



RCRA SUBTITLE D REGULATIONS

Upcoming regulations will affect owners and operators of new and existing Municipal Solid Waste Landfills. The new regulations establish revised minimum federal criteria that include location restrictions, facility design and operating criteria, groundwater and landfill gas monitoring requirements, corrective action requirements, financial assurance requirements, and closure and post-closure care requirements. Individual state restrictions can be more stringent than federal Subtitle D standards.

This Technical Tip offers the reader highlights of the Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act (RCRA) Subtitle D, 40 CFR Parts 257 and 258 requirements. It is not inclusive and the original document should be thoroughly read and understood by the reader before implementing any portion of the document.

The goal of Subtitle D

The goal of the EPA's RCRA Subtitle D is to establish a framework for federal, state and local government cooperation in controlling the management of nonhazardous solid waste. The federal role is to establish the overall regulatory direction, by providing minimum nationwide standards for protecting human health and the environment, and to provide technical assistance to the State for planning and developing their own environmentally-sound waste management practices. The actual planning and direct implementation of solid waste programs under Subtitle D remains with state and local regulators. The EPA retains the authority to enforce the appropriate standards in a given state.

When does This Take Effect? Who is Affected?

Subtitle D (Subpart A) affects new, existing and lateral expansions of Municipal Solid Waste Landfills (MSWLF) that receive household waste on or after October 9, 1993. It does not apply to MSWLF that ceased receipt of waste by October 9, 1991. There are some exemptions which extend the date to April 9, 1994. MSWLF units that stop receiving waste by October 9, 1993, must comply with specified closure requirements only. States who participate in the implementation of the new regulations must adopt and implement approved permit programs. Otherwise, the federal regulations establish minimum standards.

New Subtitle D Requirements

Location Restrictions (Subpart B): New and lateral expansions of MSWLF have location restrictions regarding airport, floodplains, unstable areas, wetlands, seismic impact zones and fault areas. Existing MSWLF's have location restrictions regarding only airports, floodplains and unstable areas.

Operating Criteria (Subpart C): All new, existing and lateral expansions of MSWLF must implement the following operating criteria:

- Procedures for excluding hazardous waste: Must have a program to detect and prevent disposal of regulated hazardous waste and PCBs (polychlorinated biphenyls).
 - ◆ Daily cover: A 6-inch minimum cover of earthen material or State approved alternative must be applied at the end of each operating day, or more frequently if necessary, to prevent or control on-site populations of disease vectors, fires, odors, blowing litter and scavenging.
 - ◆ Disease vector control: Must prevent or control on-site populations of disease vectors.

- ◆ Air criteria: Must meet requirements of State Implementation Plan under Clean Air Act. Open burning is prohibited, except for the infrequent burning of agricultural wastes, land clearing debris, diseased trees or debris from emergency cleanup operations.
 - ◆ Access requirements: Must control public access, prevent unauthorized traffic and prevent illegal dumping.
 - ◆ Run-on/run-off control: Must have a plan to design, construct and maintain a control system to prevent flow onto an active area from the peak discharge of a 25-year storm and to collect and control the water volume resulting from a 24-hour, 25-year storm.
 - ◆ Surface water requirements: Must prevent discharge of pollutants and the discharge of a nonpoint source of pollution to waters of the United States that violates any requirements on the Clean Water Act.
- Explosive gases control: Methane gas must not exceed 25 percent of LEL (1.25% by volume) in on-site structures and cannot exceed methane LEL (5% by volume) at site boundary. Gases must be monitored at least quarterly.

EPA Explanation: The decomposition of solid waste produces methane, an explosive gas. The accumulation of methane in MSWLF structures can result in fire and explosions that can injure or kill employees, users of the disposal site, and occupants of nearby structures, and can damage containment structures and thereby cause the emission of toxic fumes.

The type and frequency of monitoring depends of site specific factors that control the rate and extent of gas migration. These factors include: soil, hydrogeologic and hydraulic conditions surrounding the disposal site, and the location of facility structures relative to property boundaries. The EPA believes that the minimum quarterly monitoring accounts for the seasonal variation in subsurface gas migration patterns.

If methane limits are exceeded, necessary steps to ensure protection of human health must be taken along with immediate notification to the State of the level detected and the steps taken to protect human health. Such steps could include evacuation and ventilation of affected buildings. EPA also proposed that the owner or operator submit a remediation plan to the State within 14 days of the methane content being exceeded. The plan must describe the natures and extent of the problem and the proposed remedy.

- Liquid restrictions: Only normal household liquid and liquids in small containers can be placed in MSWLFs. Leachate or gas condensate are allowed only if composite liner and leachate collection system is in place.

EPA's Definition of Gas Condensate: Gas condensate is the liquid generated as a result of the gas collection and recovery process at the municipal solid waste landfill units. This definition pertains only to the condensate generated from the gas recovery process and not the condensate that is inadvertently generated from the gas collection system.

If condensate is intermixed with the leachate collection system and some leachate is discharged back into the refuse mass, then this is considered "gas condensate recirculation" and therefore requires the necessary landfill design.

