

HAMLET OF AKLAVIK

Operation and Maintenance Plan for Solid Waste Site and Lagoon

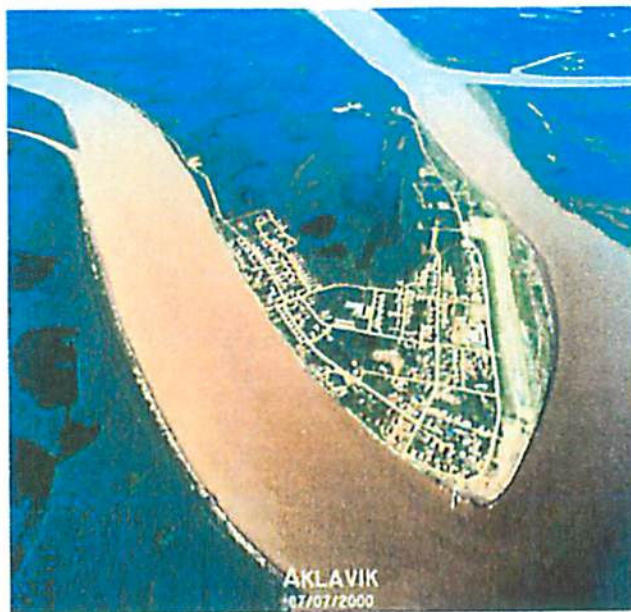


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1. INTRODUCTION

1.1 Purpose

This document has been produced to provide information regarding the Operation and Maintenance (O+M) requirements of the Hamlet of Aklavik's Solid Waste Site and Sewer lagoon. This plan will assist Aklavik's personnel in the proper operation and maintenance of these areas.

1.2 Site Setting

The Hamlet of Aklavik is located on the Peel Channel of the Mackenzie River Delta, 113 km south of the Arctic Coast. It is located at Latitude 68° 13' N and Longitude 124° 59'W.



Figure 1. Map of Northwest Territories.



Figure 2. Hamlet of Aklavik

The Hamlet of Aklavik is located less than 100 km south of the Beaufort Sea. In the summer the community is only accessible via aircraft and boat. During spring break up and winter freeze up supplies must be flown in. Between December and April, an ice road is maintained from Inuvik and supplies can be trucked in.

During spring, floods can occur due to ice jams downstream of the Mackenzie River. About once every decade, the River overruns its banks and floods the town with several feet of water.

1.3 Population

According to the 2011 census, Aklavik has a current population of 633 people occupying 226 private dwellings. This is up from the results of the 2006 census that recoded 594 people in 218 private residences.

YEAR	POPULATION PROJECTION
2015	666
2020	676
2025	678

TABLE 1. Estimated population projection for the Hamlet of Aklavik

1.4 Contact Information

TITLE	NAME	WORK /OFFICE	HOME
Senior Administrative Officer	<i>Fred Behrens</i>	(867) 978-2351	<i>1867-445 : 4374</i>
Municipal Foreman	Dean Arey	(867) 978-2024	(867) 978-2868
Municipal Service Worker	Dale Sample	(867) 978-2024	(867) 978-2292
Water Treatment Plant	Kelly Arey (WTP Trainee)	(867) 978-2554	(867) 978-2637
Water Treatment Plant	Archie Arey (Public Workers Contractor)	(867) 978-2554	(867) 978-2637
Vacuum truck operator	K& D Contracting (Contractor)	(867) 978-2792	(867) 978-2792

TABLE 2. Contact numbers for community members

2. BACKGROUND INFORMATION

2.1 Water Use

Aklavik's raw water source comes from the Peel Channel. After water is pumped to the treatment facility, it passes through a pre-treatment clarifier and a packaged Water Treatment Plant (WTP) where it undergoes coagulation/flocculation, clarification and filtration. Water is disinfected through chlorination prior to distribution. Treated water is delivered by water truck to residents and facilities in the community.

2.2 Sewage Disposal

The Clearing Lake Sewage Lagoon is a natural lagoon that operates with continuous discharge into the adjacent natural wetland. Freeze-up of the lagoon typically happens in early October, and break-up is in late May or early June.

The lagoon covers an area of approximately 290,000m² and is about 1.5 m (5ft) deep. The lagoon can therefore hold roughly 435,000m³ of sewage.

Sewage is collected from the community by vacuum truck seven days a week and disposed at the sewage lagoon. The trucks discharge the sewage using the chute at the facility.



