conjunction with the natural wetland system, in a manner that is both practical and environmentally-friendly for remote, northern communities.

In communications with CGS, CIRNAC acknowledged that, as the November 2018 Exp report outlines, the environmental health of the receiving water body is protected for flows less than 2500 m³/day at discharge concentrations of 100 mg/L for BOD and 120 mg/L for TSS. The proponent acknowledges this feedback, and the proposed facility will be designed with a decanting regimen that respects the 2500 m³/day limit. Based on the existing design year of 2040, the annual generation of wastewater is not expected to exceed 68,000 m³/year – a decanting period of 4 weeks or more would respect the 2500 m³/day discharge limit.

4. Taloyoak Wastewater Treatment Facility 2021 Business plan



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Comment:

Community and Government Services has provided a Business Plan for their new engineered wastewater treatment facility for the community of Taloyoak. Currently their sewage is discharged into a natural two ponded system into a wetland system then discharged into the ocean. CIRNAC believes the proposed facility will be an improvement over the current situation.

Recommendation:

CIRNAC recommends the proponent continue actions necessary for construction of the new facility.

Response:

This has been noted.

Sincerely,



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