Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
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Your file - Votre référence
3AM-GRA1624

Our file - Notre référence
GCDocs#96648745

August 23, 2021

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
sent via email: licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada's (CIRNAC) technical review of Government of Nunavut Community and Government Services' 2020 Annual Report for Hamlet of Rankin Inlet Water Licence 3AM-GRA1624

Dear Mr. Dwyer,

Thank you for the May 31, 2021 invitation for technical review comments on the 2020 Annual Report submitted by the Government of Nunavut Department of Community and Government Services, on behalf of the Hamlet of Rankin Inlet for Water Licence number 3AM-GRA1624. The Water Resources Division of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) reviewed the annual report and provided comments and recommendations in the enclosed memorandum for the Nunavut Water Board's consideration.

Comments have been provided pursuant to CIRNAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*.

If there are any questions or concerns, please contact me at (867) 975-4689 or john.onita@canada.ca or Andrew Keim at (867) 975-4550 or andrew.keim@canada.ca

Sincerely,

John Onita,
Regional Water Coordinator

Canada

Technical Review Memorandum

Date: August 23, 2021

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

From: John Onita, Regional Water Coordinator, CIRNAC

Subject: **Crown-Indigenous Relations and Northern Affairs Canada's (CIRNAC) technical review of Government of Nunavut, Community and Government Services' 2020 Annual Report for Hamlet of Rankin Inlet Water Licence 3AM-GRA1624**

Region: ☐ Kitikmeot ☒ Kivalliq ☐ Qikiqtani

A. BACKGROUND

According to section 2.1 of the 2020 environmental emergency and contingency plan:

"The Government of Nunavut, Department of Community and Government Services (GN-CGS) provides water supply and sewage disposal services for the Hamlet of Rankin Inlet under Nunavut Water Board (NWB) License 3AM-GRA1624 issued on May 2, 2016 and expiring May 1, 2024. Water and wastewater systems in the Hamlet include the following facilities:

- *A water intake plant. Water is drawn from Nipissar Lake and is treated at the plant.*
- *Seasonal resupply pipeline from Lower Landing Lake to Nipissar Lake; and*
- *A wastewater treatment plant, which provides primary treatment of sewage, and eventual discharge into Hudson Bay"*

The GN-CGS have submitted the 2020 Annual Report for water use and disposal of waste in Rankin Inlet to the NWB as required under Water Licence 3AM-GRA1624 for review. It is required that the annual report be developed in accordance with Schedule B conditions of the NWB licence.

CIRNAC provides the following comments and recommendations pertaining to the review of the 2020 annual report. A summary of CIRNAC's recommendations can be found in Table 1. Documents reviewed and referenced 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	Quantity of water withdrawn
R-02	Pumping of 355,444 m³ water from Lower Landing Lake
R-03	Quantity of solid wastes/sludge
R-04	Potential impacts to receiving environment
R-05	Water Quality

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
Nunavut Waters and Nunavut Surface Rights Tribunal Acts (2016); *Nunavut Water Board*	NWNSRTA, 2016
Department of Crown-Indigenous Relations and Northern Affairs Act (2000)	CIRNAC Act, 2000
3AM-GRA1631 Licence-OASE	Amended NWB Type "A" Water Licence 3AM-GRA1631; NWB July 8, 2021
3AM-GRA1624 2021 Rankin Inlet CGS QAQC-IMLE	NWB 2020
3AM-GRA1624 2021 Rankin Inlet CGS Env Contingency Plan-IMLE	NWB 2020
3AM-GRA1624 2020 Annual Report reduced size-IMLE	GN-CGS, Hamlet of Rankin Inlet, May 28, 2021
3AM-GRA1624 Technical Review Response-IMLE	NWB; December 16, 2020
3AM-GRA1624 180214 Diagram of Pipeline Extension to Lower Landing Lake-IMLE	GN-CGS, Hamlet of Rankin Inlet, 2020
3AM-GRA1624 2020-07-29-NPC Letter re 149381Municipal Water Licence Amendment-IMLE	NPC; July 29, 2020
3AM-GRA1624 Plan for Compliance 2020 - FINAL-IMLE	GN-CGS, Hamlet of Rankin Inlet, 2020
3AM-GRA1624 Annual Report 2019 FINAL-IMLE	GN-CGS, Hamlet of Rankin Inlet, 2020
200720 3AM-GRA1624 Fourth Quarter Report 2018 FINAL-IMLE	GN-CGS, Hamlet of Rankin Inlet, 2019
3AM-GRA1624 Annual Report 2017-IAAE	GN-CGS, Hamlet of Rankin Inlet, 2018
3AM-GRA1624 First Quarter Report 2016-IAAE	GN-CGS, Hamlet of Rankin Inlet, 2017
Canadian Council for Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life, (assessed in April, 2020)	CCME, April, 2020

