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

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
3BM-ARC1419

July 29, 2019

Our file - Notre référence
CIDM#1258084

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 comments on the Government of Nunavut – Community and Government Service's renewal application for water licence #3BM-ARC1419 – Hamlet of Arctic Bay**

Dear Mr. Dwyer,

Thank you for your June 28, 2019 invitation for technical review comments on the above referenced application.

The Water Resources Division of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the renewal application, and the results of the review are provided in the enclosed memorandum for consideration by the Nunavut Water Board. Comments have been provided pursuant to mandated responsibilities of CIRNAC under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

CIRNAC appreciates the opportunity to participate in this review. If there are any questions or concerns, please contact me at (867) 975-3876 or by e-mail at sarah.forte@canada.ca.

Sincerely,

Sarah Forté

Sarah Forté
Water Management Specialist

Canada

# Technical Review Memorandum

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

From: Sarah Forté, Water Management Specialist, Water Resources Division, CIRNAC

Date: July 29, 2019

Re: Review of Renewal Application for Type B Water Licence 3BM-ARC1419

Applicant: Government of Nunavut - Community and Government Services
Project: Hamlet of Arctic Bay
Region: Qikiqtani

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## A. BACKGROUND

On June 28, 2019, the Nunavut Water Board provided notification of Government of Nunavut - Community and Government Services' (GN-CGS) submission of a renewal application for Type B water licence 3BM-ARC1419 for the Hamlet of Arctic Bay.

The Hamlet of Arctic Bay has a licence for Municipal Undertakings for the use of water and for the deposit of waste which expires on August 28, 2019. This renewal application is for a 10 year licence term.

Water is drawn from Marcil Lake and treated at the water treatment plant/truck fill station, which was completed built in 1998. The applicant is requesting an increase in allowable water use from 50 005 $m^3$/year to 66 875 $m^3$/year.

The Hamlet uses trucks for both delivering water and collecting sewage. The sewage is disposed of in a sewage lagoon built in 2012 with a capacity of 59 900 $m^3$. Once a year, the lagoon is decanted into a wetland, and runs approximately 1300 m before reaching the ocean.

Solid wastes in the Hamlet are segregated with bulky materials and metals disposed of at the metal dump, and other waste including household waste brought to the landfill. Conditions at the landfill have been of concern over the last 4 years.

## B. RESULTS OF REVIEW

Crown-Indigenous and Relations Northern Affairs Canada (CIRNAC) Water Resources has read the documentation provided with this application, as well as historical submissions to the Nunavut Water Board. An improvement in water quantity monitoring efforts has been noted; with more samples being taken, better identification of samples and clearer reporting of results. Many documents that were conditions of the previous licence renewal are still are incomplete or inadequate. These deficiencies should be addressed prior to a renewed licence being issued.

We note that there is no separate quality assurance/quality control (QA/QC) plan for this water licence, instead the information is partially scattered across other plans. It could be helpful to consolidate and update the information in a QA/Q plan.

On behalf of CIRNAC, the following comments and recommendations are provided for the Board's consideration.

### 1. Water quantity requested

Reference:

- Water Licence 3BM-ARC1419, Nunavut Water Board, August 29, 2014.
- Water Licence Renewal Application 3BM-ARC1419, Hamlet of Arctic Bay, GN-CGS, May 24, 2019. Box 13
- Desktop Review on the Sustainability of Nunavut Drinking Water Sources DRAFT, Centre for Water Resources Studies, June 2017.
- Operation and Maintenance Manual, Arctic Bay Waste Water Facility, EXP, October, 2011.
- 2018 Annual Report for the Hamlet of Arctic Bay, GN-CGS, March 8, 2019

Comment:

The expired water licence grants permission to use a quantity of water not to exceed 50 005 cubic meters per annum.

GN-CGS is requesting that a renewed licence allow for the use of 66 875 $m^3$/year, to be drawn from Marcil Lake. According to the Review of Sustainability of Nunavut Drinking Water Sources, the estimated net trucked water availability over the next 10 years for the 132 $km^2$ Marcil Lake watershed is 18.5 $Mm^3$.

