

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**

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**INTEROFFICE COMMUNICATION**

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July 3, 2002

OPERATIONAL MEMO 115-26

TO: All Waste Management Division Supervisors  
FROM: Jim Sygo, Chief, Waste Management Division  
SUBJECT: Natural Soil Barrier Certification Documentation

R 299.4912\*, of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, requires verification of a natural soil barrier used in landfill construction. The composition of a natural soil barrier is defined in R 299.4104(f). Read together, these rules require a demonstration of the effectiveness of the natural soil component of landfill liner systems, including the side slopes and cell bottom. This demonstration can be completed prior to issuance of a construction permit, or a plan can be approved as part of a construction permit to complete the demonstration prior to cell licensure. This includes identification and delineation of any sand seams, root layers, saturated materials, desiccation cracks, solution zones, and other features that will increase the hydraulic conductivity of liquids through the natural soil barrier layer.

R 299.4912(4) requires the facility owner or operator to obtain soil borings on grid spacing approved by the Director of the Department of Environmental Quality (Department). In general, the Department considers that an adequate grid spacing would consist of a minimum of one boring per acre, or portion of an acre to be certified, centered unless the Department approves an alternative location. Borings should be placed evenly on a grid pattern within the footprint of the cell unless another grid pattern is approved by the Department in accordance with the provisions specified by R 299.4912(4). Geophysical methods (or other subsurface testing methods) may be used to replace or supplement test borings specified in R 299.4912(4), if a workplan for such a survey is approved by the Director or his or her representative in accordance with the provisions specified by R 299.4912(5) prior to the workplan being initiated.

Soil borings must utilize continuous sampling methods throughout the depths, or zone, of certification. Representative samples must be collected and tested for all of the items listed in R 299.4912(3).

On a case-by-case basis, the number of hydraulic conductivity tests required by R 299.4912 may be reduced if all of the following criteria are met:

1. Hydraulic conductivity data from other areas, per R 299.4920 has been submitted and accepted as appropriate.

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\* All rule citations contained herein are to the administrative rules implementing Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451 as amended, contained at R 299.4101 *et seq.*

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2. An established relationship among particle size distribution, soil type, atterberg limits, and hydraulic conductivity has been determined.
3. The boring data submitted is representative of existing site conditions.
4. Boring data submitted was taken from previously agreed upon strategic locations.
5. Available hydraulic conductivity and soil boring data indicates that the site soils appear homogenous in nature.
6. The percent distribution of sand, silt, and clay has been determined for soil samples meeting the minimum requirements for hydraulic conductivity for a natural soil barrier.
7. The boring samples considered for elimination of hydraulic conductivity testing:
  - a. Exhibit less than a five percent variation in clay, sand, or silt content (established by sieve and hydrometer testing) from the samples tested and meeting the acceptable standards for hydraulic conductivity, and
  - b. The variation does not change the atterberg limits and result in a Unified Soil Classification System classification of ML or SM.

Unsuitable materials or saturated conditions encountered within the zone of certification must either be excavated until acceptable soils and conditions are reached or those materials must not be included in the zone to be certified. Exclusion requires full delineation of the horizontal extent of the unsuitable materials or conditions by additional borings or, on a case-by-case basis, geophysical methods approved per R 299.4912(5). It is expected that the additional borings would consist of at least eight borings placed radially, no more than 45 degrees apart, and stepped out sufficiently to conclusively delineate the excluded area. It is recommended that a workplan be submitted to the Department for concurrence, prior to initiating this work.

The evaluation of site earth materials required by R 299.4904(4)(e) as part of the facility hydrogeologic report must be submitted in conjunction with certification of the natural soil barrier pursuant to R 299.4912. The items listed in R 299.4904(4)(e)(i) - (iv) must be included in the log for each soil boring. Further, the geologic cross-section required by R 299.4904(4)(f) must include a compilation of all boring logs for the site referenced to a site map with cross-sections identifying the items listed in R 299.4904(4)(f)(i) - (viii). This includes borings used to certify the natural soil barrier.