MUNICIPALITY OF CLYDE RIVER

Operation & Maintenance Plan for Municipal Water Licence: Solid Waste Disposal Facilities

November 2024

Document Control

Date	Document Title	Author	Details
August 2019	Solid waste Operation and Maintenance Plan Hamlet of Clyde River		Previous manual
November 2024	Clyde River Operation & Maintenance Plan for Municipal Water Licence: Solid Waste Disposal Facilities	GN-CGS and Dillon Consulting Limited	Consolidation of previous manuals into standardized template

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1.0 Site Description

Date this plan was prepared: 2024-Nov-13

1.1 Location of the Solid Waste Disposal Facility (SWDF)

Municipality: Clyde River
Latitude: 70°28'59 N
Longitude: 68°36'48 W
Proximity to Town: 1.2km North
Landfill Dimensions: 300m x 300m
Metal Waste Area Dimensions: Undefined

Figure 1: Clyde River Water Solid Waste Disposal Facility. Google Earth 2024

1.2 SWDF Site Summary

Year of commissioning the SWDF: Unknown

Design life of the SWDF: Unknown

1.2.1 Site History

Clyde River is a traditional Inuit community of approximately 1031 residents located on the shore of Baffin Island's Patricia Bay, off Clyde Inlet, an arm of Davis Strait in the Qikiqtaaluk Region of Nunavut. It lies in the Baffin Mountains, which in turn form part of the Arctic Cordillera Mountain range. Known as the "Gateway to the Fiords", Clyde River is located on a flood plain, surrounded by spectacular fiords that stretch all the way into the Barnes Icecap. The Municipality of Clyde River is a Community of Baffin Region and located at Latitude 70º27'N and Longitude 68º33'W, on the shore of Patricia Bay, on the east coast of Baffin Island. The annual snowfall is about 169cm, and the annual rainfall is about 5cm. In February the daily mean temperature is about -30ºc while in July the daily mean temperature is about 50ºC. Freeze up usually occurs during the month of November but may occur as early as September or October, while spring thaw usually occurs late May and June. The Community infrastructure includes a water supply facility which draws water from a Natural Lake and disinfected in the Truck fill station and delivered by water trucks into holding tanks in each building, a single cell sewage lagoon which receives trucked sewage (wastewater) from the holding tanks in each building, and a solid waste facility which includes domestic wastes, construction wastes, metal wastes and hazardous goods.

2.0 Staff

2.1 Chief Administrative Officer

Name: Rajesh Kumar

Phone: 867-924-6220

Email: cao@clyderiver.ca

Responsibilities:

The CAO manages the municipal staff to ensure that:

- Proper operation of the SWDF is carried out
- Sampling and inspections are completed
- Information under the water licence monitoring program is provided to the Government of Nunavut Department of Community and Government Services (GN-CGS) for Annual Report preparation

2.2 Foreman

Name: Ian Tigullaraq

Phone: 867-924-6301

Email: pworks@clyderiver.ca

Responsibilities:

- Daily operations and maintenance of the SWDF
- Managing waste collection
- Proper segregation of waste
- Compacting and burning of waste
- Completing inspections and other maintenance activities
- The leachate sampling program at the monitoring stations
- Maintaining signage at the SWDF and monitoring stations

2.3 Solid Waste Truck Drivers

Name: Various

Phone: N/A

Email: N/A

Responsibilities: The drivers collect solid waste within the municipality from storage containers and deliver it to the SWDF.

3.0 Health and Safety

All personnel working within the SWDF must follow the Nunavut Safety Act and be made aware of potential health hazards associated with working around solid waste. This is imperative so individuals make a conscious effort to perform all necessary safety procedures to protect themselves, their co-workers and family members at home. Safety precautions include:

- Ensure all equipment is kept as clean as possible
- Protective clothing such as coveralls, gloves, boots, and safety glasses are to be provided to personnel and always worn when working around waste
- Workers must always wear protective gloves
- Work clothing is not worn home
- Workers must wash their hands with soap and water on a regular basis, especially before delivering drinking water, eating, and before going home
- Workers must keep their vaccinations up to date

4.0 Security and Control

Access Control of to the facility:

- Perimeter fencing around the SWDF
- Signage
- 450 m restricted land use development setback surrounding the SWDF

5.0 Facility Operations

5.1 Municipal Waste Disposal

Municipal Waste Collection:	Trucked pick-up
Other Waste:	Drop off
Number of days per week waste is collected:	5
SWDF Type:	Natural attenuation

Type of waste received at the SWDF:

- MSW
- Bulky metal waste
- Hazardous
- Industrial, construction and institutional

Overview of the SWDF:

The Hamlet currently has a domestic waste site and bulky metal waste site. An access road from the community to the sewage lagoon connects those isolated sites. Both facilities are non-engineered.