From the water availability perspective, CIRNAC does not have concerns with the quantity of water requested. However, since the wastewater generated is estimated as equivalent to the water abstracted, and the sewage lagoon has a 59 900 $m^3$ capacity, it is necessary to describe what would be done with the wastewater the lagoon could not handle.

In the 2018 annual report, CIRNAC notes that water quality results are presented for samples from "Alternate Lake Source". There is no further information, so CIRNAC cannot identify where this lake is and what plans are being made for an alternate source.

Recommendation:
CIRNAC recommends that the applicant be required to explain

- how it will deal with wastewater in excess of its sewage lagoon capacity, should a renewed licence grant authorization to draw more than 59 900 $m^3$ from Marcil Lake; and
- where the alternate lake is located and what the applicant's plans are for this source. If the plans include drawing water from this lake, a request should be included in the amendment application.

## 2. Measuring water quantity

Reference:

- 2013-2015, 2017-2018 Annual Reports for the Hamlet of Arctic Bay, GN-CGS, 2014-2019
- Water Licence Renewal Application 3BM-ARC1419, Hamlet of Arctic Bay, GN-CGS, May 24, 2019, Box 13
- July 2018 3BM-ARC Water Licence Inspection Form, CIRNAC, December 6, 2018.
- Water Licence 8BC-NNF1920, Nunavut Water Board, July 22, 2019.

Comment:
The annual report states water quantity used is reported from the "On Tap Water Delivery System". Since the raw water flow meter is broken, as noted in the 2018 inspection report, it is not clear how this quantity is obtained. It also contradicts the application which states "*The quantity of water is estimated based on delivery record.*"

The application also includes the statement: "*Public uses and municipal activities. Public=26,922 cubic meters and Nanisivik & other municipal activities=39,953 cubic meters based on statistical delivery record in 2029.*" Perhaps the reference to 2029 is an error since there would not be records yet. The water quantities reported in the annual reports for the last 5 years do not correspond to the quantity in the application, so it is not clear what is meant by public use, municipal activities, other municipal activities, and Nanisivik.

If Nanisivik refers to water drawn under water licence 8BC-NNF1920 for the naval facility, it should not be included in the reporting for Arctic Bay since it is a separate authorization. It only authorizes use of water from East Twin Lake and Twin Lakes Creek.

Recommendation:
CIRNAC recommends:

- the Hamlet install a flow meter at the truckfill station to measure the quantity of water taken from Marcil Lake; and
- the applicant define their different types of water use and clarify which one is used in the annual report.

### 3. Water quality of sewage lagoon effluent

Reference:

- 2012-2015, 2017-2018 Annual Reports for the Hamlet of Arctic Bay, GN-CGS, 2013-2019
- Water Licence 3BM-ARC1419, Nunavut Water Board, August 29, 2014.
- Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of Ministers of the Environment.

Comment:
When reviewing sampling results reported over the last seven years, CIRNAC notes that the sewage lagoon is effective at treating the sewage for the parameters listed in the water licence, to the extent required by the licence. Table 1 below compares data presented in the annual reports with the water licence's discharge criteria for the sewage disposal facility (station ARC-4, reported as ARC-8).

**Table 1. 2012-2018 Arctic Bay sewage lagoon effluent quality**

| Parameter | Units | Water licence criteria | Number of samples | Maximum | Minimum | Median |
|---|---|---|---|---|---|---|
| $BOD_5$ | mg/L | 120 | 17 | 212 | 11 | 83 |
| Total suspended solids | mg/L | 180 | 17 | 240 | 8 | 20 |
| Fecal Coliform | cfu/100mL | $10^6$ | 13 | $5.1\times10^5$ | $2.3\times10^3$ | $1.1\times10^5$ |
| Oil and grease | mg/L | No visible sheen | 14 | 15.5 | 1 | 7 |
| pH | - | 6 - 9 | 14 | 7.89 | 7.13 | 7.69 |
| phenolics | mg/L | - | 13 | 0.83 | 0.21 | 0.56 |

There has been only one exceedance in $BOD_5$ and total suspended solids. Fecal Coliform and pH always met the criteria. Visibility of oil sheen was not reported, but the concentrations measured indicate there was likely no sheen.

