

**SOLID WASTE MANAGEMENT DIVISION
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AGENCY OF NATURAL RESOURCES
STATE OF VERMONT**

**PROCEDURE FOR INCORPORATING UNSTABLE AREAS INTO
MUNICIPAL SOLID WASTE LANDFILL SITING AND DESIGN**

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ADOPTED:

Signature

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**Barbara Ripley, Secretary
Agency of Natural Resources**

Date

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I. INTRODUCTION

On October 9, 1993 the new RCRA Subtitle D regulations, 40 CFR Part 258, Solid Waste Disposal Criteria, went into effect. The effective date was delayed to April 9, 1994 for any existing municipal solid waste landfill ("MSWLF") unit that disposed of 100 tons or less of solid waste. Section §258.15 requires the owner or operator of any MSWLF unit located in an unstable area to have engineering measures incorporated into the design which insure that the structural components of the MSWLF unit will not be disrupted.

Section 6-503(a) of the Vermont Solid Waste Management Rules require that "facilities shall be located such that an emission or discharge from the facility will not unduly harm the public health and will have the least possible reasonable impact on the environment, regardless of the technology used to minimize an emission or discharge". In order to demonstrate compliance with this general performance standard, Section 6-503(b)(5) requires "that the facility is not located in areas that have serious development limitations, such as highly erodible soils, steep slopes, or do not have the physical capability to support the facility". Furthermore, Section 6-606(a), has a similar general performance standard for the design of disposal facilities.

On February 16, 1994, the Vermont Agency of Natural Resources adopted a *Procedure For Incorporating Seismic Event Considerations Into Municipal Solid Waste Landfill Siting And Design In Vermont*. This procedure clarifies requirements concerning MSWLF unit siting and design with respect to seismic events. Since the factors and considerations related to an unstable area may be similar, the technical guidance provided in Section II (and other portions) of the *February 16, 1994 Procedure For Incorporating Seismic Event Considerations Into Municipal Solid Waste Landfill Siting And Design In Vermont* should be referred to while performing items A, B, and C in Section II below, as necessary.

This procedure describes the requirements for the siting and design of any MSWLF unit in unstable areas.

Appropriate use of professional expertise, such as geologists, geotechnical engineers, and those experienced in lined MSWLF analysis and design, shall be utilized as necessary.

II. DEFINITIONS

The following definitions are hereby adopted as part of this procedure and shall be referred as necessary.

Unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and Karst terranes.

Structural components means liners, leachate collection systems, final covers, run-on/run-off systems, and any other component used in the construction and operation of the MSWLF that is necessary for

protection of human health and the environment.

Poor foundation conditions means those areas where features exist which indicate that a natural or man-induced event may result in inadequate foundation support for the structural components of an MSWLF unit.

Areas susceptible to mass movement means those areas of influence (i.e., areas characterized as having an active or substantial possibility of mass movement) where the movement of the earth material at, beneath, or adjacent to the MSWLF unit, because of natural or man-induced events, results in the downslope transport of soil and rock material by means of gravitational influence. Areas of mass movement include, but are not limited to, landslides, avalanches, debris slides and flows, soil fluction, block sliding, and rock fall.

Karst terranes means areas where karst topography, with its characteristic surface and subterranean features, is developed as the result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features present in karst terranes include, but are not limited to, sinkholes, sinking streams, caves, large springs, and blind valleys.

III. REQUIREMENTS

In order to demonstrate compliance with the current Vermont Solid Waste Management Rules, the owner or operator of any MSWLF unit shall provide the following in an application for certification:

- A. A determination, with supporting documentation, as to whether the MSWLF unit is located in an unstable area.

A site evaluation of the area around and below the MSWLF unit shall be performed which is sufficient enough to assess whether an unstable area may be present. This includes assessing the following factors, at a minimum:

- 1) On-site or local soil conditions that may result in differential settling;
- 2) On-site or local geologic or geomorphologic features; and
- 3) On-site or local human-made surface and subsurface features or events (such as mining activities and surface water management/control activities).

Item 2 above includes an assessment of potential karst terranes through documentation of bedrock characteristics. It is assumed that karst terranes do not exist unless the standard site investigation indicates this potential. Furthermore, it is expected that karst terranes probably don't exist to an extent sufficient enough to present a potential unstable area in Vermont, with the remotely possible exception of the carbonaceous bedrock types typically associated with portions of the "Vermont Valley", the "Champlain Valley", and the "Taconic Range" in the western portion of the State of Vermont.

- B) For any MSWLF unit located in an unstable area, demonstrate that engineering measures have been incorporated into the MSWLF unit design which ensure that the integrity of the "structural components" of the MSWLF unit will not be disrupted.

In part, this includes incorporation of the requirements stated in Section III of the *February 16, 1994 State of Vermont Procedure For Incorporating Seismic Event Considerations Into Municipal Solid Waste Landfill Siting And Design In Vermont*. Incorporate the unstable area factors and concerns into these site analysis and design requirements.

- C) A closure and post closure plan and cost estimates for an existing MSWLF unit which can not make the demonstration in item B above, with closure completed on or before October 9, 1996. This closure deadline may be extended up to two years if the owner or operator demonstrates there is no available alternative disposal capacity and there is no immediate threat to human health and the environment.