C. RESULTS OF REVIEW

1. Quantity of water withdrawn

Comment:

Table 1, Page 1, of the 2020 Annual report provides information on the monthly quantities of freshwater obtained from all sources while acknowledging that *"broken flow meters and missed readings have caused monthly totals to become incomplete and inaccurate"*. Therefore, *"the annual total was provided by tracking totals on the flow meters in use"*.

CIRNAC observes that the quantities of water withdrawn in the months of April and May, was not reported in Table 1, Page 1, of the 2020 Annual Report. CIRNAC seeks clarification from the licensee if the omission of water quantity for the months of April and May in the Annual Report, was as a result of the broken flow meters and missed readings as acknowledged, or it meant that no amount of water was withdrawn in the months of April and May, 2020.

Recommendation:

(R-01) CIRNAC requests that the licensee:

a. Clarify if any amount / volume of water was withdrawn from any fresh water source in Rankin Inlet in the months of April and May, 2020.
b. If yes, what is the estimated amount of water withdrawn in April and May, 2020 respectively?
c. Provide information on the current state of the flow meters (whether they are repaired or replaced).

2. Pumping of 355,444 m³ water from Lower Landing Lake

Comment:

The licensee acknowledged in Page 3, Table 3 of the 2020 Annual Report that *"A total of 355,444 m³ was pumped to Nipissar Lake in 2020. A flowmeter was installed on July 22nd and lost power on September 18th that measured 245,444 m³. Approximately 110,000 m³ was not registered through the meter from July 6th-21st and September 18th-21st. Pumping was for a total of 78 days". The monthly totals are estimates calculated from the total value".* The licensee did not state whether this amount of water pumped from Lower Landing Lake into Nipissar lake was authorized under the renewed licence or the existing licence as of 2020 before the amendments took effect (on July 8, 2021).

For example, CIRNAC observes that the authorization to pump 10,000 m³ per day from Lower Landing Lake into Nipissar Lake was granted by the NWB under the renewed licence 3AM-GRA1631 with July 8, 2021 as the effective date. This renewed licence authorizes the volume of water pumped (i.e. 355,444 m³) over the acknowledged period. Considering the terms and conditions of the existing licence (as it pertains to water use),

the licensee was not authorized to pump 10,000 m³ per day from Lower Landing Lake into Nipissar Lake in 2020 under water licence 3AM-GRA1624. Therefore, the existing licence did not authorize pumping 355,444 m³ of water from Lower Landing Lake into Nipissar Lake for the period July 6 to September 21 in the year 2020.

Based on water licence 3AM-GRA1624 terms and conditions on which the 2020 Annual Report was developed, pumping of 3,485 m³ per day was authorized. This meant that the licensee only was authorized to pump a total of 271,830 m³ of water for the 78 days (July 6 to September 21, 2020), not 355,444 m³ as acknowledged. This action by the licensee did not conform to the condition specified under Part C-4 of the NWB licence 3AM-GRA1624. CIRNAC notes that a land use plan conformity determination (which still applies to-date) was issued on March 19, 2010 and June 19, 2016 by the Nunavut Planning Commission (NPC), authorizing the relocation/moving of the pump from the Char River to Lower Landing Lake. Based on this premise, the licensee was expected to continue pumping activities within specifications/limits permissible under existing water licence until the NWB approve the amendments in the renewed licence which came into effect on July 8, 2021.

Recommendation:

(R-02) CIRNAC requests that the licensee clarify pumping of 355,444 m³ of water from Landing Lake into Nipissar Lake in 2020 when it was not permissible under water licence 3AM-GRA1624 terms and conditions.

3. Quantity of Solid wastes/sludge

Comment:

Schedule B, Item c; of water licence 3AM-GRA1624 requires the licensee to report *"The monthly and annual quantities of wastes removed for disposal from licenced facilities".* A comparative review of Annual Reports submitted by the licensee from 2016 to 2020 (i.e. five consecutive years) shows that the Monthly quantities of solid waste/sludge reportedly removed from the sewage treatment facility have remained constant at 4 m³. Similarly, the review shows that the information reported in Table 2, Page 2, of the 2020 Annual Report was the same table/information reported in the 2019 and 2017 Annual Reports respectively.