A last row was added to the table above for phenolics concentrations. It is quantified in the annual reports, and we note that concentrations are elevated – values range from 0.21 to 0.83 mg/L with an average of 0.56 mg/L. The water licence does not have discharge limits for phenols. The Canadian Water Quality Guidelines for the Protection of Aquatic Life value for freshwater is 0.004 mg/L.

Recommendation:
CIRNAC recommends the applicant continue monitoring water quality and search for possible explanations for the high phenol concentrations.

### 4. Water quality of solid waste facility run-off

Reference:

- 2012-2015, 2017-2018 Annual Reports for the Hamlet of Arctic Bay, GN-CGS, 2013-2019
- Water Licence 3BM-ARC1419, Nunavut Water Board, August 29, 2014.
- Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of Ministers of the Environment, 1999.
- 2016-2018 3BM-ARC Water Licence Inspection Forms, CIRNAC, 2016-2018.

Comment:
CIRNAC reviewed sampling results from annual reports over the last seven years. As the run-off from the facilities is not authorized, the licence does not include discharge criteria. Reported concentrations were compared with Canadian Water Quality Guidelines for the Protection of Aquatic Life (CWQG-PAL), as the water sampled is directly in the environment.

Run-off samples from the dump (ARC-6)(n=5) met the guidelines in almost all cases. Exceedances were found in iron concentrations in 4 of the 5 samples, and were on average 6 times above the CWQG-PAL. Other sporadic exceedances include aluminum (2014), benzo(a)pyrene (2015), zinc (2018) and phenolics (2018).

The state of the landfill, metal dump and hazardous waste area is a concern consistently raised in CIRNAC inspection reports since 2016. Though the 2019 inspection report is not available, the visit occurred in mid-July are conditions have not improved. Of particular concern is the hazardous waste, which is not in secondary containment and has an ephemeral steam running through it. Water runs through the dump and hazardous waste area uncontrolled where the quality is degraded.

Recommendation:
CIRNAC recommends the licensee take measures that will reduce water contamination from the solid waste facility. These might include building a berm or ditch around the north of the facility to reduce the amount of water flowing through it.

### 5. Monitoring program

Reference:

- Water Licence 3BM-ARC1419, Nunavut Water Board, August 29, 2014.
- 2012-2015, 2017-2018 Annual Reports for the Hamlet of Arctic Bay, GN-CGS, 2013-2019

Comment:
The water licence monitoring program includes 14 stations, of which three are currently regularly monitored. Based on this application review and work towards a more uniform approach between municipal licences, CIRNAC suggests modifications to the monitoring program, as summarized in Table 2. Justifications are given below.

**Table 2. Monitoring program stations with proposed changes**

| Station | Description | Type<br>Frequency | Status | CIRNAC suggested modifications |
|---|---|---|---|---|
| ARC-1 | Raw Water intake at Marcil Lake | Volume<br>Monthly and Annually | Active (Volume) | No change |
| ARC-2 | Raw Sewage from pump out truck | N/A | Inactive | Remove |
| ARC-3 | Raw Wastewater Discharge (South Berm) | Volume<br>Monthly and Annually<br>Water Quality<br>Three (3) times annually (once at the onset of decant; once during decant; and once at the end of decant) | Active (Volume, Water Quality) | Keep volume and reduce water quality to once prior to licence renewal. |
| ARC-4 | Lagoon Pump Discharge (North Berm) | Water Quality<br>Three (3) times annually (once at the onset of decant; once during decant; and once at the end of decant) | Active (Volume, Water Quality) | Keep volume and reduce water quality to once prior to decant. |
| ARC-5 | Ocean water five (5) metres from point where Effluent enters the ocean from existing Sewage Disposal Facility | Water Quality<br>Three (3) times annually (once at the onset of decant; once during decant; and once at the end of decant) | Inactive | Remove |
| ARC-6a | Sampling Well at end of Wetlands | Water Quality<br>Three (3) times annually (once at the onset of decant; once during decant; and once at the end of decant) | Active (Water Quality) | Remove |
| ARC 6b | Surface water at the end of Wetland area | Water Quality<br>Three (3) times annually(once at the onset of decant; once during decant; and once at the end of decant) | Active (Water Quality) | No change |
| ARC-7 | Water five(5) metres from effluent Waste Water Treatment Facility entering Victor Bay | Water Quality<br>Three (3) times annually (once at the onset of decant; once during decant; and once at the end of decant) | Active (Water Quality) | Remove |

