

Environmental Protection Operations Directorate
Prairie & Northern Region
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ECCC File: 6200 000 016 / 006
NWB File: 3AM-PAN1828



February 14, 2024

via email at: richard.dwyer@nwb-oen.ca

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Dear Richard Dwyer:

RE: 3AM-PAN1828 # – Hamlet of Pangnirtung – Water Licence – Plans Reviewed

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board (NWB) by the Hamlet of Pangnirtung regarding the above-mentioned plans.

ECCC provides expert information and knowledge to project assessments on subjects within the department's mandate, including climate change, air quality, water quality, biodiversity, environmental emergencies preparedness and responses. This work includes reviewing proponent characterization of environmental effects and proposed mitigation measures. We provide advice to decision-makers regarding a proponent's characterization of environmental effects, the efficacy of their proposed mitigation activities, and may suggest additional mitigation measures. Any comments received from ECCC in this context does not relieve the proponent of its obligations to respect all applicable federal legislation

The following comments are provided:

1. Topic: List of parameters of concern and target concentration limits

References:

- Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP Services; November 8, 2024)
 - Section 1: Introduction
 - Section 3.4: Compliance Criteria (Part E.9) for Drainage/Seepage Samples - Current Water Licence # 3AM-PAN1828
 - Appendix B: Pangnirtung Leachate Sample Summary



- RE: 3AM-PAN1828 – Hamlet of Pangnirtung – 2023 Annual Report (Environment and Climate Change Canada; September 16, 2024)

Comment

As noted in two sections of the Drainage/Seepage Monitoring and Management Plan, the Hamlet's water licence requires the Plan to provide, amongst other things, a "*list of parameters of concern*" and "*targeted concentrations limits*". These are necessary to help address concerns from seepage and drainage of poor water quality at the sludge disposal area, solid waste disposal facility, and metals storage area which may potentially cause impacts to aquatic life if released. Appendix B of the Drainage/Seepage Monitoring and Management Plan noted samples taken in 2020 at surveillance network program (SNP) station PAN-6 had elevated concentrations of cadmium, and the pH at SNP stations PAN-4 and PAN-5 was below Canadian Council of Ministers of the Environment (CCME) guidelines for protection of aquatic marine life. ECCC's 2023 Annual Report Review also noted elevated concentrations of nitrogen compounds and heavy metals at SNP station PAN-4.

No list of parameters of concerns was found in the Plan. Section 3.4 states: "*For the initial assessment of sample results, it is suggested that CCME guideline criteria for aquatic marine life be used.*" It is not clear if these are meant to also be considered as targeted concentration limits.

ECCC notes that there are many parameters for which CCME guidelines for the protection of aquatic life in the marine environment do not exist and in those cases guidelines for the freshwater environment should be considered. Additionally, there are Federal Environmental Quality Guidelines (FEQG) which incorporate more recent scientific knowledge for some parameters, and these should also be considered.

Recommendation

ECCC recommends the Proponent include a list of parameters of concern, screening criteria, and targeted concentration limits in the Drainage/Seepage Monitoring and Management Plan.

2. Topic: Drainage and seepage management

Reference:

- Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP Services; November 8, 2024)
 - Section 4.1: Drainage Improvements – Existing Conditions

Comment

As outlined in the comment above, seepage and drainage from the facilities is a concern because of its poor water quality. The Plan submitted does not adequately address management of water draining and seeping from the facilities.

Section 4.1 of the Plan describes measures including upkeep to berms and ditches to limit runoff from outside the facilities from entering and cleaning out culverts and swales that drain the facilities. These are important elements to managing water at the site, but further measures are needed to address poor quality water. The limited water quality data available

indicates water seeping and draining from the facilities should be collected and treated before being discharged to the environment to prevent potential impacts to aquatic life. The Plan should describe how this will be done.

To manage water, the Plan also recommends that water ponding inside the metals storage area *“be pumped and dispersed as practical toward the eastern side of the metals containment area.”* This recommendation is not clear. If the intention is to disperse water outside the bermed metals storage area, it should be treated prior to dispersion. If the recommendation is to disperse within the bermed area, the purpose is unclear since it will drain back to the same ponded area.

Recommendation

ECCC recommends the Proponent modify the Drainage/Seepage Monitoring and Management Plan to:

- include measures to collect and treat poor quality water prior to discharging it to the environment; and
- clarify the statement regarding dispersion of water ponding in the metals storage area so that water isn't dispersed outside the berm prior to treatment.

3. Topic: Laboratory analysis detection limits

References

- Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP Services; November 8, 202)
 - Appendix B: Pangnirtung Leachate Sample Summary
- RE: 3AM-PAN1828 – Hamlet of Pangnirtung – 2023 Annual Report (Environment and Climate Change Canada; September 16, 2024)

Comment

Comparing water sample results against criteria to protect aquatic life allows for management of water that does not meet criteria. To do this comparison, it is necessary that the sample analysis method detection limits be lower than the criteria. In discussion of both the 2020 results in Appendix P of the Drainage/Seepage Monitoring and Management Plan and the 2023 results in the 2023 Annual Report Review, detection limits above criteria were flagged as a problem for mercury, cadmium, lead and nickel.

For the sampling results to be useable, appropriate detection limits must be requested of the laboratory when sending samples for analysis. The Plan should specify minimum detection limits for all parameters of concern identified as requested in comment #1. The target concentration limits, also identified from comment #1, should be used to determine minimum detection limits.

Recommendation

ECCC recommends the Proponent include minimum detection limits that are below criteria for parameters of concern in the Drainage/Seepage Monitoring and Management Plan, along with instructions to request them when sending samples to the laboratory.

