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Building *Nunavut* Together
*Nunavu*liuqatigiingniq
Bâtir le *Nunavut* ensemble

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

Nunavut Water Board Public Meeting

Water Licence Renewal and Amendment

Arviat

3AM-ARV----

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Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

Department of Community and Government Services
Nunalingni Kavamatkunnilu Pivikhaqautikkut
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Existing Licence

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Water Licence: 3AM-ARV---

This application is for the renewal and amendment of the expired 3AM-ARV1015 licence.

- Date of Licence Issuance: August 23, 2010
- Expiry of Licence: August 31, 2015
- Short Term Renewal: June 16, 2015
- Short Term Expiry: February 27, 2016
- Scope of Licence:

This Licence allows for the use of Water and disposal of Waste including operation of a Water Supply Facility, Solid Waste Disposal Facility, Hazardous Waste Storage Area, Bulky Metals Area, and Sewage Disposal Facility.

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Water Licence: 3AM-ARV---

In the absence of an active licence Arviat has continued to:

- Report quantities of water withdrawn &wastewater deposited
- Improve the management of solid waste
- Understand studies to improve water and waste infrastructure
- Conduct monitoring program sampling
- Engage in regular communication with the CIRNAC Inspector on compliance issues

Completed Projects:

- Additional raw water reservoir cell

Ongoing Projects

- Upgrade and expansion of the wastewater lagoon
- Upgrade and expansion of the solid waste site

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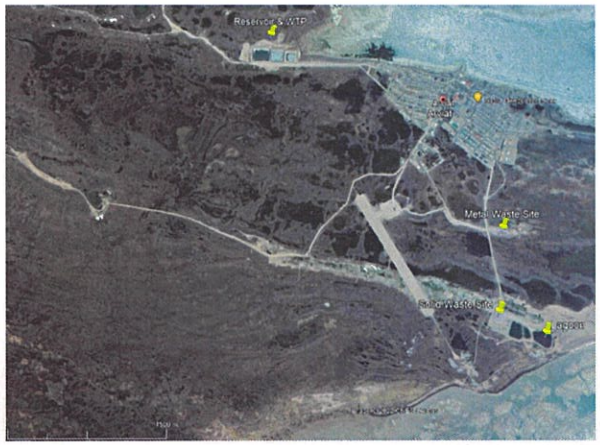
Infrastructure



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Background

- Wolf Creek is the domestic water supply for the Municipality of Arviat, approximate population of 2,657 (2016 Census)
- The watershed is frozen for seven to nine months a year; therefore, a 3- cell raw water reservoir with capacity 235,393 m^3 must be adequately supplied through an 8 km transmission line prior to freeze-up each year. The first cell of the reservoir was built and has been in use since 1988, the second cell was constructed in 1998, and the third cell in 2019.
- The *Wolf Creek 2019 Hydrologic Assessment* report indicated that only 0.2% of water is being diverted for the reservoir resupply which is below the Fisheries and Oceans Canada limits to preserve fish passage.

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Background

- A passive lagoon has received wastewater since 2005. The 37,960 m^3 lagoon acts as a holding cell during the frozen month and effluent freely flows out upon thaw. Most of the effluent treatment is attributed to the wetland treatment area.
- The 7.3-hectare wetland treatment area directs effluent flow away from the municipality and towards Hudson Bay at the end of the wetland.
- A new 2-cell lagoon project is underway that will upgrade the current lagoon and construct an adjoining cell. The new capacity is sized to accept wastewater for 10-12 month for the next 20 years. It will also be sized to hold sludge for the lifespan of the asset.
- 2 legacy abandoned lagoon cells adjacent to the active lagoon cells require remediation.

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Background

- Arviat's primary solid waste site has been in use since 1977 with an area 160 x 200 within the fenced containment berms. The metal waste area has an approximate area of 40,000 m^2
- A metals shredder was purchased by the municipality in 2017. Since operation, approximately 25% of the metals have been shredded. Non-polluted shredded metal is used as cover on the landfill site with gravel.
- Arviat has a summer-long clean up program, inclusive of 12 summer hires and 25 students.
- There is an ongoing solid waste improvement project managed by CGS. Pending federal funding approval, the abandoned lagoon cells will be evaluated for suitability to be remediated and upgraded to act as an extension to the current landfill.