| Station | Description | Type<br>Frequency | Status | CIRNAC suggested modifications |
|---|---|---|---|---|
| ARC-7b | Runoff from the Quarry Site | Water Quality<br>Annually during periods of runoff or seepage | Active<br>(Water quality) | No change |
| ARC-8 | Sewage Sludge | TBD | Active<br>(Volume, quality) | Remove |
| ARC-9 | Run-off from the Solid Waste Disposal Facility | Water Quality<br>Annually during periods of runoff or seepage | Active<br>(Water Quality) | No change |
| ARC-10 | Thermistors in accordance with approved instrumentation Monitoring and Surveillance Plan as required in | TBD | (Temperature | |
| ARC-11 | Standpipes in accordance with approved Instrumentation Monitoring and Surveillance Plan as required in | TBD | (Seepage) | |
| ARC-12 | Settlement stations in accordance with approved Instrumentation Monitoring and Surveillance Plan as required in | TBD | (Location, Elevation) | |

We recommend adopting a change in frequency of sampling of raw wastewater (ARC-3) to once prior to licence renewal. Characteristics of wastewater are important for the design of lagoons. In this case, the wastewater is contained so detailed monitoring is not deemed necessary.

CIRNAC suggests using “prior to decant” for sampling frequency for sewage lagoon discharge (ARC-4), to harmonize with other municipal water licences. Data from multiple samples for the same decant are presented in the annual reports. For the last 6 years available, water quality has remained approximately equivalent throughout the decant for 4 of the years, and parameters remained well below water licence discharge criteria. The first exception is 2016, when biochemical oxygen demand ($BOD_5$) increased from 92 to 212 mg/L, which is above the water licence criteria. The second exception occurred in 2018, when total suspended solids went from 24 and 27 mg/L to 240 mg/L at the end of the decant. This may be because the pump started to pick up sediment when the lagoon was almost empty.

To our knowledge there is no well at the end of the wetland (ARC-6a). If the licensee was able to sample the surface water at the end of the wetland (ARC-6b), this would help determine the wetland’s contribution to sewage treatment. We recommend keeping

three water quality samples (onset of decant, during decant, and at end of decant) at ARC-6b because the wetland's retention time is unknown.

Given the effectiveness of treatment in the sewage lagoon, CIRNAC is of the opinion it may not be necessary to regularly monitor ocean water five meters from the point where effluent enters the ocean from existing sewage disposal facility (ARC-5) and water five meters from effluent waste water treatment facility entering Victor Bay (ARC-7).

The sewage lagoon O&M manual specifies that de-sludging will not be necessary for the 20 year design life of the lagoon, which is until 2032. Since no action will likely have to be taken with the sludge until then, we recommend waiting before requiring sampling so that the results reflect the sludge that will have to be disposed.

The last three stations ARC-10, ARC-11, and ARC-12 are for monitoring the berms which form the sewage lagoon. No reported results were found for these stations. Thermistors were installed for ARC-10 and are now damaged. It is our understanding that standpipes to detect the presence of seepage (ARC-11) were also installed. The sewage lagoon O&M manual recommends settlement station monitoring of the berms (ARC-12) for 2 to 3 years after construction.

Recommendation:
CIRNAC recommends the monitoring program stations be simplified in any renewed licence to help with more effective monitoring. We have included suggested modifications in the right most column of Table 2.

### 6. Spill contingency plan

Reference:

- Spill Contingency Plan, Hamlet of Arctic Bay, Draft, 2010.

Comment:
A spill contingency plan is one of the minimum requirements of a water licence. The most recent version of a spill contingency plan found on the Board's ftp registry dates from 2010 and is labelled "DRAFT". This plan needs to be updated and finalized.

The whole spill contigency plan needs to be reviewed to make sure all sections are relevant, but some specific deficiencies which were noted were:

- The plan needs to be updated with a new cover page and date, so people are aware it is still relevant.
- The figures are out of date and of poor quality. A recent map with topography/drainage directions and infrastructure is an important part of a spill plan because it can help plan interventions in event of a spill.
- Since calcium hypochlorite is used as the disinfectant at the water truck fill stations, section 7.3.2 should be simplified so the reader knows what to do for a calcium hypochlorite spill. References to chlorine gas and liquid should be removed.

