

**WAC 173-303-665 Landfills.** (1) Applicability. The regulations in this section apply to owners and operators of facilities that dispose of dangerous waste in landfills, except as WAC 173-303-600 provides otherwise. No landfill will be permitted to dispose of EHW, except for the Hanford facility under WAC 173-303-700.

(2) Design and operating requirements.

(a) Any landfill that is not covered by (h) of this subsection must have a liner system for all portions of the landfill (except for an existing portion of a landfill). The liner system must have:

(i) A liner that is designed, constructed, and installed to prevent any migration of wastes out of the landfill to the adjacent sub-surface soil or groundwater or surface water at anytime during the active life (including the closure period) of the landfill. The liner must be constructed of materials that prevent wastes from passing into the liner during the active life of the facility. The owner or operator must submit an engineering report with his permit application under WAC 173-303-806(4) stating the basis for selecting the liner(s). The report must be certified by an independent qualified registered professional engineer. The liner must be:

(A) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;

(B) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and

(C) Installed to cover all surrounding earth likely to be in contact with the waste or leachate; and

(ii) A leachate collection and removal system immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the landfill. The department will specify design and operating conditions in the permit to ensure that the leachate depth over the liner does not exceed 30 cm (one foot). The leachate collection and removal system must be:

(A) Constructed of materials that are:

(I) Chemically resistant to the waste managed in the landfill and the leachate expected to be generated; and

(II) Of sufficient strength and thickness to prevent failure under the pressures exerted by overlying wastes, waste cover materials, and by any equipment used at the landfill; and

(B) Designed and operated to function without clogging through the scheduled closure of the landfill.

(b) The owner or operator will be exempted from the requirements of (a) of this subsection, if the department finds, based on a demonstration by the owner or operator, that alternative design and operating practices, together with location characteristics, will prevent the migration of any dangerous constituents into the groundwater or surface water at any future time. In deciding whether to grant an exemption, the department will consider:

(i) The nature and quantity of the wastes;

(ii) The proposed alternate design and operation;

(iii) The hydrogeologic setting of the facility, including the attenuative capacity and thickness of the liners and soils present between the landfill and groundwater or surface water; and

(iv) All other factors which would influence the quality and mobility of the leachate produced and the potential for it to migrate to groundwater or surface water.

(c) The owner or operator must design, construct, operate, and maintain a run-on control system capable of preventing flow onto the active portion of the landfill during peak discharge from at least a twenty-five-year storm.

(d) The owner or operator must design, construct, operate, and maintain a runoff management system to collect and control at least the water volume resulting from a twenty-four-hour, twenty-five-year storm.

(e) Collection and holding facilities (e.g., tanks or basins) associated with run-on and runoff control systems must be emptied or otherwise managed expeditiously and in accordance with this chapter after storms to maintain design capacity of the system.

(f) If the landfill contains any particulate matter which may be subject to wind dispersal, the owner or operator must cover or otherwise manage the landfill to control wind dispersal.

(g) The department will specify in the permit all design and operating practices that are necessary to ensure that the requirements of this subsection are satisfied.

(h) The owner or operator of each new landfill unit on which construction commences after January 29, 1992, each lateral expansion of a landfill unit on which construction commences after July 29, 1992, and each replacement of an existing landfill unit that commences reuse after July 29, 1992, must install two or more liners and a leachate collection and removal system above and between such liners. "Construction commences" is as defined in WAC 173-303-040 under "existing facility."

(i) The liner system must:

(A) Include a top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of dangerous constituents into such liner during the active life and post-closure care period; and

(B) Include a composite bottom liner, consisting of at least two components. The upper component must be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of dangerous constituents into this component during the active life and post-closure care period. The lower component must be designed and constructed of materials to minimize the migration of dangerous constituents if a breach in the upper component were to occur. The lower component must be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than  $1 \times 10^{-7}$  cm/sec.

(C) The liners must comply with (a)(i)(A), (B), and (C) of this subsection.

(ii) The leachate collection and removal system immediately above the top liner must be designed, constructed, operated, and maintained to collect and remove leachate from the landfill during the active life and post-closure care period. The department will specify design and operating conditions in the permit to ensure that the leachate depth over the liner does not exceed twelve inches (30.5 cm). The leachate collection and removal system must comply with (h)(iii) and (iv) of this subsection.