The landfill (domestic waste) site is on the south side of the access road. This site is about 600m from the ocean and slopes towards the ocean. There is a dilapidated fence located on the south face of the landfill which is intended to prevent debris from being blown from the site into the ocean. The landfill does not have berms, gate, lights or designated areas for different wastes. This facility reportedly has a capacity issue.

The Bulky metals site is located at the north of the access road and opposite to the sewage lagoon. This site receives all the metal wastes without any segregation. A dump truck or low bed is used to transport bulky metals from the community to this site. A hazardous waste management cell was not built within the bulky metals site. As a result, the hazardous wastes are mixed up with other materials.

Generation Data:

The average waste generation rate is considered to be 0.015 m3/person/day. For an estimated population of 1278 in 2023, a total of 6997 cubic meters of solid waste is expected annually.

Operations:

- The SWDF needs to be properly signed to inform operators and residents of the correct location to dispose of or store certain wastes. At a minimum, the SWDF should have disposal/storage areas for:
  - Domestic non-burnable waste (for landfilling)
  - Hazardous waste
  - Bulky Metal waste
  - Domestic burnable waste
- The waste truck driver collects municipal solid waste (MSW) from community buildings five times per week. The garbage truck is used to collect and transport municipal waste to the SWDF.
- The Waste Truck Driver is also responsible for ensuring collected waste is properly segregated and refusing the collection of hazardous waste if present. If properly trained, this individual may also be required to operate heavy equipment within the solid waste disposal facility

5.2 Open Burning

Operations:

- Wastes for burning are identified and separated. Burning should only occur at the designated location at the SWDF and when winds are light and blowing away from the community. To prevent incomplete combustion and/or leachate from contaminated ash residual from impacting any surrounding waters, waste that cannot be burned includes:
  - Non-wood building / construction materials (e.g. Styrofoam, roofing materials, electrical wire, insulation, plastics, asbestos, etc)
  - Treated wood (e.g. telephone poles, pilings, cribbing, foundation wood)
  - Asphalt & asphalt products
  - Tires
  - Hazardous wastes
  - Waste paint
  - Fuel & lubricant containers
  - Aerosol cans & other compressed gas containers (e.g. propane tanks)

- Staff shall burn municipal waste in accordance with the GN's Environmental Guideline for the Burning and Incineration of Solid Waste (2012). The Municipality will also apply for a permit to burn through the Fire Department. Controlling the open burn is extremely important to reduce the risk of uncontrolled fire and hazards to the public, employees, and the surrounding environment.

- The weather forecast must be checked prior to any burning. If heavy rain is or will be present, burning should be postponed (burning during heavy rain events may result in poor or incomplete combustion and the potential to generate harmful contaminants). Confirmation of wind speed and direction prior to any burning. If loose debris can be carried by the wind, burning should be postponed.

- The SWDF must be closed to the public during burn events

- Burning only in the designated burn area and ensuring burning does not occur in landfill piles.

- Presence of an attendant during initial stages of the burn and periodic inspection of the burn once it has been established.

- Maintaining a minimum of 5 m buffer zone around the burning area and all ensuring attendants or personnel remain upwind of the burn area.

- Confirmation the waste is no longer hot or burning prior to the addition of more waste or covering with granular material. This can be accomplished by moving around the ash and remaining materials to ensure the fire is out and material can cool.

After every burn, once the MSW is confirmed to be cold and not burning, the CAT bulldozer should push the ash and remaining material to the landfill tipping face.

5.3 Hazardous Waste Management

Hazardous wastes are those that are known to be dangerous due to their chemical, physical or biological properties, are no longer used for their original purpose, and are intended for recycling, treatment, disposal, or storage. All hazardous wastes require special handling, storage, and disposal methods to prevent human health and environmental exposure.

The Environmental Guideline for the General Management of Hazardous Waste (GN, 2010) provides information regarding the proper management of hazardous waste in Nunavut. The generator of any hazardous waste is ultimately responsible for ensuring it will be properly managed from is creation to its disposal. Generators typically use carriers to transport the hazardous waste to appropriate receivers for disposal.

