State of Ohio Environmental Protection Agency

Date: 06/12/04

Procedural and Technical Considerations for the Seismic Impact Zones Location Restriction Demonstration

THIS POLICY DOES NOT HAVE THE FORCE OF LAW

APPLICABLE RULES

MSW: OAC 3745-27-20(C)(4)
OAC 3745-27-06(C)(6)
ISW: NA
RSW: NA
Tires: NA

Cross References:
DSIWM Guidance Document 0138, *Location Restriction Demonstrations - Implementation Instructions*
Ohio EPA policy #0660 *Geotechnical and Stability Analyses for Ohio Waste Containment Facilities*

PURPOSE

This document outlines technical and procedural considerations for the seismic impact zone location restriction demonstration (LRD) required by Ohio Administrative Code (OAC) 3745-27-20(C)(4) and 3745-27-06(C)(6) [see also OAC 3745-27-20(A)(3)(d), 3745-27-06(C)(4) and OAC 3745-27-08].

APPLICABILITY

This guidance document applies to applicants proposing a new municipal solid waste (MSW) unit after June 1, 1994.

LRDs for any new units in authorized fill areas should have already been completed and placed in the operating record.

BACKGROUND

OAC 3745-27-20(C)(4) states "The sanitary landfill facility is not located in a seismic impact zone as that term is defined in Rule 3745-27-01 of the Administrative Code, unless the owner or operator demonstrates that all containment structures, including liners, leachate collection systems, sedimentation ponds, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site."

OAC 3745-27-01(S)(20), states "Seismic impact zone means an area where the maximum horizontal acceleration in lithified earth material exceeds 0.10g.

OAC 3745-27-01(M)(2), states "Maximum horizontal acceleration in lithified earth material means the maximum expected horizontal acceleration depicted on a seismic map, with a ninety percent or greater probability that the acceleration will not be exceeded in two hundred fifty years, or the maximum expected horizontal acceleration based on a site-specific seismic risk assessment."

An MSW landfill is not to be located in a seismic impact zone, unless the owner or operator can demonstrate that all containment structures are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

PROCEDURE

LRDs for new units in authorized areas should have already been completed, therefore this document will address how to proceed with the seismic impact zone LRD as part of a permit-to-install application for a new unit proposed after June 1, 1994. DSIWM recommends using the following procedure to satisfy the LRD rule requirements. The procedure is presented in two

parts. In the first part of the LRD, the applicant determines whether or not the MSW landfill is in a seismic impact zone. If so, then the applicant performs the second part of the LRD. The second part identifies and justifies the engineering measures incorporated into the design of the MSW landfill to ensure the integrity of the containment structures (e.g. liners, leachate collection systems, sedimentation ponds, and surface water control systems).

Part 1: Determining the Existence of a Seismic Impact Zone

Show the location of the facility on the attached horizontal acceleration map (USGS, 1990). The line depicting a maximum horizontal acceleration (MHA) of greater than 0.1g denotes the seismic impact zone. If the facility is on the line, consider it in the seismic impact zone. The version of this map is specified by rule and therefore must be used for the LRD. Updated versions of this map cannot be used for determining existence of a seismic impact zone, but should otherwise be used when determining if the site is stable under seismic conditions per OAC 3745-27-06(C)(4), which is required even if the facility is not in a seismic impact zone.

Part 2: Designing to Resist the MHA

If the facility is located in a seismic impact zone, then the design of the unit's containment structures (e.g., liners, leachate collection systems, sedimentation ponds, and surface water control systems) will need to resist the probable maximum horizontal acceleration (MHA) in lithified materials at the site. A summary of the seismic slope stability calculations submitted in accordance with OAC rule 3745-27-06(4) is acceptable for this demonstration.

The applicant may find US EPA's technical manuals "Solid Waste Disposal Facility Criteria" and "RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities" and Ohio EPA's policy *Geotechnical and Stability Analyses for Ohio Waste Containment Facilities* helpful references. Other references are provided below.

OAC rule 3745-27-08(C)(7)(d) requires that engineered components (which includes containment structures) be designed to have a factor of safety not less than 1.00 for seismic slope stability. The owner or operator is also obligated to install and maintain any engineering measures used in designing the facility to resist the MHA (see also DSIWM Guidance# 0138 *Location Restriction Demonstrations - Implementation Instructions*).

REFERENCES

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U.S. EPA, Office of Research and Development. April 1995. RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities, EPA/600/R-95/051.