Figure 3 . Sewage Chute

A portion of the access to the Lagoon is through a locked gate which opens from 8:00 am to 5:00 pm, Hamlet maintenance staff ensures that the gate is locked and the contractor has a key to have access to the Lagoon for after hours and on the weekend.

2.3 Solid Waste Disposal

Solid Waste is collected from the community by a designated collection truck three times a week. The waste is transported to the solid waste disposal site; there is one public access road to the disposal site. Separate disposal areas are used for refuse, hazardous materials, appliances, tires and bulky waste metal waste. Refuse is disposed of in cells (trenches).

An evaluation of the existing site to identify the solid waste management needs for the community, regulatory requirements and evaluation of five system options was done by Dillon Consulting and completed in March 2009.



Figure 4. Solid Waste Collection Site

3. SEWAGE DISPOSAL SYSTEM

3.1 Background

This section of the manual was developed to present operational and maintenance procedures to designated operators of the wastewater treatment facility in Aklavik. Each set of procedures is explained individually. The final section of the manual provides a summary of operational and maintenance procedures broken down into daily, weekly, monthly and annual tasks.

3.2 Equipment

The following equipment is utilised for the collection and transport of material from the hamlet to the sewage lagoon :

YEAR	MAKE	CAPACITY (L)
2007	Sterling	10,000
2012	Freightliner	12,000

3.3 Site Personnel

The Senior Administrative Officer (SAO) has the overall responsibility for the waste disposal site, and oversees the employees working at the site. The day-to-day operation and maintenance of the facility is the responsibility of the Hamlet Foreman. One or two people are employed by K&D Contracting who is the contractor for the sewage pumpout services; contract is from April 01, 2012-March 31, 2017.

3.4 Operational Procedures

The pump-out services is contracted out to a local contractor who will abide to the procedures and guidelines of this Operation and Maintenance Manual.

These procedures must be carried out frequently to ensure smooth operation of the treatment system.

Basic Operations

- I. Wastewater in Aklavik is collected from holding tanks at each residence or commercial building.
- II. Suction trucks pump the wastewater out of the holding tanks and transport it to the sewage treatment area.
- III. There are a very small number of homes still using honey bags; these are collected as required and deposited in a designated cell near the lagoon.
- IV. Each time it is collected, the wastewater is trucked out and discharged into the lagoon. The sewage truck backs up to a chute on the gravel pad at the lagoon, and the valve is opened. Wastewater is discharged through the chute in to the lagoon.
- V. Discharge from the lagoon is at a natural rate, as there is a natural outflow from the lagoon into the adjacent wetland area.

3.5 Sampling Procedures and Requirements

Monitoring the wastewater effluent is an important step in the efficient operation of the wastewater treatment system in Aklavik as is required by the NWT Water Board.

Six factors are particularly important to producing meaningful results:

- I. Collecting the samples at the designated time which is once in spring, immediately after break-up of the Lagoon, and once in the fall, prior to freeze-up.
- II. Using the correct clean sampling container for the parameter being tested
- III. Collecting the samples from the correct location and completing any necessary field tests at that time
- IV. Labeling the samples correctly and filling out a record sheet
- V. Using the correct procedure for field test parameters
- VI. Shipping the samples quickly and in the correct containers to the analytical laboratory

A "Surveillance Network Program" (SNP) sampling protocol has been developed and SNP station locations are outlined in the Hamlet's Water License as well as below.

STATION NUMBER	DESCRIPTION
SNP-570-3	Point where the effluent discharges from the lagoon into the wetlands

3.6 Record Keeping

Records should be kept to assist in planning for yearly operations and to assist in the evaluation of the effectiveness of the sewage treatment facility. The records should be kept in the Hamlet Office and be maintained by the SAO and Hamlet Foreman. As a minimum, the following information should be recorded:

- The approximate volume of sewage discharged to the system
- The dates any monitoring is conducted
- The results of the monitoring program
- Any maintenance activities carried out on the facility

3.7 Health and Safety

Due to the potential health hazards associated with sewage handling and treatment, the following safety precautions should be taken by sewage treatment personnel:

- PPE including gloves, boots and safety glasses are to be worn at all times
- Hands are to be washed frequently, as a minimum after work and before eating
- Equipment to be kept clean and in good working order
- To prevent cross contamination, work clothes should not be worn home
- Personnel should receive appropriate vaccinations and ensure they are kept up to date
These Vaccinations should include the following:
 - Tetanus (at least every 9 years)
 - Hepatitis A & B (commonly called TwinRix)

3.8 Bear Safety

Grizzly bears are known to frequent the area, and precautions should be taken. Bear safety information can be found on the GNWT's Resources, Environment Natural Resources website under Bear Safety:

3.9 Maintenance

The following maintenance procedures should be carried out to ensure that wastewater treatment infrastructure operates efficiently.

