



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
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Your file - Votre référence
8BC-EUR2131
Our file - Notre référence
GCDOCS#102489738

April 27, 2022

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's review comments on amendment application by Environment and Climate Change Canada for its Water Licence 8BC-EUR2131 for Eureka High Arctic Weather Station on Ellesmere Island, Nunavut

Dear Richard Dwyer,

Thank you for your March 29, 2022 email request for review and comments on the above-noted water licence amendment application.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the application 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 david.zhong@rcaanc-cirnac.gc.ca or Andrew Keim at andrew.keim@rcaanc-cirnac.gc.ca.

Sincerely,

David Zhong,
Regulatory & Science Advisor



Technical Review Memorandum

Date: April 27, 2022

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

From: David Zhong, Regulatory & Science Advisor, CIRNAC

Subject: Crown-Indigenous Relations and Northern Affairs Canada's review comments on amendment application by Environment and Climate Change Canada for its Water Licence 8BC-EUR2131 for Eureka High Arctic Weather Station on Ellesmere Island, Nunavut

Region: Qikiqtaaluk

A. BACKGROUND

The Eureka High Arctic Weather Station (HAWS; the site) is located on the north side of Slidre Fiord, at the north-western tip of Fosheim Peninsula, Ellesmere Island. Eureka station coordinates are 79.59.41N and 85.48.48W. The site has been operated by Environment and Climate Change Canada (ECCC) since April 7, 1947.

The primary purpose of the Eureka HAWS is to collect weather information in order to produce public weather forecasts. In addition, the Eureka HAWS provides support to the Arctic aviation community. The Eureka HAWS also serves as a staging location for other science-based activities in the High Arctic, various exploration projects, and some tourism. ECCC provides the necessary infrastructure to support activities at the site. This includes accommodations, fuel supplies, electrical power, transportation, aircraft landing strip, cooking operations, and water and sewage services.

On February 22, 2022, ECCC submitted to the Nunavut Water Board (NWB) an amendment application for its current water licence 8BC-EUR2131 to include the following proposed changes to the water and sewage treatment facilities and activities at the site: (1) an upgrade of existing water storage and treatment systems including development of raw water storage reservoir and installation of new packaged wastewater treatment plant with peak flow capacity of 28m³/day and (2) development of grey water exfiltration trench to treat approximately 5 m³/day of grey water in the summer seasons between 2022 and 2025.

CIRNAC provides the following comments and recommendations pertaining to the amendment application. 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	Capacity of proposed exfiltration trench
R-02	Alternative to proposed exfiltration trench
R-03	Sludge generated from the proposed wastewater treatment plant
R-04	Distances of facilities or activities from the ordinary High Water Mark of any adjacent water body
R-05	Additional types of waste generated
R-06	Proposed schedule for constructions

B. DOCUMENTS REVIEWED AND REFERENCED

The following table (Table 2) provides a list of the documents reviewed under the submission and reference during the review.

Table 2: Documents Reviewed and Referenced

Document Title	Author, File No., Rev., Date
Water Licence Amendment Application – including Attachments A to G	ECCC, 2022-02-18
Applicant Response to NWB on NPC Enquiry	NWB, 2022-03-28
8BC-EUR2131 Water Licence	NWB, 2021-07-22



C. RESULTS OF REVIEW

1. Capacity of the proposed exfiltration trench

Comment:

On page two (2) of Attachment F, it was stated that *“(I)t is proposed to install one exfiltration trench 60 m long, 1.5 m wide and 0.6 m deep as shown in Figure 2. The total storage capacity of the trenches would be approximately 45 m³, which would be adequate for a temporary storage of a 9-day grey water discharge volume to accommodate high flows or wet conditions. Unsaturated exfiltration capacity of the proposed exfiltration trench was estimated at 32.5 litres/m³/day (0.8 US Gal/ft²/day).”*

It is not clear how the total storage capacity (i.e., 45 m³) and the unsaturated exfiltration capacity (i.e., 32.5 litres/m³/day) of the proposed exfiltration trench are defined and calculated, and if the proposed exfiltration trench has the sufficient capacity to handle the estimated 5 m³ of grey water produced daily by the Nuna Camp for a 3-month period in the summer between 2022 and 2025.

Recommendation:

(R-01) CIRNAC recommends that the licensee explain how the capacities of the proposed exfiltration trench are defined and obtained, as well as address if the proposed exfiltration trench has the sufficient capacity to handle the estimated grey water produced daily by the Nuna Camp during the summer.