CIRNAC observes that there exists, no mention or description of the operating principles or procedure(s) / method(s) used to collect solid waste/sludge data at the sewage treatment facility, in the 2020 environmental monitoring program and quality assurance / quality control plan, that was submitted to the NWB by the licensee. Section 4.1 of the quality plan states, "*Quality Assurance (QA) is a set of operating principles that, if strictly followed during sample collection and analysis, will produce data of known and defensible quality (Wilson, 1995)".*

Part D, Item 6, of water licence 3AM-GRA1624 requires the licensee to "*maintain records of all Waste removed from the site and records of confirmation of proper disposal of removed Waste. These records shall be made available to an Inspector upon request".*

CIRNAC's Inspector observed in his August 11, 2020 report that *"Sewage sludge was deposited at a rate of 1 cubic meter per week, into a designated area at the municipal Landfill".* The Inspector's observation confirms that the sludge data was collected. To ensure that the quality of sludge data being generated can be validated and maintained to support informed decision making, CIRNAC seeks a description of the operating principles/procedures through which the sludge data were being generated on a monthly basis. This procedure should be clearly documented in the quality plan to include methods used in sludge weight/quantity determination, handling, safety and disposal.

Recommendation:

(R-03) CIRNAC recommends that the licensee update the *"2020 Environmental Monitoring Program and Quality Assurance / Quality Control Plan"* to include information on solid waste / sludge data collection procedures at the sewage treatment facility.

4. Potential impacts to receiving environment

Comment:

On Page 5 of the 2020 Annual Report, under the heading, *"Additional information that the licensee deems useful",* the licensee acknowledged submitting an amendment application package to the NWB on September 16, 2020 for water licence 3AM-GRA1624.

CIRNAC observes that the licensee did not wait for the NWB's approval (as acknowledged in the Compliance Plan, Parts E1-E3); before moving ahead to undertake a major/significant modification activity that is capable of altering the Lower Landing Lake's hydro-morphological structure (i.e. water flow) and Geo-morphological structure (i.e. River/Lake attributes).

The licensee reported in its 2020 Compliance Plan that, *"The pump now sits in the Lower Landing Lake (GRA-7) body of water which is upstream of Char River. This allows more water to be pumped over a longer period of time due to water levels being consistent as provided in the water balance study completed on Nipissar Lake and Lower Landing Lake in 2016. An access road was also installed from the main road to pad where the sea can containing the pump sits, and a pipeline over the vicinity of Char River to allow the utilidor pipe to bypass this river above the high water mark – no change to flow occurred to date".*

CIRNAC is concerned that the construction or installation of a new access road (without prior authorization from the NWB) within the vicinity of the Lower Landing Lake may cause sediment build-up around the lake and also could lead to erosion of the river banks. CIRNAC would assume that this activity would not pose greater impacts on the flow rate of the Lower Landing Lake.

CIRNAC seeks clarification from the licensee if the referenced water balance study of 2016 in the Compliance Plan, also covered the potential impacts that the newly

installed/constructed access road could have on the flow patterns as well as the processes and attributes of the Lower Landing Lake, Nipissar Lake and the Char River respectively.

As noted in the NWB's completeness check letter dated December 16, 2020 for water licence 3AM-GRA1624, the licensee's response to recommendation #4, item 4.2 was, *"As there are no construction activities planned to take place near Char River (steel carrier pipe is in place and not being moved), is sampling for this type of activity still recommended?"*.

CIRNAC also seeks clarification from the licensee regarding its response to the NWB that no construction or installation activity was planned or took place near or within the vicinity of the Char River as of December 16, 2020 (or probably, the end of year 2020), but acknowledged in its Compliance Plan that in 2020 "*An access road was also installed from the main road to pad where the sea can containing the pump sits, and a pipeline over the vicinity of Char River to allow the utilidor pipe to bypass this river above the high water mark".* CIRNAC asks if the installation activities of a new access road as well as a pipeline over or within the vicinity of the Char River by the licensee, are not considered a construction activity? If the answer is yes (that it is considered a construction activity):

- Was the NWB notified in writing of such proposed construction activity at least sixty (60) days prior to the beginning of the new access road construction or installation as specified under Part E, Item 2a of water licence 3AM-GRA1624?

