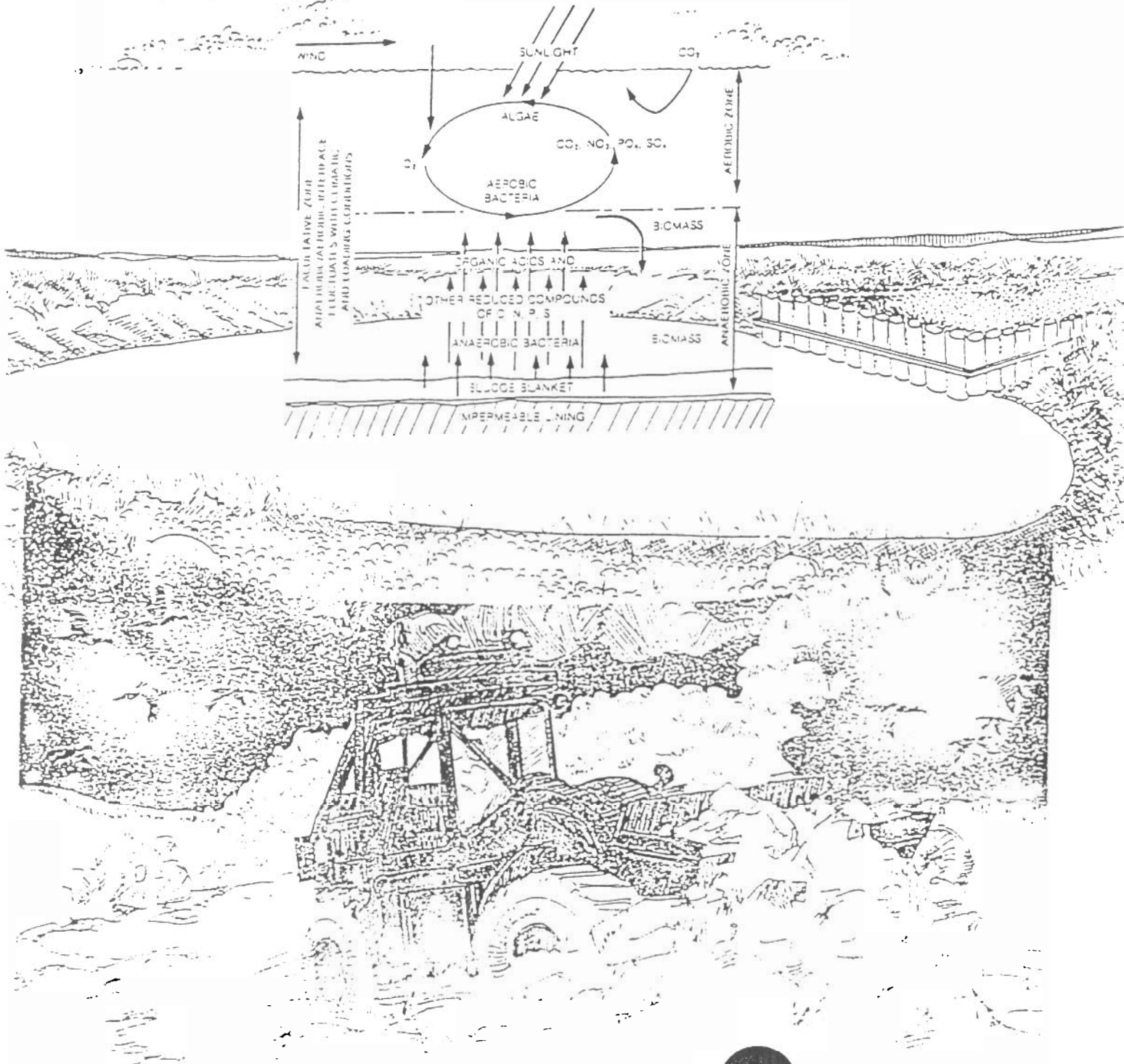


# Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories

by Diep Duong and Ron Kent



## Introduction

There are three main objectives of the Guideline for Preparing an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities. **These objectives are:**

- to assist licensed communities in developing an operation and maintenance manual
- to provide a checklist for the Water Board when they review a community's manual
- to provide a consistent format and content for writing operation and maintenance manuals

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## Plan Format

The purpose of an operation and maintenance (O&M) manual is to assist community staff in the proper operation and maintenance of their waste disposal facilities. The O&M manual must include a description of how facilities are operated and maintained, how often these tasks are performed and who is responsible for their completion. The manual must also demonstrate to the Water Board that the community is capable of operating and maintaining their waste sites.