Clyde River's SWDF is only licensed to accept MSW for disposal and shall only accept household hazardous wastes for storage. 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 entering the surrounding environment. Industrial hazardous wastes shall not be accepted for storage or disposal. Industrial sources (generators) are responsible to manage their own hazardous wastes.

The following hazardous waste operations and maintenance procedures deal with household hazardous wastes (HHW) only. Typical HHW which may be found in Clyde River include:

- Pesticides and herbicides
- Paint
- Solvents (e.g., paint cleaners)
- Flammable liquids
- Corrosive cleaners
- Batteries (wet and dry cell)
- Used fuel and oil
- Corrosive Explosive Flammable Poison
- Certain items considered HHW cannot be stored at the MSW disposal facility, however. These include:
    - Ammunition, flares and explosives (including fireworks) – contact the Clyde River RCMP for proper disposal
    - Prescriptions, medications, and bio-hazardous wastes (includes syringes) – dispose of these at the Nursing Station and/or Health Care Centre
    - Reactive chemicals – contact the GN-DOE office for disposal options

Contaminated soil can be accepted in a designated area and is typically stored in 205 L steel drums or bags approved for contaminated soil storage and must be shipped out of the municipality. Private entities responsible for creating the contaminated soil must contact the CAO to discuss storage options and provide a plan to ship the contaminants out of the municipality. The decision to store contaminated soil from industrial sources rests with the municipality.

Operations:

- The SWDF needs to have an area set aside as a hazardous waste storage area. This area should be fenced with a lockable gate and have appropriate storage options for expected HHW. This area also needs to be properly signed as the “Hazardous Waste Storage Area”. Proper signage helps operators, as well as the general public when residents arrive to dispose of their wastes. This area is intended for storage only, not disposal.

- The bulk metal/hazardous waste storage area is intended for storage only, not disposal. It is expected that hazardous wastes will be stored for up to five years. This should be sufficient time for the community to build up enough waste to make it economical for a back haul out of the community to a licensed waste receiver.

- Since the SWDF is generally accessible to the public, residents can come and drop off HHW throughout the year. However, the general public should not have direct access to the Hazardous Waste Storage Area for health and safety reasons. A designated public drop-off area for HHW should be used. The public drop-off area should be tended to regularly by the Foreman.

- Inspection of the hazardous waste storage area should occur weekly inspections by the Foreman.

5.3.1 Storage

Hazardous waste storage containers are designed to hold, store and transport small quantities of waste. Many different types of containers are available (i.e. barrels, bottles, bags and boxes) and are made from a variety of materials (i.e. aluminum, plastic, steel, and stainless steel). Selecting the proper container requires an understanding of the properties of the waste to be stored. If transport is to be undertaken, the generator should consult the Transport Authority to confirm the container meets all legislated requirements. The following are additional general points for consideration:

- Hazardous waste should be stored in their original containers where possible or in containers specially manufactured for the purpose of storing hazardous waste. The containers must be sound, sealable and not damaged or leaking. Sea can is the best option.

- Containers should be clearly labeled to identify their contents according to requirements of the Workplace Hazardous Materials Information System (WHMIS) and the relevant Transport Authority, if transport is planned.

- Small quantities of compatible hazardous waste should be bulked into 16 gauge or equivalent metal or plastic 205 litre (45 gallon) drums for the purpose of secondary containment.

- Containers should be closed and sealed at all times, except while waste is being added or removed.

It is important to know which types of waste do not mix well when storing them. This helps prevent violent, explosive reactions and toxic fumes. To store wastes safely, different systems have been created. One example is the 'Hazardous Waste Compatibility Chart' adopted by the United States' Environmental Protection Agency.

All HHW collected needs to be properly stored in sea cans to minimize any environmental and human health hazards. The GN-DOE provides information on proper storage of specific HHW; these include:

- **Antifreeze** – use original containers where possible, or bulk-store waste antifreeze into good condition 16 gauge or lower gauge steel or plastic 205 L drums.
- **Batteries** – bulk-store waste batteries into good condition 16 gauge or lower gauge steel or plastic 205 L drums, or other form of containment away from weather; wooden pallets should be used to keep batteries and containers off the ground during storage and transport.
- **Fluorescent light tubes/compact fluorescent light bulbs** – use original containers where possible and prevent breakage of light tubes/bulbs; keep away from weather.
- **Ozone Depleting Substances (ODS)** – do not landfill; wastes with ODS (i.e., refrigerators and refrigeration equipment, vehicle air conditioners, ODS-containing fire extinguishers (typically purchased before 1997) should be diverted to the bulk metal waste disposal area. The Hamlet can hire technicians to remove ODS from stored equipment.
- **Paint** – use original containers where possible, or bulk-store compatible paints into good condition 16 gauge or lower gauge steel or plastic 205 L drums; do not mix different types of paint (i.e., alkyd and latex).
- **Solvent** – use original containers where possible, or bulk-store compatible waste solvents into good condition 16 gauge or lower gauge steel or plastic 205 L drums.