(iii) The leachate collection and removal system between the liners, and immediately above the bottom composite liner in the case of multiple leachate collection and removal systems, is also a leak de-

tection system. This leak detection system must be capable of detecting, collecting, and removing leaks of dangerous constituents at the earliest practicable time through all areas of the top liner likely to be exposed to waste or leachate during the active life and post-closure care period. The requirements for a leak detection system in this subsection are satisfied by installation of a system that is, at a minimum:

(A) Constructed with a bottom slope of one percent or more;

(B) Constructed of granular drainage materials with a hydraulic conductivity of  $1 \times 10^{-2}$  cm/sec or more and a thickness of 12 inches (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-5}$  m<sup>2</sup>/sec or more;

(C) Constructed of materials that are chemically resistant to the waste managed in the landfill and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and equipment used at the landfill;

(D) Designed and operated to minimize clogging during the active life and post-closure care period; and

(E) Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit must have its own sump(s). The design of each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

(iv) The owner or operator will collect and remove pumpable liquids in the leak detection system sumps to minimize the head on the bottom liner.

(v) The owner or operator of a leak detection system that is not located completely above the seasonal high water table must demonstrate that the operation of the leak detection system will not be adversely affected by the presence of groundwater.

(i) The department may approve alternative design or operating practices to those specified in (h) of this subsection if the owner or operator demonstrates to the department that such design and operating practices, together with location characteristics:

(i) Will prevent the migration of any dangerous constituent into the groundwater or surface water at least as effectively as the liners and leachate collection and removal systems specified in (c) of this subsection; and

(ii) Will allow detection of leaks of dangerous constituents through the top liner at least as effectively.

(j) The double liner requirement set forth in (h) of this subsection may be waived by the department for any monofill, if:

(i) The monofill contains only dangerous wastes from foundry furnace emission controls or metal casting molding sand, and such wastes do not contain constituents which would render the wastes dangerous for reasons other than the toxicity characteristic in WAC 173-303-090(8), with dangerous waste numbers D004 through D017 or the toxicity criteria at WAC 173-303-100(5); and

(ii)(A) The monofill has at least one liner for which there is no evidence that such liner is leaking;

(B) The monofill is located more than one-quarter mile from an underground source of drinking water (as that term is defined in WAC 173-303-040); and

(C) The monofill is in compliance with generally applicable groundwater monitoring requirements for facilities with permits under RCRA 3005(c); or

(D) The owner or operator demonstrates that the monofill is located, designed and operated so as to assure that there will be no migration of any dangerous constituent into groundwater or surface water at any future time.

(k) The owner or operator of any replacement landfill unit is exempt from (h) of this subsection if:

(i) The existing unit was constructed in compliance with the design standards of section 3004 (o)(1)(A)(i) and (o)(5) of the Resource Conservation and Recovery Act; and

(ii) There is no reason to believe that the liner is not functioning as designed.

(3) Reserve.

(4) Monitoring and inspection.

(a) During construction or installation, liners (except in the case of existing portions of landfills exempt from subsection (2)(a) of this section), and cover systems (e.g., membranes, sheets, or coatings) must be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials). Immediately after construction or installation:

(i) Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and

(ii) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural nonuniformities that may cause an increase in the permeability of the liner or cover.

(b) While a landfill is in operation, it must be inspected weekly and after storms to detect evidence of any of the following:

(i) Deterioration, malfunctions, or improper operation of run-on and runoff control systems;

(ii) Proper functioning of wind dispersal control systems; and

(iii) The presence of leachate in and proper functioning of leachate collection and removal systems.

(c)(i) An owner or operator required to have a leak detection system under subsection (2)(h) or (j) of this section must record the amount of liquids removed from each leak detection system sump at least once each week during the active life and closure period.

(ii) After the final cover is installed, the amount of liquids removed from each leak detection system sump must be recorded at least monthly. If the liquid level in the sump stays below the pump operating level for two consecutive months, the amount of liquids in the sumps must be recorded at least quarterly. If the liquid level in the sump stays below the pump operating level for two consecutive quarters, the amount of liquids in the sumps must be recorded at least semiannually. If at any time during the post-closure care period the pump operating level is exceeded at units on quarterly or semiannual recording schedules, the owner or operator must return to monthly recording of amounts of liquids removed from each sump until the liquid level again stays below the pump operating level for two consecutive months.

