



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
918 Nunavut Drive
Iqaluit, NU, X0A 3H0

Your file - Votre référence
3AM-PAN1828
Our file - Notre référence
GCDOCS# 138895381

July 3, 2025

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 Review of the 2024 Annual Report and 4 management plans for Water Licence 3AM-PAN1828 for the Municipality of Pangnirtung in the Qikiqtani Region of Nunavut

Dear Mr. Dwyer,

Thank you for the July 15, 2024 invitation to review the 2024 Annual Report and 4 management plans, submitted by the Licensee. The management plans are titled *Water Reservoir Operation & Maintenance (O&M) Plan*, *Drainage Seepage Plan*, *Spill Contingency Plan*, and *Quality Assurance Quality Control (QAQC) Plan*. This review is for Pangnirtung's Type A Water Licence No. 3AM-PAN1828.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the documents 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*. **CIRNAC has 7 unresolved recommendations from the 2022 Annual Report, 8 unresolved recommendations from the 2023 Annual Report, and 16 unresolved recommendations from the 2024 Annual Report.** Please find CIRNAC's comments and recommendations in the attached Technical Memorandum.

If there are any questions or concerns, please contact me at michelle.blade@rcaanc-cirnac.gc.ca or Andrew Keim at 305-501-4047 or Andrew.Keim@canada.ca.

Sincerely,

Michelle Blade
Regulatory and Science Advisor



Technical Review Memorandum

Date: July 3, 2025

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

From: Michelle Blade, Regulatory and Science Advisor, CIRNAC

Subject: Crown-Indigenous Relations and Northern Affairs Canada's Review of the 2024 Annual Report and 4 management plans for Water Licence 3AM-PAN1828 for the Municipality of Pangnirtung in the Qikiqtani Region of Nunavut

Region: ☐ Kitikmeot ☐ Kivalliq ☒ Qikiqtani

A. BACKGROUND

The Hamlet of Pangnirtung is located on Baffin Island, in the Qikiqtani Region of Nunavut, with an estimated population of 1,504 (2021 Census). In 2014, the Type B Water Licence No. 3BM-PAN0810 was renewed/amended as Water Licence No. 3BM-PAN1417 subject to the terms and conditions contained therein. The Hamlet was issued a Type A water licence (Water Licence No. 3AM-PAN1828) on May 4, 2019, for a 10-year period, expiring May 3, 2028.

The Hamlet operates a potable water treatment and supply facility (including a water storage reservoir), a wastewater treatment plant, a solid waste management facility, a metal waste facility and a hazardous waste facility. Water for municipal use is pumped from Duval River. Additional terms and conditions have been added to transition the Hamlet from the former Type "B" Licence to the new Type "A" Licence. The additional terms and conditions reflect the continued management of municipal (sewage treatment) and industrial (fish processing plant) waste generated within the Hamlet, the authorized increases in water use from the Duval River, and the new and more stringent monitoring program, including an extensive monitoring campaign for 2018.

The wastewater treatment plant underwent a major upgrade in 2016 including construction of a new truck-fill station. Solid waste from the Hamlet is currently disposed of in a landfill located approximately 800 metres from the edge of the Hamlet. The existing solid waste site has been determined to be inappropriately sited due to ecological concerns, odor, and windblown litter, is reportedly poorly operated and maintained, and is nearing its life capacity. The Hamlet planned to construct a new landfill by 2024. No update was provided in the 2024 Annual report on the status of the solid waste facility project identified in the 2022 Annual Report.



During the review of Pangnirtung's 2023 Annual Water Licence Report to the NWB, Environment and Climate Change Canada (ECCC) noted elevated concentrations of nitrogen compounds and heavy metals in wastewater treatment plant effluent (PAN-3) and runoff from the sludge storage area (PAN-4). Bhabesh Roy, the Director of Infrastructure, clarified the sample locations in an email on March 13, 2025. It was noted that the sampling point of the runoff from the sludge storage area is PAN-5, not PAN-4 (even though Table 2 of Schedule H of Water Licence No. 3AM-PAN1828 shows PAN-4 : Run-off from the sludge disposal area). These samples, at the time of ECCC's review, were considered to have been taken from locations close to the coastline (i.e., less than 100 m), raising concerns about environmental compliance as the exceedances identified were not reported as spills that may enter water frequented by fish. Exceedances in these areas should be reported as the deposit may enter waters frequented by fish (as per subsections 38(5), (6) and (7) of the *Fisheries Act*). ECCC enforcement has contacted the Hamlet of Pangnirtung about addressing the concerning results and their requirements for reporting pursuant to the *Fisheries Act*.

A CIRNAC inspection was conducted on July 5, 2024.

CIRNAC provides the following comments and recommendations pertaining to the 2024 Annual Report and the outstanding CIRNAC recommendations from the 2022 and 2023 Annual Reports. 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 for the 2024 Annual Report can be found in Sections C. CIRNAC's comments and recommendations pertaining to the 2022 and 2023 Annual Reports can be found on the Nunavut Water Board public registry at <https://public.nwb-oen.ca/registry/3%20MUNICIPAL/3A/3AM%20-%20Municipality/3AM-PAN1828/3%20TECH/B%20GENERAL/2%20ANNUAL%20RPT/2023/>.