- Spill kits are a necessity, so wording of section 8.0 referring to them as a recommendation should be changed to be more definitive. Spill kit storage locations need to be indicated on a map.
- References to infrastructure need to be updated. Section 2.2 should only refer to the new sewage lagoon. Section 10.0 refers to a future landfarm that is not mentioned anywhere else.
- Contact names and phone numbers need to be updated and clarified. Section 7.2 refers to the emergency line of the Hamlet, and it is not clear if this is the same as the Hamlet number in section 4.0. If it is not, another phone number should be provided. If it is, the name should be the same in both places.

Recommendation:
CIRNAC recommends that the applicant update their Spill Contingency Plan to address points raised above.

### 7. Solid waste facility operation and maintenance manual

Reference:

- Solid Waste Operation and Maintenance Plan for Hamlet of Arctic Bay, January 2015.
- Re: Part F, Item 2 of Water Licence No. 3BM-ARC1419, Hamlet of Arctic Bay Submission of Solid Waste Disposal Facility Operations and Maintenance Plan, Aboriginal Affairs and Northern Development Canada, July 30, 2015.
- Hazardous Waste Segregation, Storage and Transportation Procedure, Hamlet of Arctic Bay, 2019.

Comment:
The applicant submitted a solid waste operation and maintenance (O&M) manual in 2015, which CIRNAC reviewed and submitted comments on. These comments are still relevant and outstanding. They are appended to this technical review and we note that the department is now referred to as CIRNAC instead of AANDC and the phone number for the manager of Field Operations is 867-975-4553.

The current application includes a “hazardous waste segregation, storage and transportation procedure”. It is not clear if this is an updated section of the solid waste O&M plan, or how they are connected.

Recommendation:
CIRNAC recommends the applicant update their solid waste O&M plan to address the recommendations in our 2015 technical review. The new hazardous waste segregation, storage and transportation procedure should be harmonized in the updated plan.

### 8. Truckfill operation and maintenance manual

Reference:

- Arctic Bay Truckfill, Arctic Bay NT, Operations and Maintenance Manual, Volume 1, Dillon Consulting Limited, June 1998.

- Truckfill Station Parts 1 & 2, submitted August 21, 2015.
- Arctic Bay Truckfill, Arctic Bay NT, Operations and Maintenance Manual, submitted June 28, 2019.
- Water Licence 3BM-ARC1419, Nunavut Water Board, August 29, 2014.

Comment:
The 1998 truckfill O&M manual is a 209 page document with a lot of information that had nothing to do with operations or maintenance, leading to confusion. In 2015, certain pages of the 209 page manual were re-submitted, without a cover page, introduction, or any explanation of why information such as the geotechnical report was included. In 2019 the pages pertaining to the truckfill station design were resubmitted.

An up-to-date and plain language O&M manual can help ensure the truckfill station is operated safely and correctly. This was a condition of the previous licence renewal that has not yet been complied with.

The 1998 document includes the bulk of what is necessary for an O&M manual, and could be used to fulfil the requirement. Elements that should be part of the O&M manual are listed in Part F Item 3 of the licence and would also include:

- Cover page with current date
- Table of contents
- Map with facilities
- Up-to-date list of contacts
- Operating procedures (Section 6.0 of 1998 document (pages 129-158))
- Maintenance procedures (Section 7.0 of 1998 document (pages 159-171))

Recommendation:
CIRNAC recommends that the applicant update their Spill Contingency Plan to address points raised above.

### 9. Annual reporting

Reference:

- Water Licence 3BM-ARC1419, Nunavut Water Board, August 29, 2014.
- 2012-2015, 2017-2018 Annual Reports for the Hamlet of Arctic Bay, GN-CGS, 2013-2019
- Email correspondence between Sergey Kuflevskiy (NWB technical advisor) and Bhabesh Roy (GN-CGS municipal planning engineer), June 20, 2019.

