Cape Christian Cleanup

Operations and Maintenance Manual
Sewage Lagoon

QESin 2007P6
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1.0 Introduction

This manual was developed to present operational and maintenance procedures related to the Sewage Lagoon at Cape Christian, as requested in Part E, Item 2 of the Water License (1BR-LOR0813) issued by the Nunavut Water Board. This manual was prepared 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".

2.0 Description

The Sewage Lagoon is located approximately 100 meters south-west of the camp. The lagoon measures 65 metres long by 35 metres wide (outside the toe of slope). The berms are 1.5 metres high and have inside and outside slopes of 3L:1H to ensure stability. A swail surrounds the lagoon to allow for overflow from spring snow melt events.

Liquid sewage from the camp (black and grey water) flows to the Sewage Lagoon by gravity in a 6" PVC pipe.

3.0 Personnel

The Camp Superintendant has the overall responsibility for the sewage waste disposal. The day-to-day operation and maintenance of the Sewage Lagoon is either carried by the Camp Superintendant or by a designated worker.

4.0 Operational and Maintenance Procedures

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

4.1 Basic Operations and Maintenance Procedures

- Daily visual inspection of the piping and its support structure connecting the camp to the sewage lagoon to ensure the proper flow of sewage. Obstructions in the piping and soil settling underneath the piping supports are examples of incidents that may cause sewage to stop flowing from the Camp to the Lagoon or worse yet, cause the sewage to backup into the Camp.
- Daily visual inspection around the sewage lagoon. The sewage water level is to be monitored as well as the integrity of the berms.

- In the event that the integrity of the berms has been compromised, the Cleanup Superintendant is to be notified and repairs are to begin as soon as possible.
- The sewage lagoon is to be pumped out when the sewage reaches 75% of its holding capacity and at the end of the project.
    - A written notice is to be sent to Nunavut Water Board at least ten (10) days prior to initiating any decant or discharge from the Sewage Lagoon.
    - The sewage is to be pumped (using a floating intake device with a screen to ensure that no solids get pumped out of the lagoon) to a discharge location referred to as the Final Discharge Point (LOR-2). The Final Discharge Point should be a bed of 10-20 large flat rocks at least 100 meters from all naturally occurring bodies of water and 100 meters from major drainage channels. The sewage will be allowed to percolate through a wide vegetated corridor in the tundra before it reaches the Ocean.

4.2 Sampling Procedures and Requirements

Monitoring the sewage effluent is an important requirement set by the Nunavut Water Board. In compliance with Part D, Item 10 of the Water License, a representative composite sample is to be collected for analysis once at the beginning of discharge upon initial release and prior to the end of discharge, from the Final Discharge Point (LOR-2). Sampling will be performed by the Contractor's Engineer.

The following factors are particularly important to producing meaningful results:

- Using the correct clean sampling container for the parameter being tested
- Collecting the samples from the correct location and completing any necessary field tests at that time
- Labelling the samples correctly and filling out a record sheet
- Using the correct procedure for field tested parameters
- Shipping the samples quickly and in the correct containers to the analytical laboratory

All waste discharged from the Final Discharge Point of the Sewage Lagoon shall not exceed the following effluent quality limits:

- Biological Oxygen Demand (BOD) - 120 mg/L
- Total Suspended Solids (TSS) - 180 mg/L
- Faecal Coliforms - 10,000 CFU/100mL
- pH - 6.0 to 9.0 (field tested)
- Oil and Grease - no visible sheen (field observation)

4.3 Record Keeping

Records are to be kept to assist in planning, the evaluation of the effectiveness of the sewage treatment system and the creation of reports for the Nunavut Water Board.

As a minimum, the following information should be recorded:

- The monthly and annual quantities (in cubic meters) of sewage generated
- The dates any monitoring is conducted
- The results of the monitoring program
- Any maintenance activities carried out

4.4 Health and Safety

Due to the potential health hazards associated with sewage handling and treatment, the following safety precautions should be taken by all persons coming into contact with sewage:

- Equipment is to be kept clean (e.g. discharge pump)
- Hands are to be washed frequently, as a minimum after work and before eating or smoking
- Work gloves and boots should be worn at all times while performing work activities. Work clothes and boots should not be worn inside the Camp.
- Personnel should receive appropriate vaccinations

Due to the remote location of the Sewage Lagoon, it is important to be "Bear Aware". Refer to the Health and Safety Plan for the proper precautions to take while working around the Sewage Lagoon.

5.0 Decommissioning Procedures

At the end of the project just prior to closure of the site, the Sewage Lagoon will be decommissioned:

- The remaining sewage will be pumped out of the Lagoon, according to standard discharge procedures, and the berms will be pushed over the remaining solids (sludge)
- Pooling sewage will be pumped out as the berms are being pushed up
- Water in the swails will also be pumped out and the swails will be backfilled to match the surrounding terrain and prevent the ponding of water.
- If required additional soil will be used to cover the solid waste in the sewage lagoon
- The final cover will be track-packed using a Caterpillar D6 bull dozer.

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