4. Topic: Sampling frequency

References

- Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP Services; November 8, 2024)
 - Section 3.2: Drainage/Seepage Location Sampling Frequency
- Type “A” Water Licence NO. 3AM-PAN1828 (Nunavut Water Board; May 4, 2018)

Comment

Section 3.2 of the Plan describing sampling frequency lacks clarity because it does not grant the same importance to all parts of the licence requirement. Part H, Item 2 of the Hamlet’s water licence is:

The Licensee shall conduct during open water in 2018, a sampling campaign at Monitoring Program Stations PAN-4, PAN-5 and PAN-6 to monitor run-off and leachate quality data within the Drainage / Seepage Monitoring and Management Plan referred to in Part E, Item 9. The campaign shall consist of sampling three times (at the beginning, middle and near the end of discharge/run-off) during the spring freshet and once per every subsequent month until freezing. Additional sampling is required after every rainfall event. Samples shall be analyzed for the parameters listed in Schedule H.

The plan cites the second sentence of the paragraph regarding freshet and monthly sampling. Though the third sentence regarding post-rainfall sampling is mentioned in the text, it includes a caveat: “For practical purposes, it is EXP’s opinion that sampling “after every rainfall event” would only be completed where there is adequate flow at the sampling locations (see below).” In all cases sampling can only be conducted when there is adequate flow, so it is not clear why less importance is given to sampling after rainfall events in Section 3.2. After freshet, sampling after rainfall events may be the only times where there is sufficient drainage and seepage to collect water samples. Collecting these samples would allow the Hamlet to meet the licence requirement of monthly sampling post-freshet.

Recommendation:

ECCC recommends the Proponent modify the Drainage/Seepage Monitoring and Management Plan to treat freshet and post-rainfall sampling with the same importance.

5. Topic: Measuring field parameters

References:

- Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP Services; November 8, 2024)
 - Section 3.3: Drainage/ Seepage Leachate Sampling Parameters
- Type “A” Water Licence NO. 3AM-PAN1828 (Nunavut Water Board; May 4, 2018)

Comment

Table 1 in Schedule H of the water licence specifies analytical parameters to be measured in the field: pH, conductivity and temperature. Section 3.3 of the Plan, which lists sampling parameters, does not specify that pH and conductivity must be measured in both the field and the laboratory. Temperature measurements are missing from the list of sampling

parameters. Field temperature measurements are important because temperature is a toxicity modifying factor for several parameters. This is relevant to drainage from the facilities because elevated concentrations of nitrogen compounds have been noted at SNP station PAN-4 in 2023 (as discussed in comment #1) and temperature is required to calculate toxic concentrations of ammonia.

Presently the plan does not include any information on how to measure field parameters. To ensure the accurate collection of field parameters, instructions on the proper equipment, its calibration, how to use it in the field, and how to record measurements should be added to the Plan.

Recommendation:

ECCC recommends the Proponent modify the Drainage/Seepage Monitoring and Management Plan to incorporate information on field parameter monitoring required by the water licence, both in the list of sampling parameters and to the sampling methodology describing their collection.

6. Topic: Washing sampling equipment

References:

- Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP Services; November 8, 2024)
 - Section 3.6.3: Sampling Methods
 - Section 4.1: Drainage Improvements – Existing Conditions, bullet 5)c)
- Protocols Manual for Water Quality Sampling in Canada (Canadian Council of Ministers of the Environment; 2011)
 - Section 3: Protocol for Cleaning Sampling Equipment

Comment

Collecting water samples from seeps or culverts with little flow can be challenging when the water to be sampled is very shallow. Section 3.6.3 of the Drainage/Seepage Monitoring and Management Plan does not acknowledge the possible difficulty and states “*Samples should always be collected into new, pre-cleaned, laboratory-supplied sample bottles.*” Section 4.1 does propose possible methods to help collect samples in difficult conditions: “(e.g., as *practical capture and time sample collection using a pail/ bucket*)”.

If a pail, bucket or other tool is used to collect water to transfer it into sample bottles, it is necessary to wash the equipment adequately prior to use at each sampling station. Otherwise, cross-contamination between samples can render interpretation of results difficult or impossible. A description of proper equipment cleaning protocols can be found in Section 3 of the CCME Protocols Manual for Water Quality Sampling in Canada.

Recommendation:

ECCC recommends the Proponent add relevant elements of the equipment cleaning protocols to the Drainage/Seepage Monitoring and Management Plan to ensure that if pails or other tools are used to collect samples, there is no cross-contamination between sampling sites.

7. Topic: Poor resolution map

Reference:

- Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP Services; November 8, 2024)
 - Appendix C: EXP 2024 Site Visit Field Report and related Photographs

Comment

The resolution of Photo 1 (Existing Drainage Plan) in Appendix C of the Drainage/Seepage Monitoring and Management Plan does not allow the reviewer to read the labels of the different features identified. It would be helpful to reviewers to be able to locate the SNP stations and culverts discussed in the memo relative to each other, to infrastructure and to the topography.

Recommendation:

ECCC recommends the Proponent provide a better resolution photo of the existing drainage plan in Appendix C of the Drainage/Seepage Monitoring and Management Plan.

If you need more information, please contact Jessica Kassir at (867)-222-2036 or jessica.kassar@ec.gc.ca.

Sincerely,

Jessica Kassir
Environmental Assessment Officer

Attachment(s):

cc: Eva Walker, Head, Environmental Assessment North (NT and NU)