Comment:
CIRNAC notes that the 2016 annual report is missing. We also note that the annual reports submitted do not include an engineer's report of the annual engineered facilities inspection as required by the licence.

When questioned on the engineer reports by the Board, the applicant replied an engineer inspected the facility during the CIRNAC Inspector's annual visit and that was the municipal engineer's report. We would like to clarify that CIRNAC Inspectors are not engineers and the responsibility of producing the report lies with the licensee.

Since 2012, reporting of water quality data has improved incrementally and the compilation of data in 2018 is to be commended.

Recommendation:
CIRNAC recommends the licensee continue their monitoring efforts and increase the number of stations to include those required by the water licence. CIRNAC also recommends the licensee submit engineer reports of facilities inspections.

## 10. Licence term

Reference:

- Water Licence Renewal Application 3BM-ARC1419, Hamlet of Arctic Bay, GN-CGS, May 24, 2019, Box 13

Comment:
The applicant is requesting a 10 year licence term.

We note that during the 5 years of the current water licence, the licensee has not met the terms and conditions of their licence which required them to provide adequate and updated plans. They have also been unable to address concerns like the run-off from the dump. A 10-year licence term might therefore be pre-mature given how much improvement is still necessary.

Recommendation:
CIRNAC recommends a licence term of 5 years be considered for a renewal.

# Appendix A – 2015 review of Solid Waste Operation and Maintenance Plan for Hamlet of Arctic Bay

# Memorandum

To: Phyllis Beaulieu, Nunavut Water Board

From: David Abernethy, Aboriginal Affairs and Northern Development Canada

CC: Scott Burgess (AANDC) and Erik Allain (AANDC)

Date: July 30, 2015

**Re: Solid Waste Disposal Facility Operations and Maintenance Plan Submitted for Nunavut Water Board Approval**

| | |
|---|---|
| Water Licence No.: | 3BM-ARC1419 |
| Applicable Term and Condition: | Part F, Item 2 |
| Applicant: | Hamlet of Arctic Bay |
| Project: | Municipal Activities |
| Region: | Qikiqtani |

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Comments:

## A. Background

On June 30, 2015, the Nunavut Water Board (NWB) provided notification that the Hamlet of Arctic Bay's (the Hamlet) submitted a Solid Waste Operation and Maintenance Plan, dated February 2, 2015, for NWB approval pursuant to Part F, Item 2 of water licence, No. 3BM-ARC1419. This licence term and condition states:

> The Licensee shall submit to the Board for approval in writing, within 90 days from the date of issuance of this Licence, an Operations and Maintenance Manual for the existing Solid Waste Management Facility, prepared where appropriate, in accordance with the *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories; 1996*. This Manual shall include but not be limited to the following:
>
> a. Solid Waste Operation and Maintenance Plan;
> b. Hazardous Waste Management Plan;
> c. Spill Contingency Plan including a Spill Response Plan that addresses potential spills associated with the solid waste facility;
> d. Monitoring Program Quality Assurance / Quality Control Plan including a
> e. Diagram that references Monitoring Program Station Numbers; and
> f. Instrumentation Monitoring and Surveillance Plan

The Government of Nunavut's Department of Community and Government Services submitted the Solid Waste Operation and Maintenance Plan on behalf of the Hamlet. The plan was submitted after the November 27, 2014 deadline (the licence was renewed and amended on August 29, 2014).

The NWB invited interested parties to review the submitted plan and provide comments by July 30, 2015.

## B. Results of review

On behalf of Aboriginal Affairs and Northern Development Canada (AANDC), the following comments and recommendations are provided:

**1. Structure of Submitted Operations and Maintenance Plan**

Source: *Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015.

Comment: The Solid Waste Operations and Maintenance Plan does not follow the format required under Part F, Item 2 of the licence. This licence condition requires a manual with specific plans and information. The Operations and Maintenance Plan should be one component of a larger manual, along with other components such as a Hazardous Waste Management Plan and Spill Contingency Plan. While the submitted plan includes relevant information it would be appreciated if the format specified in the licence was followed.

Recom: The Licensee should develop and maintain an Operations and Maintenance Manual for the existing Solid Waste Management Facility as required by Part F, Item 2 of the licence. This manual should be submitted with the Hamlet's 2015 annual report.