- Record keeping requirements: The following records must be retained in an operating record, near the facility or in a State approved facility:
- 1) Design documentation for placement of leachate or gas condensate in landfill
 - 2) Location restriction demonstrations, inspection records, training and notification procedures
 - 3) Groundwater demonstrations, certifications, findings, monitoring, testing and analytical data required by subpart E
 - 4) Closure and care post-closure plans and any monitoring (including LFG monitoring), testing or analytical data in subpart F
 - 5) Hazardous waste inspection records
 - 6) Cost estimation and financial assurance documentation
 - 7) Small community exemption demonstration (if applicable)

Design Criteria (Subpart D)

New MSWLF units and lateral expansions must have a two component composite liner that consists of a minimum 30-mil flexible membrane liner (FML) and the lower component must be at least two feet thick with hydraulic conductivity less than 1×10^{-7} cm/sec. The composite liner will maintain less than a one foot depth of leachate over liner. Local hydrogeologic, climatic, hydraulic and volume and physical and chemical characteristics of the leachate are some of the factors that

must be considered in the design.

Groundwater Monitoring and Corrective Action (Subpart E)

All MSWLF units must monitor groundwater throughout the active life and post-closure care period except in approved states where the owner or operator can demonstrate that there is no potential for migration of hazardous constituents from the MSWLF unit to the uppermost aquifer.

Existing MSWLF units and lateral expansions, less than one mile from a drinking water intake, must be in compliance with groundwater monitoring requirements by October 9, 1994. Units greater than one mile but less than two miles must be in compliance by October 9, 1995. Units over two miles must be in compliance by October 9, 1996.

Subpart E includes a list of extensive groundwater regulations that must be reviewed and understood in detail. In summary, these regulations outline programs and procedures regarding groundwater detection monitoring, assessment monitoring and corrective actions.

For detection monitoring, background concentrations of specific indicators (Part 258, Appendix I) must be established and monitoring must be conducted at least semiannually during the active life of the facility, closure and post-closure periods for a set of detection monitoring indicator parameters.

Assessment monitoring is required of additional constituents (list is included in Part 258, Appendix II) whenever a statistically significant increase over background is detected for one of more of the detection constituents specified in Appendix I of Subpart E.

Corrective actions must be implemented if constituents are above detected background levels. The owner or operator must evaluate alternative corrective measures, select the appropriate remedy, and implement it.

Closure and Post-Closure Care (Subpart F)

All MSWLF units must install a final cover system that is designed to minimize infiltration and erosion. The final cover system must be comprised of an erosion layer underlaid by an infiltration layer as follows:

- 1) the infiltration layer must be comprised of a minimum of 18 inches of earthen material that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less.
- 2) the erosion layer must consist of a minimum of six inches of earthen materials that are capable of sustaining native growth. The State may approve an alternative final cover.

A written closure plan that describes the steps necessary to close all MSWLF units at any point during its active life in accordance with the cover design requirements. The closure plan must include:

- 1) a description of the final covers and the methods and procedures used to install the cover
- 2) an estimate of the largest area of the MSWLF unit ever requiring a final cover at any time during the active life;
- 3) an estimate of the maximum inventory of wastes ever on-site over the active life of the landfill facility
- 4) a schedule for completing all activities necessary to satisfy the closure criteria

Closure activities for each MSWLF unit must begin within 30 days after the date on which the MSWLF unit receives the final waste or when the MSWLF unit has remaining capacity and there is a reasonable likelihood that the MSWLF unit will receive additional wastes, no later than one year after the most recent receipt of wastes.

All MSWLF units must completely close activities of each MSWLF unit in accordance with the closure plan within 180 days following the beginning of closure.

Post-Closure Care Requirements

Post-closure care must be conducted for 30 years unless it is increased or decreased by the State. Post-closure care consists of at least the following:

- 1) maintaining the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, substance, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover
- 2) maintaining and operating the leachate collection system
- 3) monitoring the ground water and maintaining the groundwater monitoring system, if applicable
- 4) maintaining and operating the gas monitoring system

All MSWLF units must prepare a written post-closure plan that includes;

- 1) the description and frequency of monitoring and maintenance activities
- 2) the name, address, and telephone number of the person to contact about the facility during the post-closure period
- 3) a description of the planned uses of the property during the post-closure period

Financial Assurance Criteria for Closure, Post-closure Care and Corrective Action (Subpart G)

The owner or operator must have a detailed written estimate, in current dollars, of the cost of hiring a third party to close the largest area of all MSWLF unit ever requiring a final cover at any time during the active life when the extent and manner of its operation would make closure the most expensive. During the active life of the MSWLF unit, the closure cost must be estimated annually for inflation. Financial assurance for the closure of the MSWLF unit must be established.

Portions of this Technical Tip were taken from the EPA Federal Register Part II, 40 CFR Parts 257 and 258, Solid Waste Disposal Facility Criteria; Final Rule dated October 9, 1991. Some of the deadline dates and exemptions are still changing—please verify them.

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