Table 1: Summary of Recommendations

Recommendation Number	Subject	Status
R-01	Sources of water and quantity used	2022 – Unresolved 2023 – Unresolved 2024 – Unresolved (refer to PAN-01)
R-02	Sewage discharge quantity reporting requirements	2022 – Unresolved* 2023 – Unresolved* 2024 – Resolved
R-03	Effluent discharge quality reporting requirements	2022 – Unresolved 2023 – Unresolved



		2024 – Unresolved (refer to PAN-03)
R-04	Sludge removal reporting	2022 – Unresolved 2023 – Unresolved 2024 – Unresolved (refer to PAN-04)
R-05	Duval River instantaneous flow and mean annual discharge measurements	2022 – Unresolved* 2023 – Unresolved* 2024 – Resolved
R-06	Four updated documents	2022 – Unresolved* 2023 – Unresolved* 2024 – Resolved
R-07	Monitoring Program Stations PAN-4, PAN-5 and PAN-6	2022 – Unresolved 2023 – Unresolved 2024 – Unresolved (refer to PAN-06)
R-08	Installation of appropriate flow-metering equipment	2023 – Unresolved* 2024 – Resolved
PAN-02	Quantities of discharges to/from the Wastewater Treatment Facilities	2024 - Unresolved
PAN-05	Quantities of wastes disposed of in the Landfill	2024 - Unresolved
PAN-07	Hydrology/hydraulic study of the Duval River	2024 - Unresolved
PAN-08	Addenda to four updated Plans	2024 - Unresolved
PAN-09	Spill reporting and follow-up actions	2024 - Unresolved
PAN-10	New landfill update	2024 - Unresolved
PAN-11	Compliance activities	2024 - Unresolved
PAN-12	Hydrology Study	2024 - Unresolved



PAN-13	Drainage/Seepage Monitoring and Management Plan	2024 - Unresolved
PAN-14	Water Reservoir Operations and Maintenance Manual	2024 - Unresolved
PAN-15	Spill Contingency Plan	2024 - Unresolved
PAN-16	Quality Assurance/Quality Control Plan	2024 - Unresolved

* In the 2024 Annual Water Licence Report, the Hamlet indicates that a response to CIRNAC comments on this licence from 2019 to 2023 will be prepared and submitted in a separate file.

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
Annual Report for the Hamlet of Pangnirtung, 2024	Author unknown, 29 May 2025
Hamlet of Pangnirtung – Hydrological Desktop Study	EXP, 2022
Water Licence Inspection Form	CIRNAC, 3 July 2024
Summary Report - Pangnirtung WWTF Aftercare Service – Site Visit #16 (SUMMARY REPORT)	EXP, 2024
Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut	EXP, 2024
Hamlet of Pangnirtung, Water Reservoir Operations and Maintenance Manual	EXP, 2024
Spill Contingency Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut	EXP, 2024
Quality Assurance/Quality Control Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut	EXP, 2024
Memorandum - Pangnirtung Aftercare Service 2024-2025 (FRE-00232735-A6) - Summary of Work Completed Memo Report (2023-2024)	EXP, 2025



Document Title	Author, File No., Rev., Date
2024 Sampling Results from CADUCEON Environmental Laboratories, (samples collected May 15, June 27, July 2, September 17, October 9, December 16).	CADUCEON Environmental Laboratories
ECCC Email Correspondence:	
<ul style="list-style-type: none">o RE: Pangnirtung Waste Water Treatment Plant (March 18, 2025)o RE: Concerns about water quality in Pangnirtung - WWTP effluent and sludge storage area runoff (September 5-24, 2024)o RE: Hamlet of Pangnirtung Plans for water licence 3AM-PAN1828 (January 14, 2025 – March 14, 2025)	ECCC, 2024 - 2025
Annual Report for the Hamlet of Pangnirtung, 2023	Author unknown, 25 June 2024
Pangnirtung WWTF Aftercare Service – Site Visit #16 (SUMMARY REPORT)	EXP., FRE-00232735-A5, 6 February 2024
Concerns of Pang WI and Annual Reports 2022 and 2023	Bhabesh Roy, email to Nunavut Water Board, 13 July 2024
Certificate of Analysis, Final Report	CADUCEON Environmental Laboratories, REPORT No: 23-019773, 11 August 2023
Certificate of Analysis, Final Report	CADUCEON Environmental Laboratories, REPORT No: 23-022501, 11 September 2023
Certificate of Analysis, Final Report	CADUCEON Environmental Laboratories, REPORT No: 23-025578, 11 October 2023
Licence No: 3AM-PAN1828 Type “A”; Hamlet of Pangnirtung; 2023 Annual Report Review	Nunavut Water Board, 23 August 2023
3AM-PAN1828 Updated 2022 Annual Report, including the Hamlet of Pangnirtung – Hydrological Desktop Study	Government of Nunavut, Community and Government Services (GN-CGS) on behalf of the Municipality of Pangnirtung
Crown-Indigenous Relations and Northern Affairs Canada’s Review of the 2023 Annual Report for	CIRNAC, 16 September 2024



Document Title	Author, File No., Rev., Date
Water Licence 3AM-PAN1828 for the Municipality of Pangnirtung in the Qikiqtani Region of Nunavut	
TYPE "A" WATER LICENCE NO: 3AM-PAN1828	Nunavut Water Board, 04 May 2018
TYPE "A" WATER LICENCE NO: 3AM-PAN1828 Reasons for Decision	Nunavut Water Board, 04 May 2018
Water Licence Inspection Form	CIRNAC, 22 June 2022

C. RESULTS OF 2024 ANNUAL REPORT REVIEW

PAN-01: Sources of water and quantity used

Comment:

Water licence 3AM-PAN1828 allows for withdrawal of 120,000 cubic metres of water per annum from the Duval River for all purposes. Schedule B of the Water Licence requires the Hamlet to report monthly and annual quantities in cubic metres of fresh Water withdrawn from the Duval River at Monitoring Station No. PAN-1. As per Part D, Item 7, of the Water Licence, *"The Licensee shall limit the withdrawal of Water from the Duval River to the months of July and August, unless otherwise recommended by the Hydrological Study provided under Part D, Item 5 and approved by the Board in writing."* The 2024 Annual Report provides the monthly and annual quantities in litres (L) of freshwater obtained from all sources as reported in the On Tap Water Delivery System, with over 5,000 cubic metres of water withdrawn every month. The Licensee was required, within six (6) months of approval of the Water Licence, to *"install the appropriate flow-metering equipment required to accurately record the quantity of Water withdrawn from the Duval River."*

It was noted in Section viii of the 2024 Annual Water Licence Report that installation of a flow meter to measure the Duval River withdrawal quantity into the water storage reservoir was completed in 2024, but the flow meter has not been calibrated yet.