2. Alternative to the proposed exfiltration trench

Comment:

The proposed exfiltration trench is to treat an estimated 5 m³ of grey water produced daily by the Nuna Camp for a 3-month period in the summer (i.e., a total volume of about 450 m³/year) between 2022 and 2025, or until the proposed water and sewage treatment facility upgrades are completed. The proposed exfiltration trench will then need to be decommissioned based on a revised Abandonment and Restoration Plan.

CIRNAC notes that greywater and sewage generated at the Eureka High Arctic Weather Station (approximately 35 m³/day) is currently discharged to the sewage lagoon, which will continuously be used to handle greywater and sewage until the completion of the proposed water and sewage treatment facility upgrades. CIRNAC also notes that the existing sewage lagoon is only a few kilometers from the Nuna Camp and that the estimated 5 m³/day (or



450 m³/year) of grey water produced at the temporary Nuna Camp in the summer would be collected in a holding tank before discharging to the proposed exfiltration trench.

Given the above observations, it is reasonable to suggest that the alternative of discharging grey water produced at the Nuna Camp to the existing sewage lagoon at the Eureka High Arctic Weather Station should be considered.

Recommendation:

(R-02) CIRNAC recommends that the licensee consider and discuss other alternatives for treating the grey water produced at the Nuna Camp, for example using the existing sewage lagoon at the Eureka High Arctic Weather Station.

3. Sludge generated from the proposed wastewater treatment plant

Comment:

CIRNAC assumes that the proposed packaged wastewater treatment plant would generate sludge or solid waste and would like to note the lack of an adequate discussion on the quantity and quality of the sludge, as well as how the sludge will be managed in the amendment application.

Recommendation:

(R-03) CIRNAC recommends that the licensee clarify if sludge or solid waste will be generated from the proposed wastewater treatment plant, as well as how the sludge will be managed and if the response is positive, provide information on the quantity and quality of the sludge, as well as management plan for the sludge.

4. Distances of facilities or activities from the ordinary High Water Mark of any adjacent water body

Comment:

Part D item 1, Part E items 7 and 15, and Part G item 2 of Water Licence 8BC-EUR2131 stipulate, respectively, that waste disposal, land-based activity, quarry sites, and locations of all sumps and fuel caches be at least thirty-one (31) metres from the ordinary High Water Mark of any adjacent water body.

The locations of the waste disposal facilities, land-based activity, quarry sites, and locations of temporary contaminated soil storage cells, sumps and fuel caches are marked in the three (3) topographical maps in Attachment D and a number of for-construction drawings in Attachment E.



CIRNAC notes that it is rather difficult to verify, from the topographical maps and for-construction drawings, if all waste disposal facilities, land-based activity, quarry sites, and locations of temporary contaminated soil storage cells, sumps and fuel caches are at least thirty-one (31) metres from the ordinary High Water Mark of any adjacent water body, as is required by Water Licence 8BC-EUR2131.

Recommendation:

(R-04) CIRNAC recommends that the topographical maps and for-construction drawings be revised to include information on the distances of waste disposal, land-based activity, quarry sites, and locations of all sumps and fuel caches from the ordinary High Water Mark of any adjacent water body.

5. Additional types of waste generated

Comment:

In Section 14 of *Application for Water Licence Amendment*, the two boxes marked for “Sludges” and “*Contaminated soil and/or water*”, respectively, are not checked. The licensee also indicated that the proposed amendment does not change the types of waste to be generated or disposed.

CIRNAC notes that this licence amendment seeks to install a new packaged wastewater treatment plant, which, as noted in Comment #3 above, might generate sludge. CIRNAC also notes that contaminated soils have been identified at the site.

Recommendation:

(R-05) CIRNAC recommends that the licensee clarify if sludge from wastewater treatment plant and contaminated soils are or will be generated at the project site.

6. Proposed schedule for constructions

Comment:

This water licence amendment application proposes to “(1) *upgrade of existing water storage and treatment systems including development of raw water storage reservoir and installation of new packaged wastewater treatment plant with peak flow capacity of 28 m³/day and (2) development of grey water exfiltration trench to treat approximately 5 m³/day of grey water.*”

The amendment application does not, however, include a clear schedule for the constructions of the raw water storage reservoir, the wastewater treatment plant, and the grey water exfiltration trench.



Recommendation:

(R-06) CIRNAC recommends that the licensee provide a schedule for the constructions of the proposed facilities.