The manual is to be developed according to the requirements of the Water Board. The O&M manual required by the Water Board shall include but not be limited to the following:

- location of facilities and proximity to receiving waters
- frequency of inspection of dams, dikes and drainage courses
- removal of floating materials from the sewage disposal facilities
- controlling effluent discharge quality
- runoff and drainage control within and around the facility, and restoration of erosion
- treatment of contaminated drainage
- prevention of windblown debris
- managing hazardous waste
- segregation of domestic, metal and recyclable waste materials
- method and frequency of site maintenance, including burning where permitted
- alternatives designed to reduce burning

There are guidelines and reports that have been published by the GNWT Department of Municipal and Community Affairs with input from the department of Resources, Wildlife and Economic Development, and the Northwest Territories Water Board which can provide information which will assist in the preparation of the O&M manual.

A list of these publications and reports is found in **Appendix I**. **Appendix II** contains a list of contacts from these Departments.

## Typical Operation and Maintenance Manual for Sewage and Solid Waste Disposal

The following is a list of the main components of a typical O&M manual for sewage and solid waste disposal facilities:

- A. Introduction
- B. Background
- C. Operation and Maintenance of Sewage Disposal Facility
- D. Operation and Maintenance of Solid Waste Disposal Facility
- E. Hazardous Waste Management
- F. Emergency Responses
- G. References

The following is a brief description of the information that should be included in each of the sections.

### **A. Introduction**

The introduction should include:

- purpose of the manual
- location of the community
- basic geophysical information, such as general geological information, mean precipitation data, extent of permafrost and general hydrological information
- maps or drawings of the community and the location of sewage and solid waste sites
- population projections

### **B. Background**

The background should include:

- where the community obtains its water
- how drinking water is distributed
- how sewage and solid waste are collected
- sewage generation, composition projections and related tables and charts
- solid waste generation, composition projections and related tables and charts
- sewage treatment and disposal
- solid waste management and disposal
- history of each existing site such as when site was constructed, time in use, when new facility is planned for and recent changes to facility

### **C. Operation and Maintenance of Sewage Disposal Facility**

There are several methods of wastewater treatment used in the Northwest Territories. Some of these methods are wetlands, lagoons, exfiltration pit, and mechanical treatment plants. The sewage lagoon system is the most widely used method of wastewater treatment in the NWT. For this reason, this guideline will focus on the operation and maintenance of sewage lagoon systems.

**For this section, the following information should be included:**

- site description showing specific location of the sewage treatment facility, drainage and distance to water bodies by means of maps and drawings
- type of lagoon - engineered or natural
- discharge method - continuous; intermittent; or zero
- list of people by positions and their phone numbers who are responsible for the operation and maintenance of the sewage lagoon
- description of normal O&M procedures for the lagoon system
- frequency of each of the O&M steps carried out, whether it be daily, weekly, monthly, seasonally or annually
- sampling procedures and an example of a completed sample sheet
- site records are necessary to assist in the planning of site operations and meeting regulatory requirements. **Information that must be included is:**
  - \* volumes of any effluent discharged to environment
  - \* sewage volume collected
  - \* details of any maintenance undertaken at site
  - \* record sheets
- safety procedures for the operator
- weed and insect control
- methods of controlling access to site such as signs and fencing
- list of chemicals used in the treatment process, if any
- sludge management

#### D. Operation and Maintenance of Solid Waste Disposal Facility

The following should be included:

- site description including maps of the area showing:
  - \* location of the solid waste disposal facility
  - \* dimensions of facility
  - \* distance to water bodies and drainage paths
  - \* distance and bearing to the airport runway
  - \* prevailing wind
  - \* segregation of solid wastes into sections such as bulky waste, waste oil, honey bag, refuse area, hazardous waste, recyclable and reusable waste
- list of people by position and their phone numbers who are responsible for the normal operation and maintenance of the solid waste site
- classification of the solid wastes including hazardous waste which are expected to be generated by the community
- disposal procedures for all solid waste generated by the community
- basic maintenance procedures of the solid waste site and frequency of maintenance activities including:
  - \* waste compaction
  - \* waste collection
  - \* methods of preventing windblown debris
  - \* fencing and signs
  - \* odour control
  - \* burning
- conditions that hinder the normal operations of the solid waste site such as permafrost and access to cover material
- safety procedures for the operator
- site records including:
  - \* date, description, estimated volume and generator of waste placed in compound
  - \* any maintenance activities done at site
  - \* visits by regulatory authorities or other activities at site
  - \* sampling and analysis of run off and leachate
- alternatives to burning wastes



## **E. Hazardous Waste Management**

Hazardous wastes require special handling to prevent negative impacts on human, plant and animal life. According to the *Guideline for the General Management of Hazardous Waste in the NWT*, a hazardous waste is defined as a contaminant which is a dangerous good that is no longer used for its original purpose and is intended for recycling, treatment, disposal or storage.