The Hamlet of Pangnirtung has received this comment in years 2022, 2023, and 2024, and have not yet adopted the changes to comply with the terms and conditions of their Water Licence.

2024 Annual Report Recommendation:

(PAN-01) CIRNAC recommends the Hamlet provide the following:

- Name or origin of the undefined sources of water tabulated in the 2024 Annual Water Licence Report.
- Monthly and annual quantity of freshwater withdrawn from Duval River at Monitoring Station No. PAN-1 be recorded and subsequently reported in the correct units in the 2024 Annual Water Licence Report.



- c) A reason for any withdrawals from Duval River that took place outside of the months of July and August.

PAN-02: Quantities of discharges to/from the Wastewater Treatment Facilities

Comment:

Water licence 3AM-PAN1828 requires reporting of the monthly and annual quantities in cubic metres of any discharges to and from the Wastewater Treatment Facilities at Monitoring Stations PAN-2 (Raw Sewage from pump-out truck) and PAN-3 (effluent from wastewater treatment plant). The 2024 Annual Water Licence Report reports only the annual total of sewage waste discharged as an estimate in litres (i.e., less than 53,625,900.00 L) with a note that *“The water consumption volume is not considered equal to the discharge volume. The sludge is separated out from the raw wastewater. The effluent volume = (Raw Wastewater Volume) - (sludge volume). The SCADA system was not able to accurately record effluent volume for the majority of 2024. The Hamlet was working in coordination with EXP Services Inc. and Viola to address the issues with the monitoring and recording system. The Hamlet will install new flow meters in 2025 to record the influent and effluent volumes more accurately and generate monthly reports with up-to-date volumes for each.”*

It was noted in Section viii of the 2024 Annual Water Licence Report that the WWTP *“SCADA system calibration was corrected and effluent flows were recorded from November 2024 to present.”*

2024 Annual Report Recommendation:

(PAN-02) CIRNAC recommends that the Hamlet:

- a) Provide effluent quantities (PAN-3) in the correct units (cubic metres) for the period of 2024 that are available following the SCADA calibration.
- b) Provide the estimated raw wastewater volume in the correct units (cubic metres) used to calculate the effluent volume.
- c) Provide a status update on installation of flow meters at PAN-2 and PAN-3.

PAN-03: Effluent discharge quality reporting requirements

Comment:

Water Licence 3AM-PAN1828 requires that all effluent discharged from the Wastewater Treatment Plant at Monitoring Program Station PAN-3 not exceed the effluent quality limits defined in Part E, Item 3, of the water licence. In addition, Part E, Item 4, requires that the discharge of effluent from the Wastewater Treatment Plant at Monitoring Program Station PAN-3 be demonstrated to be Acutely non-Lethal under the following test as stipulated in Schedule H of the Licence:



- *“Acute Lethality of Effluents to Rainbow Trout (as per Environment Canada’s Environmental Protection Series Biological Test Method EPS/1/RM/13 Second Edition December 2000 (with May 2007 amendments)).”*

The 2024 Annual Water Licence Report submitted analytical results for Monitoring Program Station PAN-3 for five (5) sampling events in 2024 (i.e., May 15, June 27 as treated waste water #2, September 17 as effluent #3, October 9, and December 16). The analytical results associated with the June 27, 2024, sampling event were outside the acceptable range for pH.

The analytical results associated with the May 15, 2024, and December 16, 2024, sampling events exceeded the faecal coliform limit. The sample identification for May 15, 2024, did not match the sampling locations and may have been mislabelled. While the faecal coliform sample results for the remaining sampling events met the limit, there were several results with values exceeding what would generally be expected for the treatment technology (MBR) in place at the WWTP. This may be indication that the system requires additional process optimization or confirmation that the membranes are in good operating condition.

Acute lethality results for Monitoring Program Station PAN-3 were provided for the December 16, 2024, sampling event, with the sample failing the trout bioassay test.

The 2024 Annual Water Licence Report also includes a set of analytical parameters sampled beyond the effluent requirements of Part E, Item 3, which include nitrate, nitrite and ammonia nitrogen. Elevated ammonia and nitrate concentrations were measured in the effluent, particularly during the winter and spring months. This may be an indication that nitrification is not optimized for the facility.

The 2024 Annual Water Licence Report also included analytical results for Monitoring Program Stations PAN-4 (run-off from sludge disposal area), PAN-5 (run-off from solid waste disposal facility) and PAN-6 (run-off from metal and hazardous waste storage area). In the 2024 Annual Water Licence Report, it was noted that *“the leachate coming from PAN-4, PAN-5 and PAN-6 was sampled for testing under the parameters set out in the Hamlet’s water license. The release of this leachate into the environment remains unimpeded; as a result, when the laboratory detects values which exceed the acceptable limits for any of the parameters, this constitutes a spill.”*

Spill reports were submitted for events on the following dates:

- *Spill 2024244 on dated June 27, 2024 (petroleum fuel oil, 40 litres).*
- *Spill 2025157 on dated Oct. 11, 2024 (Sewage, quantity unknown).*
- *Spill 2025158 on dated Oct. 11, 2024 (sewage, quantity unknown).“*

It is unclear what regulatory criteria were used to compare the analytical results for Monitoring Program Stations PAN-4, PAN-5, and PAN-6.



The Hamlet of Pangnirtung has received this comment in years 2022, 2023, and 2024, and have not yet adopted the changes to comply with the terms and conditions of their Water Licence.

