Guidelines for Industrial Landfills



 Approval Date:
 October 29, 1991
 Effective Date:
 October 29, 1991

 Version Control:
 Latest revision:
 Administrative Amendments - May 26, 2005

The following apply to the design and operation of a proposed industrial landfill site which does not accept hazardous wastes. Although listed separately in this document, it is strongly recommended that landfill site operation must be considered at the design stage since many design factors affect the day-to-day operation of such a landfill.

1. Related to Landfill Site Design

(a) Liner

Separation of waste material from the bedrock or seasonally high water table level shall be with a synthetic liner or 1.5 meters of native clay till with permeability 10⁻⁶ cm/sec or less. Exception to the depth of clay till liner will be considered dependent upon site specifics such as watercourses, water table, very low permeability soils, etc., but in no case shall this liner depth be less than 1.0 meter.

(b) <u>Buffer Zone</u>

The buffer zone around the landfill will be a minimum of 30 m. The buffer zone to the active area will usually be within the ratios 1:1 to 2:1 depending on whether the design includes leachate collection and treatment.

(c) Surface Run-On and Run-Off

The landfill site must have a drainage system to prevent the infiltration of surface water into the solid waste deposited at the landfill site.

Surface drainage which has not come into contact with the solid waste will be directed to the sediment control ponds if treatment for total suspended solids (TSS) is required. TSS limits will be set as a stipulation of the approval at the time of issuance.

Surface water that has been contaminated by contact with the solid waste shall be handled as if it were leachate.

(d) <u>Groundwater Monitoring Systems</u>

A groundwater monitoring system consisting of observation wells located in areas hydraulically upgradient (background quality) and downgradient of the active area must be installed at the landfill site.

The installation of each well should be at an adequate depth as to provide an indication of the potential impact of the landfill on the upper water-bearing strata.

The number of observation wells required is dependent upon the size of the predicted leachate plume. A sufficient number of wells is required to assure that the potential for leachate to affect off-site groundwater quality can be adequately assessed.

(e) Leachate Collection and Treatment

An engineered leachate collection and removal/treatment system must be installed at the site if natural leachate attenuation capabilities at the site are not sufficient to prevent the contamination of groundwater resources outside the site boundary. Leachate collected shall be either pumped back to the landfill site to recirculation galleries or treated through a treatment system before released. Water quality parameters shall be defined in the approval issued by Nova Scotia Environment and Labour if treated leachate is to be released to the environment. Among other parameters to be defined in the approval will be the requirement for the treated leachate to be non-acutely lethal, as established by approved procedures for a static 96 hour LC-50 test.

For this application, groundwater resources will be considered to be contaminated if the quality of the groundwater in the potential zone of influence, (as determined by the groundwater monitoring system), is sufficiently elevated above background quality so that the intended use, when compared to the latest edition of the *Canadian Drinking Water Quality Guidelines*, is restricted or prohibited.

Site boundary, as referred to in this section, is property boundary of the landfill site as established by a legal land survey.

(f) Conceptual Closure Plan

A conceptual closure plan is required within the first year of operation.

2. Related to Landfill Operation

(a) <u>Compaction</u>

The solid waste must be compacted to the maximum amount possible as it is deposited. The compacted waste lift height should be designed to suit daily operation.

(b) Interim Cover

In order to minimize leachate production, regular interim cover of the solid waste is required.

An interim cover depth of one-third of a meter should be sufficient cover.

Since the frequency of the cover is influenced by the nature of the solid waste and the frequency and amount of the precipitation, it can vary but in no case is it to be less than once every month.

More frequent, "Intermediate" cover is also required if the solid waste generates odours.

(c) <u>Domestic Garbage</u>

No domestic refuse will be disposed of in an industrial landfill site.

(d) <u>Burning</u>

The burning of wastes is not permitted on industrial landfill sites.

(e) Surface and Groundwater Monitoring

Baseline data shall be collected covering the quality of the existing surface waters in the area including all lakes, rivers, and streams as well as groundwater in the boreholes on and around the landfill site including wells of residents in the potential zone of influence.

The above data is to be collected and shall form part of the supporting documentation to be presented with the application for approval package. (before waste disposal is implemented).

Surface and groundwater station locations as well as a monitoring program shall form part of the supporting documentation to be presented with the application for approval package.

In addition to the number of sampling stations, the monitoring program shall include such things as frequency of sampling and chemical analysis to be undertaken.

(f) Leachate Monitoring

A leachate monitoring program shall form part of the supporting documentation to be presented with the application for approval package for sites designed to release treated leachate to the environment.

(g) <u>Closure</u>

Final cover shall be placed at the earliest possible time on all areas that have reached the final design elevation.

At closure, a cover consisting of approximately one meter of silty clay underlying a minimum of 0.3 meters of topsoil shall be placed over the landfill.

A suitable vegetative cover shall be established to prevent erosion and all measures must be taken in order to ensure that vegetation is still growing two years after final cover.

The final surface shall be graded such that water does not pool over the landfill. The final grade is not to exceed 15%.

(h) <u>Post Closure</u>

During the post closure period, which will continue for a period of 20 years or as long as leachate is generated, the owner/operator of the landfill will be required to:

- i. maintain the integrity of the final cover and all diversion and drainage structures by inspecting quarterly for evidence of erosion or undue settling and repair as necessary until the owner/operator and Nova Scotia Environment and Labour agree it is no longer deemed necessary to do so.
- ii. maintain and operate the surface water and groundwater monitoring and leachate collection systems.

Dated: October 29, 1991

Original approved by Nova Scotia Department of the Environment