As the Hamlet currently stores waste oil in drums at the bulk metal/hazardous waste storage area (if not burned within BLCS' waste oil burners), it is recommended they register the site as a hazardous waste storage facility with the GN-DOE Environmental Protection Services (R. Eno, pers. comm.).

5.3.2 Classifications of Dangerous Goods:

Class 1 – Explosives

Class 2 – Compressed Gases
Division 2.1 – Flammable Gases
Division 2.2 – Non-flammable and Non-toxic Gases
Division 2.3 – Poison Gases

Class 3 - Flammable Liquids

Class 4 – Flammable Solids

Division 4.1 – Flammable Solids

Division 4.2 – Spontaneously Combustible

Division 4.3 – Water Reactive

Class 5 - Oxidizing Substances and Organic Peroxides

Division 5.1 – Oxidizing Substances

Division 5.2 – Organic Peroxides

Class 6 - Toxic and Infectious Substances

Division 6.1 – Toxic Substances

Division 6.2 – Infectious Substances

Class 7 - Radioactive Materials 2

Class 8 - Corrosives

Class 9 - Miscellaneous

1. Class 1 substances (Explosives) are regulated by Natural Resources Canada under the Explosives Act.

2. Class 7 substances (Radioactive Materials) are regulated by the Canadian Nuclear Safety Commission under the *Nuclear Safety and Control Act and Nuclear Liability Act.*

6.0 Maintenance

Overview of Maintenance Activities:

- Annual inspections will be undertaken by Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) accompanied by a licensee and/or a licensee representative from GN-CGS. The inspection report and recommendations will be reviewed by a GN-CGS municipal engineer and submitted in the Annual Report submitted to the Nunavut Water Board (NWB).
- Regular visual inspections by municipal staff of the:
  - Berms
  - Fence
  - Signage
  - Presence of water runoff in the SWDF

Any issues identified by municipal staff must be reported to the regional municipal engineer. Follow-up actions will be undertaken by the municipality with technical support from the GN-CGS.

7.0 Monitoring

Regulatory Inspection:

The annual Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) inspection will take place accompanied by the licensee from the Municipality and/or with a licensee representative from GN-CGS. The inspection will be reviewed by a GN-CGS municipal engineer and submitted with the annual report.

Table 1: Licence Requirements Related to O&M of the SWDF

Requirements	Reported
A summary of modifications and/or major maintenance work carried out on the SWDF	Proposal submitted to NWB 60 days prior
A list of spills and unauthorized discharges	Annual report submitted to NWB
A summary of any studies requested for the SWDF and future planned studies planned	Annual report submitted to NWB
Volume of Potable Water Supply at Post River Monitoring Program Station CLY-1	Annual report submitted to NWB
The Licensee shall sample water quality at Monitoring Stations CLY-2 once at the beginning, middle and near the end of the season during observed flow. Samples shall be analyzed for the parameters listed in Part H Item 4 of the water license, as well as Total Petroleum Hydrocarbons.	Annual report submitted to NWB

Table 2: Monitoring Program Station Description and Locations

Station	Description	Latitude	Longitude
CLY-2	Runoff from the Solid Waste Disposal Facilities	70º28’14”	68º37’49”

8.0 Surface Water Management

At some point, for a variety of reasons, impacted water may accumulate in the landfill, hazardous waste storage area, or the bulky metals area. The water may or may not be impacted by leachate, hazardous wastes, or contaminants from land farmed soil. In the event this occurs, the following procedures will be followed:

- Collect samples from the water licence monitoring program at stations as outlined in the Environmental Monitoring Program and QA/QC Plan. It is recognized that it may take some time for results to be received from the accredited laboratory.
- Analyze samples for parameters of concern and compare the results to the relevant Canadian Water Quality Guidelines.
- Water should be inspected for odours, stain, or signs of visible impact (sheens, floating scum).
- Consult with the GN-CGS municipal engineer and CIRNAC on discharge options.

