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RCRA/Superfund/OUST Hotline Monthly Report Question

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1. Liners and Leak Detection Systems for Hazardous Waste Landfills, Surface Impoundments, and Waste Piles

   The Hazardous and Solid Waste Amendments (HSWA) of 1984 created new requirements for both permitted and interim status hazardous waste land disposal units. Initially, to satisfy the requirements outlined in §3004(o), EPA promulgated minimum technological requirements (i.e., double-liners) on July 15, 1985 (50 FR 28702). EPA subsequently proposed two rules on liners and leak detection. On March 28, 1986 (51 FR 10706), and April 17, 1987 (52 FR 12566), EPA proposed amendments to the double liner and leachate collection system standards for landfills and surface impoundments. On May 29, 1987 (52 FR 20218), EPA proposed leak detection system requirements for landfills, surface impoundments, waste piles, and land treatment units. This notice also proposed to expand the double liner requirement to include waste piles. On January 29, 1992 (57 FR 3462), EPA issued a final rule on liners and leak detection systems encompassing all the above proposed rules. How did the January 29, 1992, final rule affect the minimum technological requirements of RCRA §3004(o)?

The January 29, 1992, Federal Register finalizes EPA's proposed actions of March 28, 1986; April 17, 1987; and May 29, 1987; and completes the codification of the minimum technological requirements imposed by RCRA §§3004(o)(4) and 3004(o)(5)(A). It also modifies previous liner and leachate collection and removal system regulations for permitted and interim status landfills, surface impoundments, and waste piles. In addition, the final rule requires owners and operators of these three types of units to install a leak detection system, establish an action leakage rate, develop a response action plan, and implement a construction quality assurance program.

The following landfills, surface impoundments, and waste piles are

affected by this final rule: (1) new units for which construction commences after January 29, 1992; (2) replacement units reused after July 29, 1992; and (3) lateral expansions of units for which construction commences after July 29, 1992. The rule applies to these units regardless of their permit status, and the Agency maintains that the permit does not act as a shield with respect to the leak detection requirements (57 FR 3464). The regulations at 40 CFR §270.4 have, therefore, been amended to require that an owner or operator apply for a permit modification to meet these requirements.

According to the statute, minimum technological requirements for landfills and surface impoundments include a double-liner and leachate collection system, and a leak detection system. Minimum technological requirements for waste piles include a leak detection system. The final rule expanded the double-liner requirements to waste piles (57 FR 3472).

The Agency has determined that a leachate collection and removal system meeting the standards in the final rule fulfills the statutory requirement for a leak detection system. Therefore, a unit's leachate collection and removal system between the top and bottom liners is also its leak detection system. The leak detection system must be designed to detect, collect, and remove leaks at the earliest practicable time. It must be constructed of materials that are compatible with the waste and are strong enough to resist pressure gradients, designed and operated to minimize clogging, and constructed with a minimum bottom slope of one percent. The drainage layer may be granular or synthetic. A granular drainage layer must be a least 12 inches thick. and have a minimum hydraulic conductivity of 3x10***-5 m***2/sec for waste pile and landfill units, or 3xl0***-4 m***2/sec for surface impoundment units. Synthetic drainage layers must have a hydraulic transmissivity of 3x10***-5 m***2/sec for waste pile and landfill units, or 3x10***-4 m***2/sec for surface impoundment units. The system requires a sump of sufficient size to collect and remove liquids efficiently and to prevent liquids from backing up into the drainage layer. Variances for alternative system design are available. Landfill and waste pile units also require a leachate collection and removal system immediately above the top liner which ensures that the leachate depth on the top liner does not exceed one foot.

The double-liner system comprises a top and bottom liner. The

top liner is the liner directly above the leak detection system. It must be designed to prevent migration of hazardous constituents into the liner during active life of the unit and during the post closure period (e.g., a geomembrane liner). The bottom liner must be a composite liner consisting of an upper component (e.g., a geomembrane) designed to prevent the migration of hazardous constituents into the liner, underlain by at least 3 feet of compacted soil material with a hydraulic conductivity of no more than lxl0-***7 cm/sec.

Each unit requires a site-specific action leakage rate and a site-specific response action plan. The action leakage rate is based on the maximum leakage rate that the leak detection system can remove without the fluid head on the bottom liner exceeding one foot. When the action leakage rate is exceeded, the response action plan must specify actions to be taken to ensure that the leakage does not migrate out of the unit.

To ensure that the constructed unit meets or exceeds all design criteria and specifications, a construction quality assurance (CQA) program must be implemented. A CQA program must include a test fill for compacted soil liner components, unless waived. It also requires a certification by a registered professional engineer that the CQA plan has been successfully carried out and the liner system meets the design and construction requirements.

The leak detection system must be monitored at least weekly during the active life of the unit, and either monthly, semi-annually, or annually during the post-closure period for disposal units, depending on the amount of liquids detected in the sumps.