2024 Annual Report Recommendation:

(PAN-03) CIRNAC recommends that the Hamlet:

- a) Include all dates of discharge from the Wastewater Treatment Plant, and reasoning if Monitoring Program Station PAN-3 analytical results are not available for all discharge dates.
- b) Compile the analytical results in an appendix table with comparison to the applicable guidelines or instruct the laboratory to include the guidelines in the laboratory report for easy reference and comparison.
- c) Clarify whether MBR#2 PAN 3 sample on May 15, 2024, was collected at the PAN 3 effluent location or within the WWTP, and confirm that Effluent PAN 4 was collected at the PAN 4 location (Landfill site).
- d) Clarify whether a follow-up sampling was completed after the failed acute toxicity test at PAN 3. If follow up sample was not collected, it is recommended that the Hamlet develop a procedure for collecting a follow up sample in the event an acute toxicity sample fails to confirm results.

PAN-04: Sludge Removal Reporting

Comment:

Water licence 3AM-PAN1828 requires reporting of the monthly and annual quantities in cubic metres of sludge removed from the Wastewater Treatment Plant. The 2024 Annual Water Licence Report notes that with respect to the estimated quantity of sewage waste discharged that “*the sludge is separated out from the raw wastewater. The effluent volume = (Raw Wastewater Volume) - (sludge volume).*”

However, CIRNAC was unable to locate the sludge removal values in the 2024 Annual Water Licence Report.

2024 Annual Report Recommendation:

(PAN-04) CIRNAC recommends that the Hamlet include the 2024 sludge removal measurements in the 2024 Annual Water Licence Report, or provide reason for why this was not done. The Hamlet of Pangnirtung has received this comment in years 2022, 2023, and 2024, and have not yet adopted the changes to comply with the terms and conditions of their Water Licence.

PAN-05: Quantities of wastes disposed of in the Landfill

Comment:



Water licence 3AM-PAN1828 requires reporting of the monthly and annual quantities of Wastes disposed of at the landfill. CIRNAC was unable to locate the monthly and annual quantities of Wastes disposed of at the landfill 2024 Annual Water Licence Report.

2024 Annual Report Recommendation:

(PAN-05) CIRNAC recommends the Hamlet include the 2024 monthly and annual quantities of Wastes disposed of at the landfill in the 2024 Annual Water Licence Report, or provide reason for why this was not done.

PAN-06: Monitoring Program Stations PAN-4, PAN-5 and PAN-6

Comment:

Water Licence 3AM-PAN1828 requires the Monitoring Program to be conducted in accordance with Schedule H of the Water Licence.

The 2024 Annual Water Licence Report submitted analytical results for Monitoring Program Station PAN-3 (effluent from the wastewater treatment plant) for five (5) sampling events in 2024 (i.e., May 15, June 27 as treated waste water #2, Sept 17 as effluent #3, October 9, and December 16). The 2024 Annual Water Licence Report also submitted analytical results for Monitoring Program Stations PAN-4 (run-off from sludge disposal area), PAN-5 (run-off from solid waste disposal facility) and PAN-6 (run-off from metal and hazardous waste storage area). Monitoring Program Station PAN-4 was sampled on May 15, 2024, as well as on October 9, 2024. Monitoring Program Stations PAN-5 and PAN-6 were sampled on July 2, 2024, and October 9, 2024.

Although not required by Water licence 3AM-PAN1828, analytical results were also submitted for Monitoring Program Station PAN-2 (also referred to as raw waste water or influent #2) for five (5) sampling events in 2024 (i.e., May 15, June 27, September 17, October 9, and December 16).

Upon review of the analytical results against the requirements of the Monitoring Plan in Schedule H of the Water Licence, the following information/samples are missing from the 2024 Annual Water Licence Report:

- Flow at each monitoring program station as per the frequency in Table 2 of Schedule H.
- Monthly analytical results for PAN-3 for the effluent parameters and metals for the months of January, February, March, April, July, August and November.
- Monthly acute lethality testing of effluent to Rainbow Trout at PAN-3. Only one sample was collected in December 2024 and submitted to ALS laboratory in Winnipeg for trout bioassay (pass/fail) and the results indicate that it failed.
- Magnesium and sodium results for PAN-5 and PAN-6 on July 2, 2024, and just sodium for PAN-4, PAN-5, and PAN-6 on October 9, 2024.



- Field data (i.e., pH, conductivity and temperature) for PAN-3, PAN-4, PAN-5 and PAN-6.

Additional analytical results not required by the Water Licence were sometimes provided for Monitoring Program Stations PAN-4, PAN-5 and PAN-6. Analytical results for PAHs, PHCs, and phosphorus were provided for PAN-5 and PAN-6 for the July 2, 2024, sampling event, as well as analytical results for PAHs, PHCs, and phosphorus for PAN-4, PAN-5, and PAN-6 for the October 9, 2024, sampling event.

There was no comparison or discussion of whether the analytical results met the compliance criteria outlined in Section 3.4 of the Drainage/Seepage Monitoring and Management Plan (i.e., CCME guideline criteria for aquatic marine life). There was also no mention of sampling methodology or if any field duplicates were collected and analyzed during the sampling events. The Quality Assurance / Quality Control Plan indicates that one field blank be collected per cooler and 10% blind duplicates be collected per sampling event, and if the total number of samples collected is less than five, include at a minimum, one blind duplicate.

Monitoring Program Stations PAN-4, PAN-5 and PAN-6 are only required to be sampled/tested when discharge is observed. As reported in the 2024 Annual Water Licence Report, leachate from these locations was tested on June 27, 2024, and October 11, 2024, and the associated analytical results were determined to constitute a spill. However, the dates of the samples on the third party analytical data do not match up with the spill reports (e.g., PAN-4 was sampled on May 15 and Oct 9, 2024; PAN-5 was sampled on July 2 and Oct 9, 2024; and PAN-6 was sampled on July 2 and Oct 9, 2024).