3.9.1 Sewage trucks and Holding tanks

The transport of sewage to the treatment facility is critical to the whole process. As such, it is important that the sewage trucks be kept in good repair.

- Repairs to sewage trucks should be completed as a priority
- To prevent freezing, sewage trucks should not sit full for long periods in the winter
- Holding tanks must be kept in good working order

3.9.2 Access Road and Truck Pad

The access road is constructed of gravel and is approximately 2 km northwest of the community. Basic road maintenance is to be conducted as follows:

- At least twice a year (spring and fall), the road and truck pad is to be graded to smooth and the surface is to be reshaped if required. The road should be graded more frequently is required. The sewage discharge point should also be inspected for erosion and maintained as required.
- As necessary during the winter, snow is to be removed to ensure unrestricted access to the sewage discharge point is maintained
- Any spilled and frozen wastewater should be removed during snow removal and dumped to the lagoon

3.9.3 Drainage

The truck pad at the sewage discharge point should be graded such that any wastewater spilled during the off-loading procedure will flow into the sewage system.

3.9 Operational and Maintenance Summary

DAILY

- Collect wastewater from holding tanks and transport to the sewage truck discharge point
- Clean any spills immediately
- Clear snow from road and truck pads as required
- Record O&M information as required

WEEKLY

- Remove non-sewage floating materials (i.e. plastic bags) from the lagoon
- Ensure significant erosion is not occurring at the truck discharge location
- Record O&M information as required

MONTHLY

- Grade and maintain the access road if required
- Conduct the monitoring program as required
- Record O&M information as required

YEARLY

- Conduct the semi-annual monitoring program
 - once in spring, immediately after break-up of the Lagoon,
 - once in the fall, prior to freeze-up
- Review O&M records to evaluate the effectiveness of the sewage treatment system and plan for the upcoming year

4. SOLID WASTE SITE

4.1 Manual Organization

This section of the manual was developed to present operational and maintenance procedures to designated operators of the landfill site in Aklavik. Each set of procedures is explained individually. The final section provides a summary of operational and maintenance procedures broken down into daily, weekly, monthly and annual tasks.

The waste from the households in Aklavik is picked up Monday, Wednesday and Fridays; this service is contracted out to a local contractor.

4.2 Waste Disposal Site

The disposal site is organized into separate disposal areas:

4.2.1 Refuse Disposal Area:

This is the main disposal area at the landfill; general waste is placed here.

4.2.2 Bulky Metal Waste Area:

Large non-combustible items such as automobiles, snowmobiles, etc. are placed in the bulky metal waste disposal area. It is located across the access road from the regular waste disposal area. A berm was constructed around the bulky metal storage area and this was done to assist with surface water management.

- Vehicles, ATV's and snowmobiles must have all fluids emptied so they do not drip out and contaminate the environment. This includes fuel, glycols and oils. These fluids can be collected in separate containers and taken to the hazardous materials area.

4.2.3 Hazardous Materials Area:

Hazardous materials can include the following items and will need to be disposed of properly for the health and safety of the community and to ensure the environment is protected.

- **PAIN**: Small 4L and 20L cans should be dumped into a drum labeled "WASTE PAINT" using a funnel provided. Place bung in drum when done
- **FUEL**: Small amounts can be dumped into a drum labeled "WASTE FUEL"
- **HOUSEHOLD HAZARDOUS WASTES**: Pesticides, chemicals, fertilizers, cleaners, solvents, adhesives, etc should all be segregated in bins or drums provided. Each container will need to be labeled as to the waste stream.
- **CAR BATTERIES**: Place on pallets and stack up to three high with cardboard in between the layers. Batteries need to be shrink wrapped to secure them
- **OLD FUEL DRUMS**: Fuel needs to be drained and drums can be placed in the designated area.
- **DRUM OF LIQUIDS**: Drums need to be labeled as to the contents and placed in the designated area.
- **GLYCOL**: Needs to be dumped into a drum labeled "WASTE GLYCOL". Place bung in drum when done.
- **OILS**: Transmission, hydraulic fluid, engine oil, transmission, mineral oil, etc can be dumped into a drum or tote labeled "USED OIL"
- **APPLIANCES**: Food must be removed from fridges and freezers prior to disposal. Place in the designated area