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Sampling Program

Station	Description	Frequency	Request
ARV-1	Raw water supply at Wolf River prior to treatment.	Monthly	Change to Wolf Creek
ARV-2a	Effluent from the discharge point of the Solid Waste Disposal Facility.	Monthly during the months of May to August and prior to discharge of accumulated impacted water. Acute Toxicity Annually	Remove acute toxicity testing
ARV-2b	Effluent from the discharge point of the New Solid Waste Disposal Facility.		Remove the reference to a new solid waste facility
ARV-3	Raw Sewage at truck offload point.	Not Active	Re-activate and add a point where effluent discharges from new lagoon to wetland

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Sampling Program

Station	Description		Request
ARV-4	Effluent from the discharge point of the Sewage Disposal Facility (end of Wetland).	Quality Monthly during the months of May to August. Acute Toxicity Annually	Remove acute toxicity testing
ARV-5	Discharge from the Bulky Metal Waste Area.	Monthly during periods of observed flow.	N/A
ARV-6	Discharge from the Hazardous Waste Storage Area.		
ARV-7	Water level in Wolf River.	Monthly during periods of open water.	Remove resupply

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Sampling Program

Station	Description		Request
ARV-8	Water level in Sewage Disposal Facility lagoon.	Monthly during Thawed conditions.	Remove
ARV-9	Run-off from Solid Waste Disposal Facility	Monthly	N/A
ARV-10	Effluent from the Final Discharge Point of the Hydrocarbon Impacted Soil Storage and Treatment Facility	To be determined in accordance with Part D, Item 10	Remove
ARV-11	Effluent discharge from dewatering contaminated soil areas.	To be determined in accordance with Part D, Item 14 (c)	Remove

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Regulatory Review

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ECCC Comments

01. Monitoring Program Compliance Point ARV-4

CGS Response:

- CGS accepts this recommendation and is petitioning that ARV-4 be established at the recommended location downstream in the wetland in an area accessible by municipal staff.

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ECCC Comments

02. Project Timelines

CGS Response:

- CGS provided an updated timeline for the wastewater and solid waste projects.

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ECCC Comments

03. Abandonment and Restoration Plans

CGS Response:

- There is no plan to close the solid waste disposal area or the bulky metals area. The business case recommended that both areas remain in use indefinitely, and expansion take place.
- An investigation of the abandoned lagoon cells to assess their potential to be remediated and re-used to expand the current solid waste will be included in the next phase of the solid waste project.

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ECCC Comments

04. Lagoon Desludging

CGS Response:

- It was determined that since the lagoon cell is expected to be decommissioned, desludged, remediated, and upgraded in 2024, desludging in 2021 would provide minimal benefit compared to the labor required for the undertaking.
- A new OM plan containing a sludge management plan that includes assessment and disposal techniques, as well as a disposal location, will be prepared by the design consultant and contractor for the new 2-cell lagoon.

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ECCC Comments

05. Additional Monitoring Stations

CGS Response:

- The licensee agrees that a monitoring station at the point of discharge from the lagoon should be included in the new license.
- However, this station should not be considered a compliance point and no effluent limits should be imposed at this point since it represents only partially treated effluent.

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ECCC Comments

06. Duplicate Sampling

CGS Response:

- The QA/QC Plan was updated to include information on the frequency of replicate/duplicate samples in the sampling program.

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CIRNAC Comments

01. Solid Waste Site Capacity

CGS Response:

- Beginning in 2018, the Municipality began shredding depolluted metal waste to increase capacity at the site. The metal was then used as cover material for the landfill which resulted in compaction that drastically increased the capacity.
- CGS will undertake a study in 2022/23 to determine how to further improve capacity of the current solid waste site and evaluate the feasibility of expanding into the abandoned lagoon cells after proper remediation.

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CIRNAC Comments

02. Lagoon Design Parameters

CGS Response:

- Lagoon-wetland systems do not function to achieve treatment goals prior to discharging into the wetland. The wetland treatment area is a significant component of the treatment facility. The 2-cell lagoon system will be sized to retain wastewater for 12 months for a 20-year design life
- Effluent will be decanted into the wetland treatment area in late summer once the wetland has had the opportunity to develop and runoff has passed through. Currently the effluent is benefiting from dilution rather than treatment, potentially resulting in lower effluent concentrations, but in reality, not better-quality effluent.
- The pumping rate will be determined during design to optimize both drawn down time and effectiveness off the wetland treatment but it will be below the recommended maximum of 2500 m3/day to preserve the health of the marine receiving environment.

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CIRNAC Comments

03. Lagoon Effluent Parameters

CGS Response:

- The licensee is requesting that the effluent parameter limits at the end of the wastewater treatment facility be changed to cBOD/TSS of 100/120 mg/L. This error in the OM Plan was fixed in the newer version.