In addition, the 2024 Annual Water Licence Report also added that the “Hamlet faces challenges shipping samples to the Southern labs in the south due to frequent flight cancellation, several transit points for cargo and delayed arrival of coolers containing samples to the lab. For ALS lab in Winnipeg, most of the time samples expired the detention time which may have an effect on the outcome of the samples.”

The Hamlet of Pangnirtung has received this comment in years 2022, 2023, and 2024, and have not yet adopted the changes to comply with the terms and conditions of their Water Licence.

2024 Annual Report Recommendation:

(PAN-06) CIRNAC recommends that the Hamlet:

- a) Provide a summary report of data and information generated under the Monitoring Program in 2024.
- b) Utilize the Station IDs in Water Licence 3AM-PAN1828 when submitting samples to the laboratory for analysis.
- c) Conduct water quality monitoring in accordance with Schedule H of the Water Licence. In particular, it is requested that the Hamlet follows the monitoring and



sampling requirements for the following Monitoring Program Stations that had missing information/samples in 2024, including:

- o PAN-1 – Daily flow measurements
- o PAN-2 – Daily flow measurements
- o PAN-3 – Monthly flow measurements, effluent parameters, acute lethality and metals.
- o PAN-4 – Tested when discharge is observed for flow, effluent parameters and metals (including magnesium and sodium).
- o PAN-5 - Tested when discharge is observed for flow, effluent parameters and metals (including magnesium and sodium).
- o PAN-6 - Tested when discharge is observed for flow, effluent parameters and metals (including magnesium and sodium).

If samples were not collected meeting the frequency requirement, provide an explanation as to why it was not done (e.g., weather).

- d) Provide QA/QC data or provide an explanation as to why it was not done.
- e) Confirm the dates of discharge from the Monitoring Program Stations PAN-4 (run-off from sludge disposal area), PAN-5 (run-off from solid waste disposal facility) and PAN-6 (run-off from metal and hazardous waste storage area).

Effort should be taken to collect monthly water samples on days where a flight is scheduled out of Pangnirtung.

PAN-07: Hydrology/hydraulic study of the Duval River

Comment:

Water Licence No. 3AM-PAN1828 Schedule B: Annual Reporting Requirement h) A progress report and revisions (if applicable) to any studies requested by the Board that relate to Waste management, Water use or reclamation and a brief description of any future studies planned by the Licensee including, a non-technical executive summary for the general public, translated into Inuktitut.

The 2024 Annual Water Licence Report states that *“the Hamlet is actively working on the following studies:*

1. *Hydrology/hydraulic study of the Duval River, funded by NRC; 3 year term and expected to be completed in 2026.*



2. *Bursting the Banks: Dealing with the flooding due to climate change in the Arctic; Hamlet of Pangnirtung; funded by CIRNAC; 3 year term; expected to be completed in 2027.*
3. *Risk-based Approach to Community Planning; funded by CIRNAC; 3 year term; expected to be completed in 2028.”*

2024 Annual Report Recommendation:

(PAN-07) CIRNAC recommends that the Hamlet provide a non-technical executive summary for the general public, translated into Inuktitut, for the *Hydrology/hydraulic study of the Duval River*, which was requested by the NWB, explaining how the Hamlet is actively working to remain in compliance with the water licence terms and conditions.

PAN-08: Addenda to 4 updated Plans

Comment:

Water licence 3AM-PAN1828 requires revisions to Plans, Manuals, and Reports approved under the Licence to be in the form of addenda. In the 2024 Annual Water Licence Report, it was noted that an engineering consulting firm (EXP Services Inc.) was retained to upgrade the following O&M Plans and resubmit corrected versions to the NWB in 2024:

- O&M plan for QA/QC
- O&M Plan for Spill Contingency Plan
- O&M Plan for drainage/leachate management Plan under revision. The updated version will be submitted later.
- O&M Plan for Water storage Reservoir

2024 Annual Report Recommendation:

(PAN-08) CIRNAC recommends that the Hamlet provide revisions to any plans in the form of an addendum to be included within the 2024 Annual Water Licence Report, complete with the lists of revisions detailing where significant content changes are made, to remain in compliance with the water licence terms and conditions. CIRNAC also requests that the Hamlet confirm whether the plan titled, *Drainage/Seepage Monitoring and Management Plan, Hamlet of Pangnirtung, Pangnirtung, Nunavut* (EXP, 2024) is the same as the O&M Plan for Drainage/Leachate Management Plan under revision and provide an update as to when the updated version will be submitted.

PAN-09: Spill reporting and follow-up actions

Comment:



Water Licence No. 3AM-PAN1828 requires that annual reporting provides “a list and description, including volumes, of all un-authorized discharges, spills and summaries of follow-up action taken.” In the 2024 Annual Water Licence Report, it was noted that “the leachate coming from PAN-4, PAN-5 and PAN-6 was sampled for testing under the parameters set out in the Hamlet’s water licence. The release of this leachate into the environment remains unimpeded; as a result, when the laboratory detects values which exceed the acceptable limits for any of the parameters, this constitutes a spill.

Spill reports were submitted for events on the following dates:

- Spill 2024244 on dated June 27, 2024 (petroleum fuel oil, 40 litres).
- Spill 2025157 on dated Oct. 11, 2024 (Sewage, quantity unknown).
- Spill 2025158 on dated Oct. 11, 2024 (sewage, quantity unknown).“

The two spills reported on October 11, 2024, were reported as "quantity unknown," making it difficult to assess the impact of these spills and the adequacy of follow-up actions (if taken).

As per Part G, Item 3, of the Water Licence, “the Licensee shall, subject to section 16 of the Regulations, report any unauthorized deposits of Waste or foreseeable unauthorized deposits of waste and/or Discharges of Effluent, and:

- a) Employ, as required, the approved Spill Contingency Plan;
- b) Report the incident immediately via the NWT/NU 24-Hour Spill Reporting Line (867) 920-8130 and to the Inspector at (867) 975-4295; and
- c) For each spill occurrence, submit a detailed report to the Inspector and to NWB, no later than thirty (30) days after initially reporting the event. The report shall include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain, clean up and restore the spill site.”