**2. Limited Information on the Solid Waste Disposal Facility's Location and Layout**

Source: *Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Figure 2.

Comment: The submitted Solid Waste Operation and Maintenance Plan does not provide adequate information on the Solid Waste Disposal Facility's location, designated waste management areas, and water management procedures.

Recom: The Licensee should revise its Solid Waste Operation and Maintenance Plan to:

a) describe the Solid Waste Disposal Facility's location relative to receiving waters, the Hamlet, the Hamlet's freshwater source, the sewage lagoon, and any other important infrastructure or topographic features;
b) Include detailed maps and/or drawings that identify the Solid Waste Disposal Facility's location, designated waste management areas (e.g., bulky metals, hazardous materials, Burn Area, tire storage, etc.), and water management control measures (i.e., runoff and drainage).
c) Provide location coordinates for the Solid Waste Disposal Facility's location (i.e., latitude and longitude).

**3. Diagram that References the Solid Waste Disposal Facility Monitoring Program Station**

Source: *Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Section 8.1.

Comment: Section 8.1 of the submitted Solid Waste Operation and Maintenance Plan includes a diagram that references the Solid Waste Disposal Facility's Monitoring Program Station for runoff/leachate (Station No. ARC-9). This diagram is required under Part F, Item 2(e) of the licence. The diagram provides minimal detail for the monitoring program station's actual location relative to the Solid Waste Disposal Facility and surrounding environment.

Recom: The Licensee should provide a detailed diagram that references the location of the Solid Waste Disposal Facility's Monitoring Program Station for runoff/leachate.

The Licensee should update Table-2: Monitoring Stations, in Section 8.1 of the submitted Solid Waste Operation and Maintenance Plan to reference the location coordinate (latitude and longitude) for Monitoring Program Station No. ARC-9.

**4. Including Photos and Reporting Forms in in Annual Report Submissions**

Source: Annual Report Submissions

*Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Appendix C and D.

Comment: Including photos of the Solid Waste Disposal Facility as well as completed Monthly Municipal Solid Waste Quantity Forms (Appendix C of submitted plan) and the Monthly Solid Waste Disposal Facility Inspection Forms (Appendix D of the submitted plan) in annual report submissions would assist interested parties understand the Hamlet's waste management procedures.

Recom: Annual reports should include photos of the Solid Waste Disposal Facility's waste management areas (e.g., non-burnable wastes, burn area, hazardous wastes, and bulky metals) and licensed Monitoring Station to assist interested parties understand the Hamlet's waste management procedures. These photos should be taken during the summer months when there is no snow on the ground.

In addition, annual reports should include completed Monthly Municipal Solid Waste Quantity Forms (Appendix C of submitted plan) and the Monthly Solid Waste Disposal Facility Inspection Forms (Appendix D of the submitted plan) to document waste management practices.

**5. Managing residual ash**

Source: *Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015.

*Aboriginal Affairs and Northern Development Canada. August 6, 2014 Water Licence Inspection Form, Municipality of Arctic Bay.* September 10, 2014.

Comment: The submitted Solid Waste Operation and Maintenance Plan does not specify provisions for managing residual ash from the open burning of (suitable) waste materials. The September 10, 2014 AANDC Inspection Form states that, "the Municipal waste area (burn and bury) is not well maintained and burned materials are pushed over but not subsequently covered by material. The issue has been identified many times in the past."

Recom: The Hamlet should ensure that burned materials / ash are regularly covered with suitable aggregate material. Procedures should be incorporated into a revised Operation and Maintenance Plan.

**6. Spill Contingency Plan, AANDC Contact Information**

Source: Nunavut Water Board. *Water Licence No. 3BM-ARC1419*. Issued to the Hamlet of Arctic Bay. Date September 2, 2014. Part B, Item 7.

*Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Section 10.11

Comment: Section 10.11 of the Solid Waste Operation and Maintenance Plan (Spill Contingency Plan section) provides incorrect departmental contact information for the purposes of reporting hazardous material spills.