(iii) "Pump operating level" is a liquid level proposed by the owner or operator and approved by the department based on pump activation level, sump dimensions, and level that avoids backup into the drainage layer and minimizes head in the sump.

(5) Surveying and recordkeeping. The owner or operator of a landfill must maintain the following items in the operating record required under WAC 173-303-380:

(a) On a map, the exact location and dimensions, including depth, of each cell with respect to permanently surveyed benchmarks; and

(b) The contents of each cell and the approximate location of each dangerous waste type within each cell.

(6) Closure and post-closure care.

(a) At final closure of the landfill or upon closure of any cell, the owner or operator must cover the landfill or cell with a final cover designed and constructed to:

(i) Provide long-term minimization of migration of liquids through the closed landfill;

(ii) Function with minimum maintenance;

(iii) Promote drainage and minimize erosion or abrasion of the cover;

(iv) Accommodate settling and subsidence so that the cover's integrity is maintained; and

(v) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

(b) After final closure, the owner or operator must comply with all post-closure requirements contained in WAC 173-303-610 (7), (8), (9), and (10) including maintenance and monitoring throughout the post-closure care period. The owner or operator must:

(i) Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;

(ii) Maintain and monitor the leak detection system in accordance with subsections (2)(h) and (4)(c) of this section, where such a system is present between double liner systems;

(iii) Continue to operate the leachate collection and removal system until leachate is no longer detected;

(iv) Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of WAC 173-303-645;

(v) Prevent run-on and runoff from eroding or otherwise damaging the final cover; and

(vi) Protect and maintain surveyed benchmarks used in complying with subsection (5) of this section.

(c) Reserve.

(7) Special requirements for incompatible wastes. Incompatible wastes, or incompatible wastes and materials must not be placed in the same landfill cell, unless WAC 173-303-395 (1)(b) is complied with.

(8) Action leakage rate.

(a) The department must approve an action leakage rate for landfill units subject to subsection (2)(h) or (j) of this section. The action leakage rate is the maximum design flow rate that the leak detection system (LDS) can remove without the fluid head on the bottom liner exceeding 1 foot. The action leakage rate must include an adequate safety margin to allow for uncertainties in the design (e.g., slope, hydraulic conductivity, thickness of drainage material), construction, operation, and location of the LDS, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the LDS, and proposed response actions (e.g., the action leakage rate must consider decreases in the flow capacity of the system over time resulting from siltation and clogging, rib layover and creep of synthetic components of the system, overburden pressures, etc.).

(b) To determine if the action leakage rate has been exceeded, the owner or operator must convert the weekly or monthly flow rate from the monitoring data obtained under subsection (2)(h) of this section to an average daily flow rate (gallons per acre per day) for each sump. Unless the department approves a different calculation, the average daily flow rate for each sump must be calculated weekly during the active life and closure period, and monthly during the post-closure care period when monthly monitoring is required under subsection (9) of this section.

(9) Response actions.

(a) The owner or operator of landfill units subject to subsection (2)(h) or (j) of this section must have an approved response action plan before receipt of waste. The response action plan must set forth the actions to be taken if the action leakage rate has been exceeded. At a minimum, the response action plan must describe the actions specified in (b) of this subsection.

(b) If the flow rate into the leak detection system exceeds the action leakage rate for any sump, the owner or operator must:

(i) Notify the department in writing of the exceedance within seven days of the determination;

(ii) Submit a preliminary written assessment to the department within fourteen days of the determination, as to the amount of liquids, likely sources of liquids, possible location, size, and cause of any leaks, and short-term actions taken and planned;

(iii) Determine to the extent practicable the location, size, and cause of any leak;

(iv) Determine whether waste receipt should cease or be curtailed, whether any waste should be removed from the unit for inspection, repairs, or controls, and whether or not the unit should be closed;

(v) Determine any other short-term and long-term actions to be taken to mitigate or stop any leaks; and

(vi) Within thirty days after the notification that the action leakage rate has been exceeded, submit to the department the results of the analyses specified in (b)(iii), (iv), and (v) of this subsection, the results of actions taken, and actions planned. Monthly thereafter, as long as the flow rate in the leak detection system exceeds the action leakage rate, the owner or operator must submit to the department a report summarizing the results of any remedial actions taken and actions planned.