It is unclear whether the spills were reported immediately via the NWT/NU 24-Hour Spill Reporting Line (867) 920-8130 and to the Inspector at (867) 975-4295, and whether any follow-up actions were taken for any of the three spills.

In addition, as per the 2024 water licence inspection report, it was noted that old and open drums of waste oil were observed leaking to the environment. No other spill reports to account for this were noted.

2024 Annual Report Recommendation:

(PAN-09) CIRNAC recommends that the Hamlet:

- a) Take appropriate action to remedy any active leaking of waste oil to the environment.
- b) Report all spills, including those associated with old and open drums of waste oil leaking to the environment.



- c) Provide estimates or ranges for spill volumes where precise measurements are not available, or provide an explanation as to why this cannot be done.
- d) Confirm if the spill was reported immediately via the NWT/NU 24-Hour Spill Reporting Line (867) 920-8130 and to the Inspector at (867) 975-4295, or provide an explanation as to why was not done.
- e) Provide a summary of follow-up actions taken for each spill, specific to the product released (i.e., petroleum fuel spill vs a sewage spill). Provide details on how spills were collected and disposed of and specify if additional monitoring or corrective actions were taken.

PAN-10: New landfill update

Comment:

The 2024 Annual Water Licence Report states that “*no abandonment and restoration work were carried out this reporting year.*” CIRNAC’s review of the 2023 Annual Water Licence Report notes that the Hamlet planned to construct a new landfill by 2024.

2024 Annual Report Recommendation:

(PAN-10) CIRNAC recommends that the Hamlet provide a status update on the construction of a new landfill and the decommissioning of the existing solid waste management facility to remain in compliance with the water licence terms and conditions.

PAN-11: Compliance activities

Comment:

The June 24, 2024, inspection identified non-compliance with the Water Licence and the following summary was provided with respect to actions required by the licensee to promote and ensure compliance:

1. *“Oil spills must be remediated at both Water Treatment Plant and Waste Water Treatment Plant parking lots.*
2. *Wind-blown debris must be collected around the fencing and set in the appropriate waste facilities.*
3. *Damaged fencing at the Solid Waste Facility/Burn Cap must be repaired or replaced.*
4. *All hazardous waste must be placed in the designated hazardous waste facility.*
5. *The Hazardous Waste Facility is not bermed properly and is allowing waste oil to escape the facility and enter the water stream. The facility must be working in a way to contain the migrating oil.”*



In the 2024 Annual Water Licence Report, the Hamlet indicated that the following was completed with respect to actions taken to address concerns of deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector:

- *“The contaminated soil was stored in a cell built in the metal dump.*
- *All the used oil drums are stored in a containment cell adjacent to the metal dump.*
- *Hamlet submits Annual Reports on time. Hamlet follows the direction of the CIRNAC inspector and work closely with the technical members of GN-CGS.*
- *The missing annual reports for 2019,2020 and 2021 were re-prepared and re-submitted.*
- *The response to CIRNAC assessment on this licence from 2019 to 2023 will be prepared and submitted in a separate file.”*

Under Section viii of the 2024 Annual Water Licence Report, the following additional information was provided:

- *“The hazardous material was kept in a storage area inside the metal dump.*
- *The waste oil drums were relocated into the metal dump site.”*

Based on the response in the 2024 Annual Water Licence Report, it is unclear whether the Hamlet addressed any of the non-compliance concerns identified in the June 24, 2024, inspection report.

2024 Annual Report Recommendation:

(PAN-11) CIRNAC recommends that the Hamlet describe how and when these concerns identified in the June 24, 2024, Inspection Report were addressed. For items not addressed or completed, a timeline for addressing the non-compliance concerns should be provided.

PAN-12: Hydrology Study

Comment:

Part D, Item 5, of Water Licence 3AM-PAN1828 requires that a hydrology study is completed for the site:

- *“The Licensee shall complete and provide to the Board the results of a Hydrological Study of the Duval River within four (4) years of the approval of this Licence by the Minister. The Hydrological Study shall address relevant interveners’ comments and recommendations made during the 2017-2018 licensing process, including, at a minimum, details related to the discharge volume and velocity, erosion, sedimentation, water quality, and variability of discharge into the Duval River.”*



The Hydrological Desktop Study for the Hamlet of Pangnirtung, attached to the 2022 Annual Water Licence Report, was reviewed from a high-level.

The study has undertaken a water balance calculation to determine discharge rates on the Duval River. The water balance calculation uses available historical annual precipitation volumes and projects these for future estimates of available precipitation. Estimates are made on the percentage of precipitation which falls as rain during the extraction period and that which would fall as snow. Reported evapotranspiration rates in arctic environments are sourced from 12 locations/reports. The water balance compares various combinations of precipitation and evapotranspiration against future water use.

It is noted in the assessment that:

- The estimated splits in precipitation are conservative based on the change in precipitation as rainfall versus snow in the latest period monitored as per the cited source.
- The water balance scenarios are all relatively conservative with lower precipitations and higher evapotranspiration scenarios.
- There is some reference to climate change and how this could impact river flows but there is no attempt to integrate climate change into the water balance or quantify the effects.
- There are recommendations in the study for future studies and monitoring, including: installation of flow gauges, topographic survey, water quality monitoring and permafrost monitoring.

In terms of the requirements under the water licence:

- The study does not provide details on discharge velocity due to lack of long-term monitoring data, though it is understood that monitoring is now being undertaken and development of a model to simulate various discharges is also being progressed.
- The study does not discuss any geomorphological issues in terms of erosion or sedimentation of the Duval River.
- There is no discussion on water quality in the study.
- There is limited discussion on variability of flows based on the available historical water level measurements from 1973-1983.