CIRNAC is aware that the amendment application package submitted by the licensee on September 16, 2020 was mainly *"to move the annual resupply pumping location from Char River 200 m upstream to Lower Landing Lake, increase daily and annual pumping volumes, and associated changes to monitoring and reporting requirements in the current licence to reflect the change"* as referenced in the 2020 annual report, Page 5. CIRNAC notes that this amendment application did not contain any mention of the *intent* or *plan* to install or construct a new access road within the vicinity of the Char River by the licensee in 2020.

Recommendation:

(R-04) CIRNAC recommends that the licensee provide the following information to the NWB:

a. Provide within 30 days "as built" installation/construction drawing signed and stamped by an Engineer registered in Nunavut, for the newly installed/constructed access road as well as for the newly installed pipeline.
b. Provide detailed information on the potential impacts of the newly installed/constructed access road; and the newly installed pipeline on both the flow pattern and attributes (surface features) of the Char River and Lower Landing Lake in the next Annual Report

c. Provide a mitigation plan for any identified impacts; particularly mitigation against potential erosion and sediment build-up on the river/lake banks of Lower Landing Lake and Char River.
d. Update the environmental monitoring program and quality assurance / quality control plan to include information on flow monitoring and data collection procedures at river/lake banks of Lower Landing Lake and Char River and provide that information.
e. Provide, within 30 days the data/results used to support the conclusion that, *"no change to flow occurred to date"* after the new access road was installed/constructed; also after moving of the pump from the Char River to Lower Landing Lake was undertaken.

5. Water Quality

Comment:

Part H, Item 5, of the water licence 3AM-GRA1624 states that, *"The Licensee shall sample annually during spring freshet, at Monitoring Program Stations GRA-1, GRA-6 and GRA-7 and analyze for the following parameters in accordance with the Canadian Council of Ministers of the Environment (CCME, 2013) Water Quality Guidelines for the Protection of Freshwater Aquatic Life:*

pH	*Sulphate*	*Total Nickel*
Total Suspended Solids	*Total Alkalinity*	*Total Zinc*
Total Phenols	*Chloride*	*Benzene*
Total Hardness	*Magnesium*	*Ethylbenzene*
Sodium	*Total Arsenic*	*Xylene (BTEX)*
Total Aluminum	*Total Cobalt*	*Total Petroleum Hydrocarbons (TPH) (using a method that measures mineral sources of hydrocarbons; e.g. ASTM D7678 PHC test or other)*
Total Chromium	*Total Iron*	
Total Copper	*Total Manganese*	
Total Lead	*Total Mercury*	
Conductivity	*Total Phosphorous*	
Ammonia Nitrogen	*Oil and Grease*	

The descriptions for Monitoring Program Stations as stated in Part H, Item 1, of water licence 3AM-GRA1624 are as follows:

GRA-1 (Raw water supply prior to treatment)
GRA-6 (Char River water pumped to Nipissar Lake)
GRA-7 (Lower Landing Lake)

CIRNAC is satisfied with the sampling information provided by the licensee. All parameters specified in Part H, Item 5 of water licence 3AM-GRA1624, were analyzed. Sampling was conducted as required. There are no indications of any concerns for water quality based on results provided by the licensee for monitoring program stations GRA1, GRA6 and GRA7

respectively. CIRNAC's conclusion is based on a comparative presentation of reported results and CCME water quality guidelines for the protection of freshwater aquatic life as contained in the table below:

		GRA-1 (Raw Water Supply Prior to Treatment)	GRA-6 (Char River Water Pumped into Nipissar Lake)	GRA-7 (Lower Landing Lake)	CCME Freshwater Long Term Limit (2020)
Parameter	**Unit**	**25-Jun-20**	**25-Jun-20**	**25-Jun-20**	
Bicarbonate (HCO3)	mg/L	35.9	14.4	13.4	
Carbonate (CO3)	mg/L	0.6	0.6	0.6	
Hydroxide (OH)	mg/L	0.34	0.34	0.34	
Alkalinity, Total (as CaCO3)	mg/L	29.4	11.8	11	
Ammonia Total (as N)	mg/L	0.047	0.01	0.01	**0.483**
Biochemical Oxygen Demand	mg/L	2	2	2	
BOD Carbonaceous	mg/L	2	2	2	
Chloride (Cl)	mg/L	19	6.59	6.04	**120**
Conductivity	umhos/cm	143	52.9	48.2	
Fecal Coliforms	MPN/100mL	10	10	10	
Hardness (as CaCO3)	mg/L	42.4	15	13.9	
Mercury (Hg)	mg/L	0.000005	0.000005	0.000005	**0.00025**
Nitrate (as N)	mg/L	0.02	0.02	0.02	**13**
Nitrate and Nitrite as N	mg/L	0.07	0.07	0.07	**0.02**
Nitrite (as N)	mg/L	0.01	0.01	0.01	**0.06**
Oil and Grease	mg/L	5	5	5	
Phenols	mg/L	0.001	0.001	0.001	**0.004**
Phosphorus (P)	mg/L	0.0123	0.0087	0.01	
Sulfate (SO4)	mg/L	10.1	2.02	1.83	
Aluminium (Al)	mg/L	0.0301	0.0162	0.0198	**0.1**
Arsenic (As)	mg/L	0.00086	0.000042	0.00041	**0.005**
Cadmium (Cd)	mg/L	0.000005	0.000005	0.000005	**0.00004**
Calcium (Ca)	mg/L	13.1	4.63	4.26	
Chromium (Cr)	mg/L	0.00016	0.0001	0.0001	**0.001**
Cobalt (Co)	mg/L	0.00012	0.0001	0.0001	**0.01**
Copper (Cu)	mg/L	0.00096	0.0007	0.00066	**0.002**
Iron (Fe)	mg/L	0.062	0.081	0.082	**0.3**
Lead (Pb)	mg/L	0.000105	0.00005	0.00005	**0.001**
Magnesium	mg/L	2.38	0.834	0.779	
Manganese	mg/L	0.0315	0.0064	0.00686	**0.19-1.4**
Nickel (Ni)	mg/L	0.00253	0.00053	0.0005	**0.025**
Potassium (K)	mg/L	1.37	0.782	0.738	
Sodium (Na)	mg/L	9.83	3.15	3.13	
Zinc (Zn)	mg/L	0.003	0.003	0.003	**0.007**
Total Organic Carbon	mg/L	4.28	3.48	3.03	
Total Suspended Solids	mg/L	3	3	3	**5**
pH pH	pH Units	7.43	7.15	7.33	**6.5-9.0**
Benzene	mg/L	0.0005	0.0005	0.0005	**0.37**
Toluene	mg/L	0.001	0.001	0.001	**0.0002**
Ethyl Benzene	mg/L	0.0005	0.0005	0.0005	**0.09**
o-Xylene	mg/L	0.0005	0.0005	0.0005	
F1 (C6-C10)	mg/L	0.1	0.1	0.1	
F2 (C10-C16)	mg/L	0.1	0.1	0.1	
F3 (C16-C34)	mg/L	0.25	0.25	0.25	
F4 (C34-C50)	mg/L	0.25	0.25	0.25	
Total Hydrocarbons (C6-C50)	mg/L	N/A	N/A	N/A	

Recommendation:

(R-05) CIRNAC recommends that the Licensee and the Government of Nunavut adopt the provided example / template to be used to compare data sets collected annually during Freshet from the listed sampling points. Data collected over time (annually) may then be compared and evaluated to determine compliance with CCME water quality guidelines for

the protection of freshwater aquatic life. This table may also be used at other sites in Nunavut and in future Annual Reports.

D. REFERENCES

Canadian Council for Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life, (assessed in April, 2020)

Department of Crown-Indigenous Relations and Northern Affairs Act (2000)

Government of Nunavut, Community and Government Services, Environmental Monitoring Program and Quality Assurance/Quality Control Plan; Nunavut Water Board, 2021

Government of Nunavut, Community and Government Services, Environmental Contingency Plan; Nunavut Water Board, 2021

Government of Nunavut, Community and Government Services, Compliance Plan; Hamlet of Rankin Inlet, 2020

Government of Nunavut, Community and Government Services, Diagram of Pipeline Extension to Lower Landing Lake; Hamlet of Rankin Inlet, 2020

Nunavut Water Board, Technical Review Response; NWB, December 16, 2020

Nunavut Planning Commission Letter, Re-Municipal Water Licence Amendment; NPC, July 29, 2020

Nunavut Water Board Type “A” Water Licence (Amended) 3AM-GRA1631; NWB, July 8, 2021

Nunavut Waters and Nunavut Surface Rights Tribunal Acts (2016); *Nunavut Water Board*

2020 Annual Report, Hamlet of Rankin Inlet; May 28, 2021
2019 Annual Report, Hamlet of Rankin Inlet; 2020
2018 Annual Report, Hamlet of Rankin Inlet; 2019
2017 Annual Report, Hamlet of Rankin Inlet; 2018
2016 Annual Report, Hamlet of Rankin Inlet; 2017