



## Bottom Slopes for Expansions and Ten Year Design Demonstrations

### Applicable Rules

MSW: OAC 3745-27-08(C)(1)

ISW: OAC 3745-29-08(C)(1)

RSW: NA

Tires: NA

DMWM Cross-Referenced guidance document:

#636 *Ten Year Design Demonstration*

#691 *Separatory Liner/Leachate Collection Systems*

### Purpose

This educational guideline reviews the relationship of vertical expansions and ten year design demonstrations to the composite liner system slope requirements.

### Applicability

This document applies to municipal (MSW) and industrial (ISW) solid waste landfill facilities.

### Detailed Discussion

The composite liner system in a new or laterally expanding MSW and ISW landfill is to have at least a 2.0% slope<sup>2</sup>. The composite liner system standards for a vertically expanding landfill depend on when the composite liner system was constructed. If the liner was constructed after December 31, 2003, the liner is to have at least a 2.0% slope<sup>2</sup>. If the liner was constructed before December 31, 2003, the owner or operator is to demonstrate that the existing composite liner system located beneath the vertical expansion will maintain positive drainage in the leachate collection system as well as meeting the requirements in (C)(3) for leachate collection.

**Lateral Expansions:** The manner in which the expansion area relates to the existing landfill is important. The flow of leachate from one unit to another will need special consideration to be sure internal ponding does not occur. The settlement under existing constructed areas will need to be analyzed or investigated for this purpose.

The bottom slope in the expansion area must meet all the standards set in rule, including the 2.0% slope.<sup>2</sup>

In authorized fill areas, removing waste and redesigning and reconstructing the liner is not required, but may be necessary to address any slope incompatibility (e.g., slope reversal due to settlement). A redesigned liner, if it does not involve a modification to vertically expand the limits of waste placement, is an alteration. As an alteration, the design must meet all the composite liner system requirements, including the requirements of (C)(3) which addresses leachate collection, with the following caveat: if the redesigned liner is under a vertical expansion, it will need to meet the slope requirement as applied to vertical expansions, if the redesigned liner is not under a vertical expansion, the slope

---

<sup>1</sup> 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.

<sup>2</sup> The slope is to be at least 2% after accounting for 100% of the primary consolidation settlement and the secondary consolidation settlement of the compressible materials beneath the facility, which includes, as applicable, in-situ soil, added geologic material, structural fill material, and recompacted soil liner.

## Bottom Slopes for Expansions and Ten Year Design Demonstrations

requirement does not apply. This is because the slope requirement is applied specifically to new facilities and expansion areas.

**Vertical Expansions:** For vertical expansions, the designer will need to know if there is a liner under existing waste and when it was constructed.

If there is no liner, a separatory liner/leachate collection system is required. See #691 *Separatory Liner/Leachate Collection Systems*. If there is a liner and it was constructed before December 31, 2003, the designer will need to demonstrate that positive drainage is maintained and that the requirements in (C)(3) for leachate collection are met.

If the liner has not been constructed, or was constructed after December 31, 2003, the slope is to be at least 2.0%<sup>2</sup>.

DMWM recommends that **all existing landfills** assess the possibility of a future vertical expansion. If there is a possibility, the owner or operator should consider redesigning the composite liner system in any unconstructed areas to meet the minimum slope requirements as applied to vertical expansions. If the composite liner system does not meet the rule requirements, a permit application for a vertical expansion above that area could be denied.

**Ten Year Design Demonstrations:** Upon every tenth anniversary of receiving their initial solid waste permit-to-install, the owner or operator compares the approved facility design to the current engineering requirements in effect on the anniversary date. DMWM guidance document #636 *Ten Year Design Demonstration*, provides more information. The minimum 2.0% slope<sup>2</sup> of the composite liner system is required only for new facilities and expansions. The other composite liner system requirements do apply; however, since the rule language specifically identifies the slope requirement as applying to new facilities and expansions, it does not apply to other authorized fill areas.

DMWM recommends the owner or operator take the opportunity of the ten year design demonstration to assess the possibility of a future vertical expansion. If there is a possibility, the owner or operator should consider redesigning the composite liner system in any unconstructed areas to meet the minimum slope requirements as applied to new facilities. If the composite liner system does not meet the rule requirements, a permit application for a vertical expansion above that area could be denied.

### Contact

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

Central District Office DMWM Supervisor (614) 728-3778

Northeast District Office DMWM Supervisor (330) 963-1200

Northwest District Office DMWM Supervisor (419) 352-8461

Southeast District Office DMWM Supervisor (740) 385-8501

Southwest District Office DMWM Supervisor (937) 285-6357

Central Office Authorizing Actions and Engineering Unit (614) 644-2621

### Disclaimer

The procedures set out in this document are intended solely for guidance of government personnel. The procedures are not intended and cannot be relied upon to create rights, substantive or procedural, enforceable by any party against Ohio EPA. While this guidance document is not legally binding, all statutes and rules referenced herein are binding and enforceable. Ohio EPA reserves the right to vary this guidance or to change it at any time without public notice and also reserves the right to deviate from this guidance on a case-by-case basis.