Recom: The Solid Waste Operation and Maintenance Plan / Spill Contingency Plan should be revised to include the correct AANDC contact information. This contact information is provided in Part B, Item 7 of the water licence:

Manager of Field Operations, AANDC

Telephone: (867) 975-4295

Fax: (867) 979-6445

**7. Wastewater and Leachate Sampling Procedures**

Source: *Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Appendix A, Page 41

Comment: Included in the plan are guidelines for the collection of leachate samples downstream of the Solid Waste Disposal Facility, Appendix A, *Guidelines for Water, Wastewater and Leachate Sampling and Testing*. This guideline provides specifications for the types of sample bottle used to monitor the quality of

wastewater and leachate. According to the specifications five samples should be taken from points in five different bottles. The volumes for Bottles 1 through 4 are provided. No information is provided for the fifth bottle type

Recom The Licensee should revise its *Guidelines for Water, Wastewater, and Leachate Sampling and Testing* to include the specifications of all five bottle types used to monitor the quality of wastewater and leachate.

**8. The Installation and Maintenance of Fencing**

Source: Nunavut Water Board. *Water Licence No. 3BM-ARC1419*. Issued to the Hamlet of Arctic Bay. Date September 2, 2014. Part D, Items 7 and 8.

Ferguson Simek Clark Engineering and Architects*. Guidelines for the Planning, Design, Operations, and Maintenance of Modified Solid Waste Sites in the NWT.* Prepared for the Government of the Northwest Territories, Department of Municipal and Community Affairs. FSC Project No. 2001-1330. April 21, 2003. Section 3.9

*Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Section 1.

Comment: The submitted plan states that solid waste disposal facility is a "non-engineered facility. No design and drawings are available. The Operation and Maintenance Plan did not exist in the past. Therefore, the Hamlet is not following any regulatory protocol for managing community waste. The existing waste sites have partial fencing."

Recom: The Hamlet should consider the water licence as the regulatory approval for managing community waste and maintain an Operations and Maintenance Manual for the Solid Waste Management Facility as required under Part F, Item 2 of the licence. Additionally, Part D, Item 8 of the licence requires the Hamlet to implement measures to control wind-blown litter at the Solid Waste Disposal Facility. As stated in the Government of the Northwest Territories April 2013 *Guidelines for the Planning, Design, Operations, and Maintenance of Modified Solid Waste Sites in the NWT*, the Hamlet should fence this facility for the following reasons[1]:

- To control or limit access to the landfill by community residents;
- To prevent scavenging animals from causing a nuisance and risking the safety of workers and residents; and
- To control the spreading of blowing garbage.

[1] Ferguson Simek Clark Engineering and Architects. *Guidelines for the Planning, Design, Operations, and Maintenance of Modified Solid Waste Sites in the* NWT. Prepared for the Government of the Northwest Territories, Department of Municipal And Community Affairs. FSC Project No. 2001-1330. April 21, 2003. Section 3.9

**9. Secondary Containment of Hazardous Wastes**

Source: *Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Section 6.2.

Comment: The submitted plan states, “the bulk metal/hazardous waste storage area is currently used to store hazardous wastes from the community. This area is filled but not bermed or lined and runoff from the facility presently flows into the sewage treatment wetland. If use of this area is to continue for storage of hazardous wastes, it is recommended that an engineered berm and liner system be installed as this will limit the amount of potentially hazardous leachate from entering the surrounding environment.”

Recom: The Hamlet should take necessary measures to ensure that all hazardous wastes are placed in secondary containment. An engineered berm and liner system should be installed in the designated hazardous waste storage area as advised in section 6.2 of the submitted *Solid Waste Operation and Maintenance Plan*.

**10. Plans to Construct a New Solid Waste Disposal Facility**

Source: *Solid Waste Operation and Maintenance Plan for the Hamlet of Arctic Bay*. January 2015. Section 1.0.

Comment: The submitted plan states that, “the Hamlet requires a new solid waste facility ASAP but is not sure how soon the capital project will be funded to build the new waste management facility.”

Recom: Any new solid waste facility should be designed by an engineer and include water management provisions (i.e., containment and discharge of runoff/leachate, and diversion of non-contact water). Drawings prepared by an engineer should accompany a licence amendment application when the Hamlet seeks NWB approval of a new facility.

The Hamlet should implement and further refine its waste management practices until such time that a new solid waste facility can be constructed.

Prepared by David Abernethy