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CIRNAC Comments

04. Lagoon Liner

CGS Response:

- In the event that the liner is damaged resulting in a leak, the effluent will passively exfiltrate into the wetland treatment area, which is downgrade from the lagoon, in the same way that it does with the current permeable lagoon.
- The new lagoon will use the same wetland as the current lagoon therefore no additional land will be contaminated.
- In addition, the effluent samples taken, and lagoon water levels will be monitored in order to detect evidence of a leak. Repairs to the liner will be completed if there is a leak.

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CIRNAC Comments

05. Removal of Inactive Monitoring Stations

CGS Response:

- A "hydrocarbon impacted storage facility" was never constructed and does not exist therefore ARV-10 and ARV-11 do not exist.
- Having inactive compliance points listed in the monitoring station program table is unnecessarily cumbersome for operational staff and provide no benefit.

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CIRNAC Comments

06. Sludge Disposal

CGS Response:

- A new OM plan will be prepared by the design consultant and contractor for the new 2-cell lagoon. The plan will contain a sludge management plan that includes assessment and disposal techniques, as well as a disposal location.
- The upgraded lagoon will be sized to accommodate 20 years of sludge accumulation.
- Effluent samples as well as visual inspection will indicate if sludge accumulates more than anticipated, and appropriate methods to remove and dispose of the sludge will be included in the new, upgraded lagoon Operation and Maintenance plan.

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DFO Comments

01. Fish Screen

CGS Response:

Information on the fish screen has been requested from the staff involved with the resupply. If the fish screen does not meet DFO requirements actions will be initiated to replace it.

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Renewals and Amendments for the Water License

Request	Justification
Licence Term: 10 years	This amendment includes upgrades to the water supply, wastewater disposal, and solid waste disposal infrastructure. The water consumption is not expected to exceed the reservoir capacity in the next 10-years.
Maximum Annual Water Withdrawal: 235,393 m^3	The reservoir capacity 235,393 m^3 will be sufficient to supply the municipality until at least 2034 based on design calculations.

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Renewals and Amendments for the Water License

Request	Justification
Changes to the Sampling Program	• The water source is named Wolf Creek • Acute toxicity was removed from other Nunavut municipal water licences due to being deemed inappropriate for northern jurisdictions by the regulators. • ARV-3 to test at the outlet of the lagoon to monitor treatment efficacy. • Remove ARV-7 as the hydrology study demonstrated Wolf Creek can support the resupply which is 0.22% of flow. • Remove ARV-8 since level is monitored annually by the lagoon's ability to maintain 1 m freeboard • Remove ARV-10 and ARV 11 because they do not exist.

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Renewals and Amendments for the Water License

Request	Justification
Effluent Parameters at the end of the wetland-treatment-area	Change CBOD limit to 100 mg/L and Total Suspended Solid limit to 120 mg/L; levels are based off of the multi year Nunavut based lagoon-wetland treatment research.
Remove references to "Hydrocarbon Impacted Soil Storage and Treatment Facility" and "New Solid Waste Disposal Facility"	These facilities do not exist.

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Renewals and Amendments for the Water License

Request	Justification
Remove requirement for annual geotechnical engineer inspection	Hiring a geotechnical engineer to conduct an annual inspection is not practical and is not supported by the Dam Safety Guidelines (CDA, 2013).
Remove prescriptive recommendations on how to carry out reclamation of abandoned facilities	Licenced professionals will dictate appropriate remediation activities

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Renewals and Amendments for the Water License

Request	Justification
Remove ARV-7	The hydrology study was done on Wolf Creek indicated the annual reservoir resupply uses 0.22% of the flow. DFO allows up to 10% withdrawal. The licensee requests that this condition be removed since the licensee has demonstrated the water source can support the annual reservoir resupply.
Remove ARV-8	The Level is monitored, by staff and the CIRNAC inspector through the lagoon's ability to maintain 1 m freeboard.

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Renewals and Amendments for the Water License

Request	Justification
Remove requirement for weekly inspection of Monitoring Program Stations	This requirement is inconsistent with other NWB issued water licences. The monitoring stations are regularly monitored, multiple times a week, during regular municipal operations and sampling begins when flow is present. Preparing a weekly report is too high of a burden on staff.
Change sampling "May-August" to "Monthly during thawed conditions"	Thaw typically does not occur until June or July and freeze-up may be as late as September or October depending on the year.

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Renewals and Amendments for the Water License

Request	Justification
Remove acute lethality testing	ECCC has recognized that this test is not practical for remote northern communities and it has been removed from other licences.
Remove the requirement to submit paper copies	Electronic submission is standard practice.

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The End

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