Cape Christian Cleanup

Operations and Maintenance Manual
Landfill

QESin 2007P6
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1.0 Introduction

This manual was developed to present operational and maintenance procedures related to the Non-Hazardous Waste Landfill 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 Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories; 2003".

2.0 Description

The Non-Hazardous Waste Landfill is located to the north of the hill that the Main Station Building was constructed on (refer to Figure 1). The landfill location was selected based on the required landfill size, distance to material to be landfilled, distance to borrow sources and proper drainage to prevent ponding and seepage into the landfill.

The first phase of the Non-hazardous Waste Landfill measures about 100 metres long by 90 metres wide (outside the toe of slope). The berms are up to 3 metres high and have inside slope of 2L:1H and outside slope of 3L:1H to ensure stability. One additional phase for the landfill can be added should the amount of waste to be landfilled exceed the capacity of the first phase of the landfill.

The Non-Hazardous Waste Landfill is to be used for the disposal of all nonhazardous waste from the site and non-hazardous waste generated during site construction and remediation activities, including Type A soil and contaminated soils that exceed Tier I criteria and are less than Tier II criteria. All hazardous waste is to be disposed of off site.

3.0 Equipment List

The following equipment is required to operate the Non-Hazardous Waste Landfill:

- 1 x Caterpillar D6R dozer
- 1 x Caterpillar 320 excavator
- 1 x Caterpillar 950 loader
- 1 x Caterpillar D250E Rock Truck