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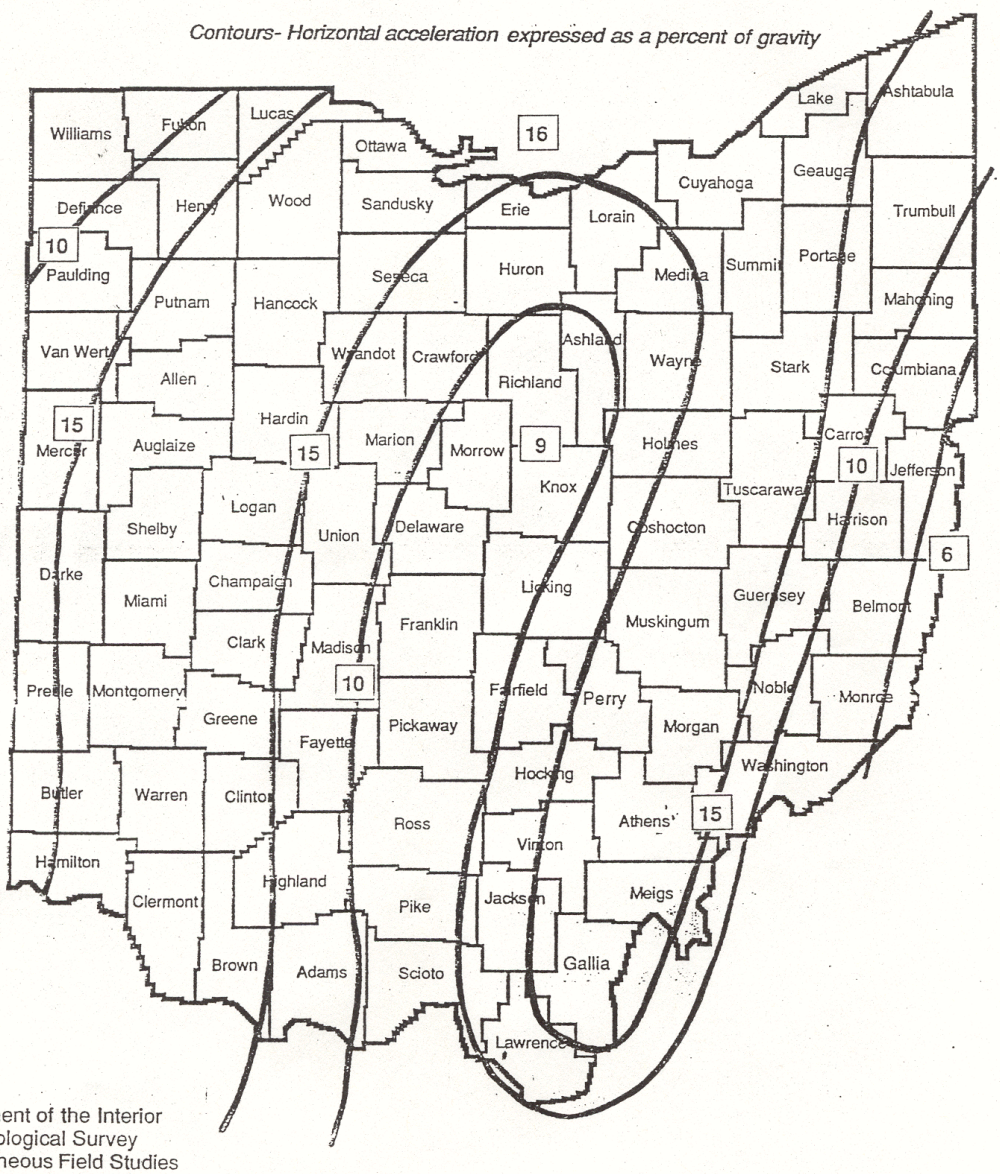
POINT OF CONTACT

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

Central District Office DSIWM Supervisor
(614) 728-3778
Northeast District Office DSIWM Supervisor
(330) 963-1200
Northwest District Office DSIWM Supervisor
(419) 352-8461
Southeast District Office DSIWM Supervisor
(740) 385-8501
Southwest District Office DSIWM Supervisor
(937) 285-6357
Central Office Processing and Engineering Unit
(614) 644-2621

Horizontal Acceleration

(10 percent probability of being exceeded in 250 years)



From
Department of the Interior
U.S. Geological Survey
Miscellaneous Field Studies
Map MF-2120

"Probabilistic Earthquake Acceleration and Velocity Maps for the United States and Puerto Rico" by S.T. Algermissen, D.M. Perkins, et al., (1990)