Communities generate hazardous wastes as part of their normal operations. These waste include: used oil, paint, old batteries, antifreeze, paint cleaners, soils contaminated with fuel products, etc.. Communities should consult with the appropriate government department or agency for advice before accepting any hazardous waste produced by industries or commercial establishments.

For specific steps on managing hazardous waste, refer to the *Guideline for the General Management of Hazardous Waste in the Northwest Territories* and *Guideline for Industrial Waste Discharges in the Northwest Territories*.

**The following information should be included in the hazardous waste section:**

- handling of hazardous wastes
- segregation
- storage
- classification of the different types of hazardous waste found in the community
- collection
- site records
  - \* dates of hazardous waste collection
  - \* date, description, volume and generator of wastes placed in compound
  - \* method of storage
  - \* name of carrier removing wastes from the compound
  - \* copies of the forms for Transport of Dangerous Goods from persons removing wastes from site
- safety procedures for the operator to follow when dealing with hazardous wastes such as Workplace Hazardous Materials Information System (WHMIS)

## **F. Emergency Responses**

### **Fire**

- procedures to follow in case of this event
- persons and departments to notify and their phone numbers

### **Spill**

A spill is a discharge of a contaminant in contravention of the Environmental Protection Act. Refer to the *Spill Contingency Planning and Reporting Regulations* for more information. Things to include in this section:

- contingency plans for spills
- reporting procedures for spills

## **G. References**

This section should include a list of all reports, guidelines and other documents used to develop the operation and maintenance manual.

## Appendix I

Doku, I.A., and Heinke, G.W., 1993. Potential for Use of Wetlands for Wastewater Treatment in the Northwest Territories. Prepared for the Department of Municipal and Community Affairs, Government of the NWT, Yellowknife, NWT.

Heeney, P.L. and Heinke, G.W., 1991. Guideline for the Collection, Treatment and Disposal of Hazardous and Bulky Wastes in the Northwest Territories. Prepared for the Department of Municipal and Community Affairs, Government of the NWT, Yellowknife, NWT.

Heinke, G.W., Smith, D.W. and Finch G.R., 1988. Guideline for the Planning, Design, Operation and Maintenance of Wastewater Lagoon Systems in the Northwest Territories, Volume I and II. Prepared for the Department of Municipal and Community Affairs, Government of the NWT, Yellowknife, NWT

Heinke, G.W., Smith, D.W. and Gerard, R., 1990. Guideline for Disposal of Wastewater in Coastal Communities of the Northwest Territories. Prepared for the Department of Municipal and Community Affairs, Government of the NWT, Yellowknife, NWT.

Heinke, G.W., Wong, J., 1991. Guideline for the Planning, Design, Operation and Maintenance of Solid Waste Modified Landfill Sites in the Northwest Territories, Volume I and II. Prepared for the Department of Municipal and Community Affairs, Government of the NWT, Yellowknife, NWT.

Environmental Guideline for Industrial Waste Discharges 1995. Department of Renewable Resources, Government of the NWT, Yellowknife, NWT.

Environmental Guideline for General Management of Hazardous Waste 1995. Department of Renewable Resources, Government of the NWT, Yellowknife, NWT.

Environmental Guideline for Site Remediation. Environmental Protection Division, Department of Renewable Resources, Government of the NWT, Yellowknife, NWT.

Generic Plans and Operating Procedures of a Remediation Facility for Hydrocarbon Contaminated Materials in the NWT. 1995. Environmental Protection Division, Department of Renewable Resources, Government of the NWT, Yellowknife, NWT.

Guidelines for Contingency Planning. 1987. Northwest Territories Water Board.

Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories. 1992. Northwest Territories Water Board.

Spill Contingency Planning and Reporting Regulations. Government of the NWT, Yellowknife, NWT.

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