- **ELECTRONIC WASTE:** Can be collected on pallets or in wooden crates and is to be labeled and shrink wrapped if exposed. Place in the designated area
- **TIRES:** Place in the designated area
- **PROPANE TANKS:** Place in the designated area
- **HONEY BAGS:** Place in the designated area
- **TREATED /PAINTED WOOD:** Place in the designated area. This material cannot be burned due to the chemicals or paint applied to the surface. Place in landfill.
- **CARDBOARD/PAPER/WOOD:** Place in the designated area. This material is designated for burning which is arranged with the Renewable Officer to ensure that burning methods are followed accordingly to regulations.

4.3 Equipment List

The following equipment is required to operate the Aklavik solid waste disposal site:

- Loader 250 WA Komatsu (Owned by Hamlet)
- Grader 710A Champion (Owned by Hamlet)
- Cat D6 (rented from K&D Contracting)
- Dump truck (rented from K&D Contracting)

4.4 Site Personnel

The Senior Administrative Office is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the Hamlet foreman and Municipal Services worker. The Hamlet contracts the service for garbage collection.

4.5 Operations Procedure

These procedures must be carried out on a regular basis to ensure the landfill operates safely and efficiently.

4.5.1 Basic Operations

- I. All waste is to be placed in the designated areas.
- II. Dumping should be restricted to a manageable portion of each area at a time
- III. Waste should be pushed 3 times per week
- IV. If fill is available, cover the material to reduce wildlife attractants and to prevent garbage from blowing around.

4.5.2 Hazardous Waste Area Operation

The hazardous materials storage area is a small area located near the refuse area. Specific information and training on handling hazardous waste materials have been provided for Hamlet staff by GNWT Department of Environmental and Natural Resources.

4.5.3 Bulky Waste Area Operation

The bulky waste disposal area is the open area located on the left side of the road before the area where regular household solid waste is located. To ensure effective operation:

- Place bulky wastes in an organized manner, starting from the back and working towards the front
- Stack bulky wastes whenever possible to conserve space
- Ensure that waste is stacked in such a way that it is safe to walk through the site

4.5.4 Special Considerations

Winter Operations:

Covering and pushing of partially-full or full areas of the cell being used should be completed in the late summer to prepare for the onset of winter

Wind:

A fence should be constructed around the solid waste disposal area to help control the movement of wind driven material off the landfill site, as well as to reduce access to the area by wildlife. Waste should be collected off the fence on a regular basis and deposited in the landfill

Spring Clean-up :

A spring clean-up should be conducted after the snow has melted to collect waste that has accumulated around the Hamlet over the winter.

Health and Safety:

Due to the nature of the facility, safety precautions should be taken by those personnel involved in the operation and maintenance of the landfill:

- Water and puncture proof gloves and safety boots are to be worn at all times, and work clothes should not be worn home
- Hands are to be washed frequently, as a minimum after work and before eating
- Personnel should receive appropriate vaccinations and ensure they are kept up to date
- Only personnel trained to handle hazardous materials should do so
- Reflective safety vests should be worn when working around heavy equipment

Bear Safety:

Grizzly bears are known to frequent the area, and precautions should be taken. Bear safety information can be found on the GNWT's Resources, Environment and Natural Resources website under Bear Safety:

www.enr.gov.nt.ca/live/documents/content/safety.pdf

4.5.5 Site Records

Records should be kept to assist in planning for yearly operations and future expansion. The information should be reviewed annually to evaluate the effectiveness of the operation and to forecast future operational requirements. The records should be kept in the Hamlet Office and maintained by the Senior Administrative Officer. As a minimum, the following information should be recorded:

Refuse

- Number of loads per day
- The dates of cover placement in cells

Bulky Metal Wastes

- Itemize the site contents
- The number of trips to the site and the dates
- The date when the site is full

Hazardous Materials

- The number of trips to the sites and dates
- The type of hazardous material placed there and method of storage
- The party using the site
- The date when the site is full

4.6 Maintenance Procedures

Proper maintenance of a landfill facility is crucial to ensuring the efficient operation of all the components. Activities can be divided into the following categories:

4.6.1 Storage maintenance

As the first step in waste collections process, residential and commercial storage containers should be adequately maintained. The following points should be considered:

- Garbage containers should be covered to prevent windblown debris from littering the community and to prevent animals from getting into the garbage
- Bulky wastes should not be left in residential areas for long periods due to aesthetic and safety concerns