2024 Annual Report Recommendation:

(PAN-12) CIRNAC recommends that the Hamlet:

- a) Integrate climate change into the water balance including the potential for loss of permafrost conditions.



- b) Undertake the recommended future studies and monitoring as per the report, including the flow monitoring currently being undertaken.
- c) Complete a geomorphological assessment of the river to fulfill the erosion and sedimentation discussions required under the licence.
- d) Include a discussion of water quality to the revisions of the report.

PAN-13: Drainage/Seepage Monitoring and Management Plan

Comment:

Part E, Item 9, of Water Licence 3AM-PAN1828 requires an updated Drainage/Seepage Monitoring and Management Plan for the site:

- *“The Licensee shall submit to the Board, for approval, a standalone Drainage / Seepage Monitoring and Management Plan with the 2018 Annual Report to address intervener’s comments and recommendations made during the 2017-2018 licensing process and public hearing, including, at a minimum, a list of parameters of concern, targeted concentrations limits and monitoring details.”*

A standalone Drainage/Seepage Monitoring and Management Plan was not submitted with the 2018 Annual Report. In the 2024 Annual Water Licence Report, however, it was indicated that EXP Services Inc. was retained to develop the Drainage/Seepage Monitoring and Management Plan.

In the 2024 Drainage/Seepage Monitoring and Management Plan, it is noted that although a formal standalone Drainage/Seepage Monitoring and Management Plan was not submitted with the 2018 Annual Water Licence Report, the Hamlet has completed several key elements of the Plan. These elements/activities have included:

- *“Completion of site survey and development of a drainage plan indicating surface water drainage controls and key culvert information including culvert coordinates. Results of the survey and drainage plan development were provided in an EXP memo report entitled “Pangnirtung Drainage Plan Topographic Survey” EXP file FRE-00253815-A0 dated June 18th, 2019. A copy of key drainage plan figures from this work which indicate the locations of the three Water Licence specified Drainage/Seepage monitoring stations is provided in Appendix A;*
- *Development of the report entitled Quality Assurance/Quality Control Plan Hamlet of Pangnirtung, Pangnirtung, Nunavut (EXP file FRE-00232735-A0, May 24th, 2018) outlining the Water Licence monitoring program requirements and QA/QC program to ensure reliable results. The 2018 QA/QC plan outlines leachate seep sample requirements including locations, frequency, sampling and analytical suites which are reiterated in this standalone plan;*



- *A memo report dated February 11th, 2021, and entitled Pangnirtung Leachate Sample Summary (EXP file FRE-00232735-A0) provided a summary of results of drainage/seepage samples collected on June 21, 2020 from the three drainage/seepage monitoring stations specified in the Water Licence. A copy of this report is provided in Appendix B.”*

The Drainage/Seepage Monitoring and Management Plan was reviewed from a high-level and with consideration towards parameters of concern, targeted concentrations limits and monitoring details. The findings of the review of the Drainage/Seepage Monitoring and Management Plan are as follows:

- With respect to parameters of concern and monitoring details, it is noted that the Drainage/Seepage Monitoring and Management Plan is a supplement to the document entitled Quality Assurance and Quality Monitoring Plan (QA/QC Monitoring Plan) prepared by EXP (2018). Section 3 of the Drainage/Seepage Monitoring and Management Plan is adapted from the EXP QA/QC Plan (EXP, 2018) which should be referred to if further clarification of sampling requirements, method and procedures is required.
- With respect to targeted concentration limits, Section 3.4 states that *“for the initial assessment of sample results, it is suggested that CCME guideline criteria for aquatic marine life be used.”*
- Under Section 3.2 of the Drainage/Seepage Monitoring and Management Plan, it is noted that “after completion of a one-year monitoring period it is understood the results of the program would be submitted with the Annual Report for that year, and the requirements for sampling during subsequent years would be pending review by the NWB (this should be confirmed in writing with the NWB).”
- Ongoing/ recommended work and annual inspection and maintenance is summarized in Section 4.

2024 Annual Report Recommendation:

(PAN-13) CIRNAC recommends that the Hamlet:

- a) Update the Drainage/Seepage Monitoring and Management Plan to provide reference to the most recent version of the Quality Assurance and Quality Monitoring Plan.
- b) Conduct ongoing/ recommended work and annual inspection and maintenance as per the report.

PAN-14: Water Reservoir Operations and Maintenance Manual

Comment:



Part D, Item 13, of Water Licence 3AM-PAN1828 requires an updated Water Reservoir Operations and Maintenance Manual for the site:

- *“The Licensee shall submit for Board review an updated Water Reservoir Operations and Maintenance Manual with the 2018 Annual Report. The updates shall address interveners’ comments and recommendations made during the 2017-2018 licensing process and public hearing.”*

An updated Water Reservoir Operations and Maintenance Manual was submitted in 2018.

In the 2024 Annual Water Licence Report, it was indicated that EXP Services Inc. was retained to update the Water Reservoir Operations and Maintenance Manual. Without the Hamlet providing revisions to any plans in the form of an addendum within the 2024 Annual Water Licence Report (refer to comment PAN-08), it is unclear where content changes were made. As such, the updated Water Reservoir Operations and Maintenance Manual was reviewed from a high-level.

The Water Reservoir Operations and Maintenance Manual provides the maintenance schedule for the reservoir/water intake piping, which is as follows:

- Annual maintenance as described below.
- Five-year cleaning of the reservoir.