(c) To make the leak and/or remediation determinations in (b)(iii), (iv), and (v) of this subsection, the owner or operator must:

(i) Assess the source of liquids and amounts of liquids by source;

(ii) Conduct a fingerprint, dangerous constituent, or other analyses of the liquids in the leak detection system to identify the source of liquids and possible location of any leaks, and the hazard and mobility of the liquid; and

(iii) Assess the seriousness of any leaks in terms of potential for escaping into the environment; or

(iv) Document why such assessments are not needed.

(10) Special requirements for ignitable or reactive waste.

(a) Except as provided in subsection (8)(b) of this section, and in WAC 173-303-161, ignitable or reactive waste must not be placed in a landfill, unless the waste and landfill meet all applicable require-

ments for owners and operators of dangerous waste treatment, storage and disposal facilities contained in this chapter, and:

(i) The resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under WAC 173-303-090 (5) or (7); and

(ii) WAC 173-303-395(1) is complied with.

(b) Except for prohibited wastes which remain subject to treatment standards in WAC 173-303-140 (2)(a), ignitable wastes in containers may be landfilled without meeting the requirements of (a) of this subsection, provided that the wastes are disposed of in such a way that they are protected from any material or conditions which may cause them to ignite. At a minimum, ignitable wastes must be disposed of in nonleaking containers which are carefully handled and placed so as to avoid heat, sparks, rupture, or any other condition that might cause ignition of the wastes; must be covered daily with soil or other noncombustible material to minimize the potential for ignition of the wastes; and must not be disposed of in cells that contain or will contain other wastes which may generate heat sufficient to cause ignition of the waste.

(11) Special requirements for hazardous wastes F020, F021, F022, F023, F026, and F027.

(a) Hazardous wastes F020, F021, F022, F023, F026, and F027 must not be placed in a landfill unless the owner or operator operates the landfill in accord with a management plan for these wastes that is approved by the department pursuant to the standards set out in this subsection, and in accord with all other applicable requirements of this section. The factors to be considered are:

(i) The volume, physical, and chemical characteristics of the wastes, including their potential to migrate through the soil or to volatilize or escape into the atmosphere;

(ii) The attenuative properties of underlying and surrounding soils or other materials;

(iii) The mobilizing properties of other materials co-disposed with these wastes; and

(iv) The effectiveness of additional treatment, design, or monitoring requirements.

(b) The department may determine that additional design, operating, and monitoring requirements are necessary for landfills managing hazardous wastes F020, F021, F022, F023, F026, and F027 in order to reduce the possibility of migration of these wastes to groundwater, surface water, or air so as to protect human health and the environment.

(12) Special requirements for containers. Unless they are very small, such as an ampule, containers must be either:

(a) At least ninety percent full when placed in the landfill; or

(b) Crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill.

(13) Disposal of liquid waste. Special requirements for bulk and containerized liquids are at WAC 173-303-140 (4)(b).

[Statutory Authority: Chapter 70.105 RCW. WSR 15-01-123 (Order 13-07), § 173-303-665, filed 12/18/14, effective 1/18/15. Statutory Authority: Chapters 70.105 and 70.105D RCW. WSR 09-14-105 (Order 07-12), § 173-303-665, filed 6/30/09, effective 7/31/09; WSR 98-03-018 (Order 97-03), § 173-303-665, filed 1/12/98, effective 2/12/98; WSR 95-22-008 (Order 94-30), § 173-303-665, filed 10/19/95, effective 11/19/95. Statutory Authority: Chapter 70.105 RCW. WSR 88-02-057 (Order DE

83-36), § 173-303-665, filed 1/5/88, effective 2/5/88; WSR 86-12-057 (Order DE-85-10), § 173-303-665, filed 6/3/86; WSR 84-09-088 (Order DE 83-36), § 173-303-665, filed 4/18/84.]