4.6.2 Collection maintenance

The garbage contractor is required to ensure that the waste collection vehicle is in good operating condition to ensure the collection service is not interrupted for extended periods. Other maintenance considerations than what is stated in the contract include the following:

- The collection vehicle should be equipped with a shovel to clean up accidental spills during collection
- The collection vehicle should be cleaned periodically

4.6.3 Access Road Maintenance

The access road is gravel and approximately 2 km long northwest of the community. Basic road maintenance is to be conducted as follows:

- At least twice a year (spring and fall), the road and truck pad is to be graded to smooth and the surface is to be reshaped. This should occur more often if required.
- As necessary during the winter, snow is to be removed to ensure unrestricted access to the site for the garbage collection vehicles

4.7 Operational and Maintenance Summary

DAILY

- Collect waste from the Hamlet and transport it to the landfill (this is for large household items)
- Ensure all wastes stay in designated areas
- Clean up any spills immediately
- Clear snow from roads and disposal area as required
- Record O&M information as required

WEEKLY

- Contractor picks up garbage from residents and businesses in the community three times a week
- Pick-up windblown materials which have migrated past the disposal area
- Record O&M information as required

MONTHLY

- Grade and maintain access roads, if required
- Cover waste with overburden as required
- Record O&M information as required

YEARLY

- Review O&M records to assist in planning for the upcoming year

5. Emergency Response

Due to the nature of these types of facilities, uncontrolled fires and spills of unknown or hazardous materials should be treated with extreme caution. Hamlet personnel responsible for the solid waste and sewage disposal facilities should be trained in Workplace Hazardous Materials Information System (WHMIS), Transportation of Dangerous Goods Act and Regulations (TDGA and TDGR) and First Aid. Appropriate vaccinations of employees should be kept current.

5.1 FIRE

A contingency plan should be developed by the Hamlet of Aklavik's Volunteer Fire Department for responding to a fire at the solid waste disposal site. Special precautions should be implemented, as burning of waste can produce poisonous vapors. The following procedures should be used in case of uncontrolled fire:

- Evacuate area around landfill immediately
- Keep all personnel up-wind of the site
- Notify the Hamlet Volunteer Fire Department at 978-2222

5.2 SPILLS

A spill is defined as the discharge of a contaminant in contravention of the Environmental Protection Act.

Spills of unknown or hazardous substances at the landfill should be treated with extreme caution. Spilled materials should only be handled by properly trained and equipped personnel. The following actions should be undertaken by personnel in the event of a hazardous materials spill at the landfill:

- **Be alert and consider your personal safety first**
- Assess the hazard to persons near the spill and where possible take action to control danger to human life. If possible identify the material or products spilled
- If the spill creates a fire, explosion or other hazard to life, remove all potential ignition sources, if possible, evacuate the area and contact the RCMP (978-1111) and the Hamlet's Volunteer Fire Department (978-2222)
- If safe and practical, try to take appropriate action to stop the release of material
- Contact the Hamlet Foreman and the SAO, and report the spill
- Mark the spill scene to warn the public and prevent access

Once contacted, the Hamlet Foreman shall:

- Proceed to the spill location,
- Make the necessary arrangements for first aid and removal of injured personnel. Take the necessary action, where possible, to secure the site to protect human safety
- If not already done and it is safe to do so, take the appropriate action to stop the flow or release material. If at all possible, take the necessary action to contain or prevent the spread of the spilled material
- **Contact the 24-hour Spill Line at (867) 920-8130**
- Contact the Hamlet Senior Administrative Officer
- Contact the Fire Department if required

Throughout the spill response, personnel should place their personal safety as the highest priority.

The Spill Contingency Planning and Reporting Regulations should be referred to for more information. These regulations are found in Appendix, and may also be found at:

spills@gov.nt.ca

REFERENCES

- "Hamlet of Aklavik-Solid Waste Site Evaluation" prepared by Dillon Consulting March 2009
- "Hamlet of Aklavik – Background Report for Water License Renewal" prepared by AECOM Canada Ltd. May6, 2009
- "Operations and Maintenance Manual, Sewage and Solid Waste Facility – Hamlet of Paulatuk" prepared by Dillon Consulting August 2004
- "Google Maps" - Figures of of Aklavik – 2012 Google maps
- "Wikipedia" – Location of Aklavik

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**Hamlet of Aklavik Operation and Maintenance Plan:
Solid Waste Site and Lagoon**