The river intake piping (pump suction) and the diesel pump are brought out of storage and used during the filling of the reservoir. The intake piping is to be inspected for cracks and leaks and to confirm any gaskets are present and properly seated. The strainer/check valve is inspected for blockages and to confirm the check valve is operational. It is noted that local knowledge indicates there are no fish in the Duval River (there have been no studies completed to confirm this), therefore, a specific-sized strainer is not required. Strainer sizing is to be based on minimizing debris being pulled from the river and deposited into the reservoir. This is in contradiction to the Water Licence as Part D, Item 4, states that *“the Licensee shall, within six (6) months of approval of this Licence, equip all freshwater intake structures with screens of appropriate mesh size that meet the requirements of Fisheries and Oceans (DFO) Canada’s Freshwater Intake End-of-Pipe Fish Screen Guidelines (1995 or the most current) so as to prevent the entrainment of fish and control Water withdrawal rates such that fish do not become impinged within the screens.”* However, under Section viii of the 2024 Annual Water Licence Report, the following statement was made:

- *“Water: Installation of fish screen at the end of the intake pipe: It was installed and operational.”*

In addition, with respect to the diesel pump, the Water Reservoir Operations and Maintenance Manual indicates that *“care must be taken when refueling the pump. Spill prevention and best practices for refueling must be observed for this facility.”*

2024 Annual Report Recommendation:



(PAN-14) CIRNAC recommends that the Hamlet:

- a) Update the Water Reservoir Operations and Maintenance Manual to reflect that a fish screen is required and has been installed.
- b) Update the Water Reservoir Operations and Maintenance Manual to provide reference to the Spill Contingency Plan when speaking about spill prevention and best practices for refueling at the facility.
- c) Under Schedule B: Annual Reporting Requirement, Item g, of the Water Licence, indicate whether cleaning of the reservoir has been carried out or when it is anticipated to be conducted in the 2024 Annual Water Licence Report.

PAN-15: Spill Contingency Plan

Comment:

Part G, Item 2, of Water Licence 3AM-PAN1828 requires an updated Spill Contingency Plan for the site:

- *“The Licensee shall submit to the Board for review an updated Spill Contingency Plan with the 2018 Annual Report. The updates shall address interveners comments and recommendations made during the licensing process and public hearing, including a topographical map with all infrastructures/facilities included within the scope of this Licence.”*

An updated Spill Contingency Plan was submitted in 2018.

In the 2024 Annual Water Licence Report, it was indicated that EXP Services Inc. was retained to update the Spill Contingency Plan. Without the Hamlet providing revisions to any plans in the form of an addendum within the 2024 Annual Water Licence Report (refer to comment CH08 in Section 2.3 above), it is unclear where content changes were made. As such, the updated Spill Contingency Plan was reviewed from a high-level.

The purpose of the Spill Contingency Plan is to address potential environmental spill incidents that may occur during the routine operation and maintenance activities that take place within public facilities and infrastructures, such as the municipal garage, solid waste landfill including bulky metal / hazardous waste material storage area, water treatment / truck fill station, and wastewater treatment plant in Pangnirtung. In addition, it is also to address potential environmental spill incidents that may occur in private properties, such as sewage holding tank in private homes or institutions.

The Spill Contingency Plan includes a review of appropriate government acts and regulations, the identification of foreseeable spill scenarios, spill contingency procedures and general health, safety and emergency contingency requirements necessary when conducting activities that may require contact with the spilled materials.



The Spill Contingency Plan's Appendix B contains a topographical map with all infrastructures/facilities.

With respect to burning of waste, the following is noted in the Spill Contingency Plan:

- *“Once waste is properly segregated, burnable waste such as domestic waste (e.g., food waste, paper products, paper board/cardboard packaging) and non-treated wood are burned at least once per week, when winds are light and blowing away from the community,”* and
- *“The Hamlet presently burns garbage during summer almost every day. Hamlet personnel (e.g., Foreman and crew) typically carry out and control burning of waste at the municipal solid waste disposal area. Controlling the open burn is extremely important to reduce the risk of uncontrolled fire and hazards to the public, employees and the surrounding environment. The potential contaminants associated with solid waste burning process include PCBs, metals in particulate matters, dioxins and furans, polycyclic aromatic hydrocarbons, etc.”*

Part E, Item 6, of the Water Licence states:

- *“The Licensee shall practice open burning only as a means of last resort when all other reasonable disposal measures have been implemented.”*

2024 Annual Report Recommendation:

(PAN-15) CIRNAC recommends that the Hamlet:

- a) In line with the information presented in the 2024 Water Licence Annual Report, include in the Spill Contingency Plan that when the laboratory detects values which exceed the acceptable limits for any of the parameters included in the Water Licence at PAN-4, PAN-5 and PAN-6, where the release of leachate into the environment remains unimpeded, this constitutes a spill.
- b) Provide alternatives to open burning of waste.

PAN-16: Quality Assurance/Quality Control Plan

Comment:

Part H, Item 7, of Water Licence 3AM-PAN1828 requires an updated Quality Assurance/Quality Control Plan for the site:

- *“The Licensee shall submit to the Board for review, with the 2018 Annual Report, an updated Quality Assurance/Quality Control Plan to address relevant intervener’s comments and recommendations made during the 2017-2018 licensing process and public hearing.”*



Section 2.3.1 of the Quality Assurance/ Quality Control Plan outlines the drinking water sample collection frequency and analytical testing for the water treatment plant. This includes biweekly bacteria sampling from five locations (raw, treated and three different taps in the community). In addition, the Quality Assurance/ Quality Control Plan includes analytical requirements for Monitoring Station PAN-1 and the Truck-Fill Station for which samples are to be collected twice annually. This data was not included in the 2024 Annual Water Licence Report.

Part H, Item 8, of Water Licence 3AM-PAN1828 indicates that “*the Plan shall be acceptable to an accredited laboratory and include a covering letter from the accredited laboratory confirming acceptance of the Plan for analyses to be performed under the Licence.*” The updated Quality Assurance/Quality Control Plan did not include such a covering.

2024 Annual Report Recommendation:

(PAN-16) CIRNAC recommends that the Hamlet include the 2024 analytical results for Monitoring Station PAN-1 and the Truck-Fill Station within the summary report of data and information generated under the Monitoring Program in 2024 which is required by Schedule B, Item f, of the Water Licence. CIRNAC also recommends that the plan be provided to the accredited laboratory for their approval.