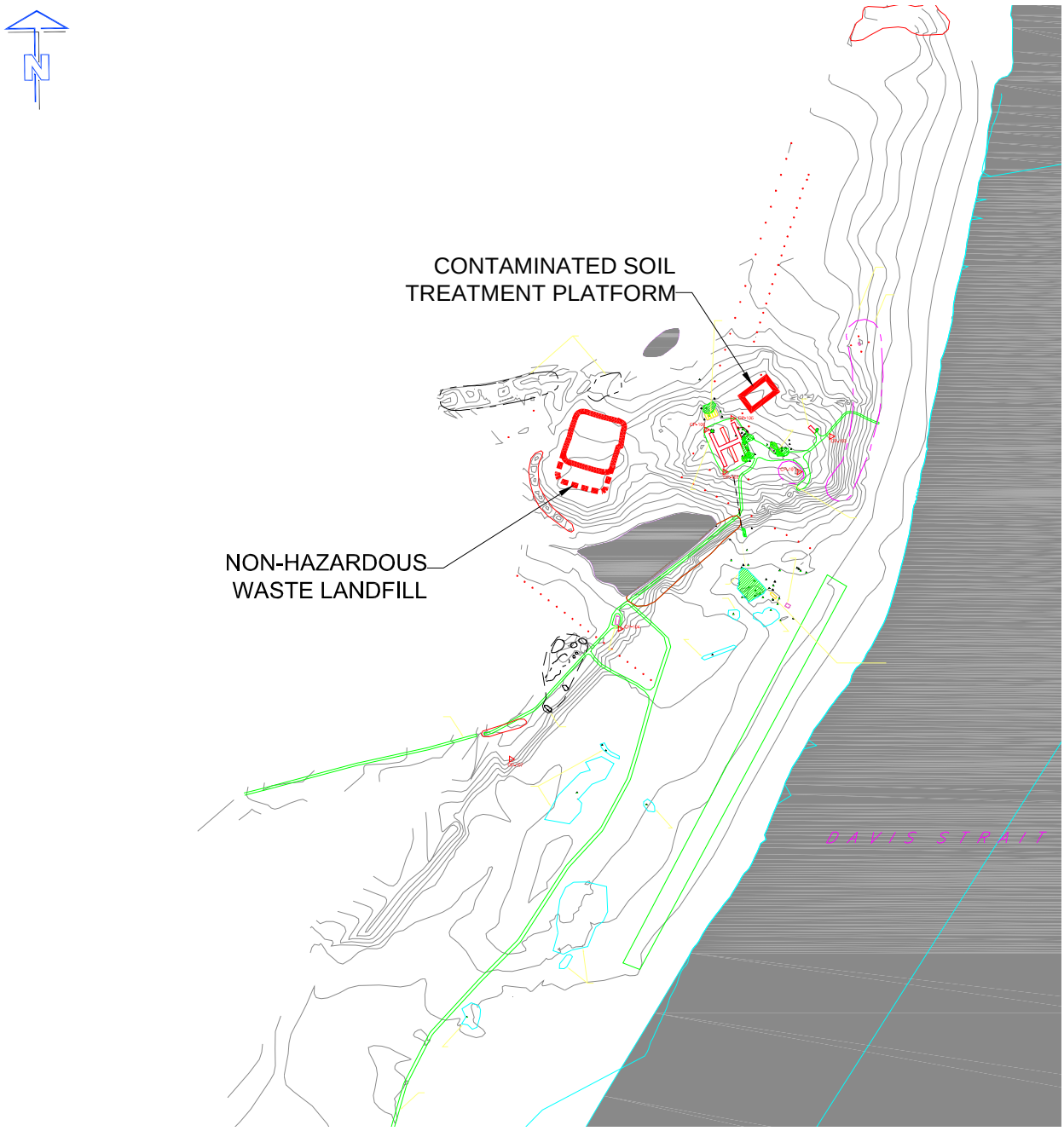

Figure 1: NON-HAZARDOUS WASTE LANDFILL AT CAPE CHRISTIAN

4.0 Personnel

The Cleanup Superintendant has the overall responsibility for the construction, operation, maintenance and closure of the Non-Hazardous Waste Landfill.

5.0 Operational and Maintenance Procedures

These procedures must be carried out frequently to ensure smooth operation of the Non-hazardous Waste Landfill.

5.1 Basic Operations and Maintenance Procedures

- Place non-hazardous waste in uniform, horizontal lifts. The maximum thickness of each waste lift shall not exceed 0.5 metre.
- Place bulky wastes in an organized manner, starting from the back and working towards the front.
- Track-pack each waste lifts 3-5 times with the bulldozer.
- Place Tier I contaminated soil or Type 6 granular fill as intermediate cover to a maximum loose thickness of 150 mm over each layer of non-hazardous waste or as required to infill voids within the waste layer, and track-pack with bulldozer (minimum 3 passes).
- Only dry and stable material is to be placed in the landfill.
- Each layer of solid waste and cover material is to be sloped to prevent ponding and seepage into the Landfill.
- Segregate all asbestos from other material and consolidate in one single location within the Landfill. Provide daily intermediate cover of minimum 150 mm Type 6 fill on asbestos waste. Do not operate equipment directly on asbestos waste containers. Replace ripped or torn asbestos waste bags.
- Also segregate metal, PCB-amended painted materials (<50ppm), and creosote treated materials from other material placed in the Non-Hazardous Waste Landfill.
- Ensure that all vehicles to be landfilled have been drained of all fluids and that the batteries have been removed.
- Ensure that all compressed air cylinders to be disposed of have been vented.

- At the end of each construction season, place and compact Type 3 granular fill as a temporary cover over the Landfill.
- Remove all surface snow/ice and the Type 3 granular cover at the start of the next construction season.

5.2 Sampling Procedures and Requirements

Monitoring any water collected within the landfill berms due to rain or snowmelt is an important requirement set by the Nunavut Water Board. In compliance with Part D, Item 12 of the Water License, a representative composite sample is to be composed from a minimum of 5% of the total volume to be released from the Final Discharge Point of the Non-hazardous Waste Landfill (LOR-5). 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

Seepage from Non-hazardous Waste Landfill shall meet the following wastewater discharge limits prior to being released onto land to a location at least thirty (30) metres distance from the ordinary high water mark of any adjacent water body, where direct flow into a water body is not possible and no additional impacts are created:

- pH - 6 to 9
- Oil and Grease – 5 000 µg/L
- Arsenic (total) – 100 µg/L
- Cadmium (dissolved) – 10 µg/L
- Chromium (dissolved) – 100 µg/L
- Cobalt (dissolved) – 50 µg/L
- Copper (dissolved) – 200 µg/L
- Lead (dissolved) – 50 µg/L

- Mercury (total) - 0.6 μg/L
- Nickel (dissolved) – 200 μg/L
- PCB (total) – 1 000 μg/L
- Phenols – 20 μg/L
- Zinc (total) – 500 μg/L

If the effluent does not meet the wastewater discharge limits, it shall be considered hazardous waste and disposed off-site at an approved facility.

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 Landfill.

5.3 Record Keeping

Records are to be kept to assist in planning, future monitoring 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 metres) of material deposited in Non-hazardous Waste Landfill;
- A summary of any construction work, modification and major maintenance work (including as-built diagrams) carried out at the Non-Hazardous Waste Landfill
- Specific location, depth and description of these materials on the Project Record Drawings:
  - Metal
  - Asbestos
  - Creosote treated materials
  - PCB-amended painted materials (<50 ppm)

5.4 Health and Safety

Health and Safety precautions should be taken by workers involved in the operation and maintenance of the Landfill:

- 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
- Reflective safety vests should be worn when working around heavy equipment

3.5 Closure Procedures

- Complete the last berm to specifications.
- Install the final monitoring well once the last berm has been completed
- Do not place final cover (Type 2 Granular Fill) until Engineer has determined that there is sufficient type 6 intermediate cover.
- Construct final cover over landfill to the specified thicknesses and grades as indicated on the Drawings.

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