



GUIDANCE DOCUMENT #155

Division of Materials & Waste Management
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Protection of the Composite Liner - Materials and Thickness

Applicable Rules

MSW: OAC 3745-27-08(D)(12)(b)(ii)

ISW: OAC 3745-29-08(D)(12)(b)(ii)

RSW: OAC 3745-30-07(C)(1)(I), OAC 3745-30-07(C)(3)(d)

Tires: OAC 3745-27-72(C)(1)(I), OAC 3745-27-72(C)(4)(d)

DMWM Cross-Referenced guidance documents:

#686 Select Waste Layers

#158 Freeze-thaw Protection During Construction of Recompacted Soil Liners and Barrier Layers

Purpose

The landfill programs require protection of the composite liner from desiccation, freeze/thaw cycles, wet/dry cycles, and intrusion of objects during construction and operation. The purpose of this document is to provide guidance on the choice of materials and thickness to be used as a protective layer.

Permits may include a designated protective layer. If materials and thicknesses are not specified in the permit, this document may also provide guidance in selecting materials and specifying a thickness.

This document does not address practices which may be employed to protect the liner.

Applicability

This guidance document is applicable to owners or operators of municipal (MSW), industrial (ISW), and residual (RSW) solid waste landfills, and scrap tire (ST) monofills who are constructing liner and leachate collection systems at their facility.

Background

When the prescribed granular drainage layer is used above the composite liner, the 12 inch thick layer protects the liner from intrusion of objects during construction and operation. The granular drainage layer is also often effective in protecting the recompacted soil layer from desiccation, freeze/thaw cycles, and wet/dry cycles. However, when geosynthetic drainage net is used as the leachate collection system's drainage layer, the geosynthetic drainage net does not provide the same level of protection. In such cases, additional measures are required by the rules (MSW and ISW landfill rules include specifications, RSW and ST landfill rules include a performance standard).

Procedure

CHOICE OF MATERIALS

There are a variety of materials available for composite liner protection. They include manufactured materials, earthen materials, and wastes (e.g. fabric, sand, gravel, processed tires, and crushed glass). The selection of an acceptable material will be dependent upon a number of factors (see also DMWM guidance #158 Freeze-thaw Protection During Construction of Recompacted Soil Liners and Barrier Layers), including:

- the purpose of protection (intrusion, desiccation, etc.)
- the nature of the waste being disposed (intrusion risk)

¹ Note: This document was originally published on the date noted above. DMWM re-issued the document to make it consistent with current formatting and publication standards after evaluating the content and determining it is still relevant and appropriate. No substantive changes were made to the document.

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- the material's resistance to intrusion
- the material's permeability (should not impede leachate flow)
- constructability
- availability
- potential to clog the leachate collection system
- stability on slopes
- potential to decompose
- potential to compress
- chemical compatibility
- moisture content/leachate quality (because the material will be placed prior to cell certification, any "leachate" from the material should not pose a risk to the environment - thus MSW is not acceptable)

Note, when the protective measure is a permanent feature of the landfill's design (either with geosynthetic drainage net or as a designated protective layer), it is part of the landfill construction. Thus, it is included as part of the cell's construction certification, and if a waste material is used (e.g. a suitable ISW, RSW or exempt waste), then disposal fees do not apply. Approval to use an acceptable waste material in construction of the landfill can be either through the issuance of the permit, or through the Integrated Alternative Waste Management Program [see OAC 3745-27-05(A)(4)].

THICKNESS

Pursuant to the August 15, 2003 rules for MSW and ISW landfills, the thickness necessary to protect the FML from intrusion of objects when a geosynthetic drainage net is used is 12 inches. For RSW and ST landfills the design of the protective layer thickness will be dependent upon the characteristics of the waste to be disposed, whether a select waste layer is to be placed, and the characteristics of the protective layer material. In many cases, 12 inches of granular material (as specified in the August 15, 2003 rules for MSW and ISW landfills) will be adequate, particularly since select waste layers are required by the landfill operation rules [see DMWM guidance #686 Select Waste Layers]. For purposes of protection from desiccation, freeze/thaw cycles, and wet/dry cycles the thickness will be dependent on local climatic conditions.

If the protective layer material is compressible or will decompose over time, then the protective layer may need to be thicker. Note, if waste is being used for the protective layer in excess of what is necessary for protection from intrusion or frost damage, its application may be viewed as disposal rather than construction in which case disposal fees would apply.

Contact

If you have questions regarding this document or would like additional information, please contact:

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Disclaimer

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