9.0 Modifications and Upgrades

Planned modifications or upgrades:

Planning study for upgrades to the SWDF ongoing.

10.0 Previous Reports

- Solid Waste Operation and Maintenance Plan for Hamlet of Clyde River, August 2019

Appendix A

As-Built Drawings

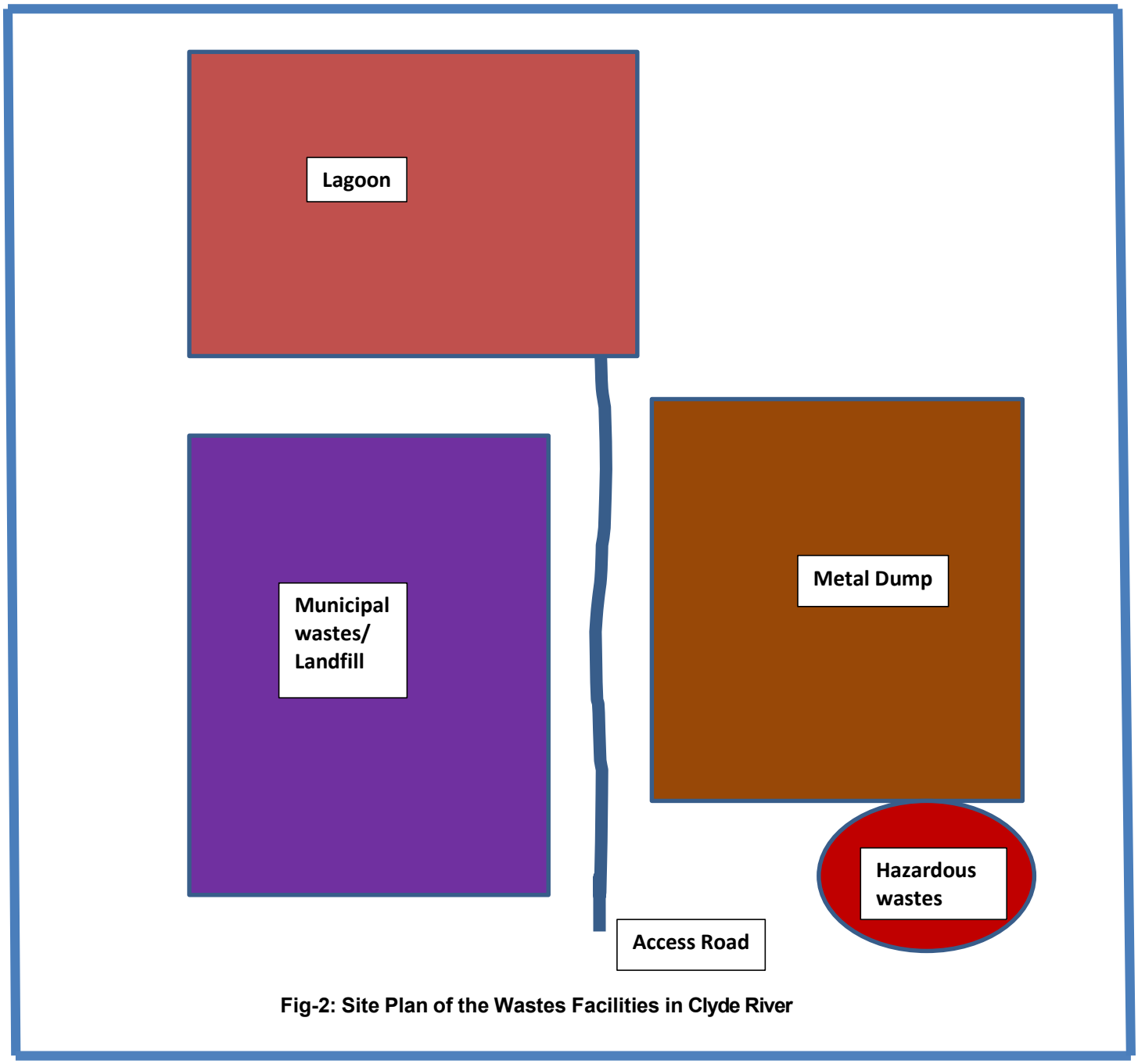

Fig-2: Site Plan of the Wastes Facilities in Clyde River