NEBRASKA

DEPT. OF ENVIRONMENT AND ENERGY

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Municipal Solid Waste Disposal Areas
Final Cover System

This document provides additional guidance addressing the information requested in a permit application with respect to the design and/or operation of a final cover system at a municipal solid waste disposal area. It supplements the Environmental Protection Agency's (EPA) Solid Waste Disposal Facility Criteria – A Technical Manual. Both documents should be used when preparing the information in the permit application. The EPA manual is available from the National Technical Information Service at 1-800-553-NTIS or (703) 487-4650. The order number is PB94-100-450.

The final cover system should consist of an infiltration layer and an erosion layer. The following is a summary of the final cover system requirements in accordance with Title 132 – Integrated Solid Waste Management Regulations.

A. The soil depth in the infiltration layer must be a minimum of eighteen inches.

B. The soil in the infiltration layer must have a uniform hydraulic conductivity equal to or less than that of the soil in the bottom liner or natural bottom soil, but never greater than 1 X 10-5 cm/sec.

C. If there is a flexible membrane liner (FML) in the bottom composite liner, then in all likelihood an FML would be needed in the infiltration layer of the final cover system. When an FML is provided at the base of the infiltration layer, the soil component in the infiltration layer must have a hydraulic conductivity less than or equal to 1 x 10-5 cm/sec.

D. The material which comprises the FML in the final cover system may differ from the FML utilized in the bottom composite liner. However, the FML in the final cover system should have a hydraulic conductivity less than or equal to the FML in the bottom composite liner.

E. When a bottom liner consists of only soil and is capped with an FML, the FML may meet and exceed the hydraulic conductivity requirements of the infiltration layer. An eighteen inch, uniformly compacted soil component of the infiltration layer must still be provided.

F. The use of geonets in the design of infiltration layers allows for improved drainage. Geonets cannot be used in lieu of the minimum thickness of the infiltration layer, but may be used to improve drainage characteristics.

G. During construction of the infiltration layer of the final cover system, hydraulic conductivity is measured by discrete samples of the soil that have been placed and are presumed to represent

the entire soil mass. The presumption also assumes that the soil mass is uniform in all directions and qualities. When a soil mass is constructed on a “reasonably rigid” base, the normal, small variations in quality are accepted., Compaction of the infiltration layer on a “reasonably rigid” base is unlikely in a landfill due to the variability in shape, size and density of municipal solid waste. If the base of the infiltration layer cannot support the load of the construction machinery, cracks will develop in the constructed soil mass. These cracks are usually vertical and will allow [are not resistant to] water movement. - Since the concept of “reasonably rigid” is not well defined and the desired end result of the construction is a uniform mass of soil in the infiltration layer, the design should address how an eighteen inch uniform infiltration layer will be achieved. Inherent in the plan for achieving a uniform layer should be a method for detecting any cracks in the layer that may develop during construction. Some suggested items for the prevention of cracks might be removal and recompacting of in-place soil, additional layers of soil, proof rolling, adjusting moisture content, changing soil types, and when/where these various items will be utilized.

H. The erosion layer must be a minimum of eighteen inches in thickness. The erosion layer soil should be of a type and density that will support vegetative cover.

I. Vegetative cover on the erosion layer is beneficial because the vegetation reduces both wind and water erosion and reduces the need for frequent maintenance. The design of the erosion layer should consider the following areas.

1. Slope of the ground. Grass and other vegetative plants thrive better when mowed at regular intervals. Slopes should be flat enough to safely accommodate mowing equipment.

2. Soil(s) to be used. The soil should be of a type that promotes growth. The general type of soil that supports plants is loam and/or a mixture of loam and clay or loam and sand. Density should not be so high as to prevent water movement into the erosion layer and reduce water storage capacity of the erosion layer. Soil with which to make a seedbed should be provided in the design.

3. Annual freeze-thaw cycling has a detrimental effect on vegetation root systems. Erosion layers should be thick enough to prevent freezing the entire root systems.

4. Grass or plant varieties utilized for the vegetation cover should be appropriate for the growing conditions at the site. Grass mixtures and cover varieties, as well as soil types and root zone depth information can be acquired from any Natural Resources Conservation Service district (county) office.

5. Maintenance of site vegetation should be an ongoing activity that provides timely repair of the vegetation and prevents the growth of unacceptable plants. Woody plants are unacceptable because their deeper root system may puncture the final cover system. Other plants with deep, stiff root systems should be prevented from growing.

RESOURCES:

- NDEE Home Page http://DEE.ne.gov/

Contacts:

- NDEE Waste Management Section (402) 471-4210
- NDEE Toll Free Number (877) 253-2603
- NDEE Hazardous Waste Compliance Assistant (402) 471-8308
- Email questions to: NDEE.moreinfo@nebraska.gov

NDEE Publications:

- Title 132 – Integrated Solid Waste Management Regulations
  Titles are available on the NDEE Home Page under "Laws/Regs & EQC", "Rules & Regulations"

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