3745-56-21 **Design and operating requirements.**

(A) A surface impoundment that is not covered by paragraph (C) of this rule or rule 3745-67-21 of the Administrative Code must have a liner for all portions of the impoundment (except for existing portions of such impoundments). The liner must be designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil or ground water or surface water at any time during the active life (including the closure period) of the impoundment. The liner may be constructed of materials that allow wastes to migrate into the liner (but not into the adjacent subsurface soil or ground water or surface water) during the active life of the facility, provided that the impoundment is closed in accordance with paragraph (A)(1) of rule 3745-56-28 of the Administrative Code. For impoundments that will be closed in accordance with paragraph (A)(2) of rule 3745-56-28 of the Administrative Code, the liner must be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility. The liner must be:

(1) 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; and

(2) 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

(3) Installed to cover all surrounding earth likely to be in contact with the waste or leachate.

(B) The owner or operator will be exempted from the requirements of paragraph (A) of this rule if the director finds, based on a demonstration by the owner or operator, that alternate design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents (see rule 3745-54-93 of the Administrative Code) into the ground water or surface water at any future time. In deciding whether to grant an exemption, the director will consider:

(1) The nature and quantity of the wastes; and

(2) The proposed alternate design and operation; and

(3) The hydrogeologic setting of the facility, including the attenuative capacity and thickness of the liners and soils present between the impoundment and ground water or surface water; and

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

(C) The owner or operator of each new surface impoundment unit on which construction commences after January 29, 1992, each lateral expansion of a surface impoundment unit on which construction commences after July 29, 1992 and each replacement of an existing surface impoundment unit that is to commence reuse after July 29, 1992 must install two or more liners and a leachate collection and removal system between such liners. "Construction commences" is as defined in rule 3745-50-10 of the Administrative Code under "existing facility".

(1)

(a) The liner system must include:

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

(ii) 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 hazardous 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 hazardous constituents if a breach in the upper component were to occur. The lower component must be constructed of at least three feet (91.0 centimeters) of compacted soil material with a hydraulic conductivity of no more than 1 x 10-7 centimeters per second.

(b) The liners must comply with paragraphs (A)(1), (A)(2), and (A)(3) of this rule.

(2) 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 detection system. This leak detection system must be capable of detecting, collecting, and removing leaks of hazardous 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 paragraph are satisfied by installation of a system that is, at a minimum:

(a) Constructed with a bottom slope of one ~~percent~~per cent or more;

(b) Constructed of granular drainage materials with a hydraulic conductivity of 1 x 10-1 centimeters per second or more and a thickness of twelve inches (30.5 centimeters) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3 x 10-4 meters squared per second or more;

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

(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.

(3) The owner or operator must collect and remove pumpable liquids in the sumps to minimize the head on the bottom liner.

(4) 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 ground water.

(D) The director may approve alternative design or operating practices to those specified in paragraph (C) of this rule if the owner or operator demonstrates to the director that such design and operating practices, together with location characteristics:

(1) Will prevent the migration of any hazardous constituent into the ground water or surface water at least as effectively as the liners and leachate collection and removal system specified in paragraph (C) of this rule; and

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

(E) The double liner requirement set forth in paragraph (C) of this rule may be waived by the director for any monofill, if:

(1) The monofill contains only hazardous wastes from foundry furnace emission controls or metal casting molding sand, and such wastes do not contain constituents which would render the wastes hazardous for reasons other than the toxicity ~~characteristics~~characteristic in rule 3745-51-24 of the Administrative Code; and

(2)

(a)

(i) The monofill has at least one liner for which there is no evidence that such liner is leaking. For the purposes of this paragraph, the term "liner" means a liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility, or a liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility. In the case of any surface impoundment which has been exempted from the requirements of paragraph (C) of this rule on the basis of a liner designed, constructed, installed, and operated to prevent hazardous waste from passing beyond the liner, at the closure of such impoundment, the owner or operator must remove or decontaminate all waste residues, all contaminated liner material, and contaminated soil to the extent practicable. If all contaminated soil is not removed or decontaminated, the owner or operator of such impoundment will comply with appropriate post-closure requirements, including but not limited to ground water monitoring and corrective action;

(ii) The monofill is located more than one-quarter mile from an "underground source of drinking water" (as that term is defined in rule ~~3745-34-01~~3745-50-10 of the Administrative Code); and

(iii) The monofill is in compliance with generally applicable ground water monitoring requirements for facilities with Ohio hazardous

waste permits; or

(b) 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 hazardous constituent into ground water or surface water at any future time.

(F) The owner or operator of any replacement surface impoundment unit is exempt from paragraph (C) of this rule if:

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

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

(G) A surface impoundment must be designed, constructed, maintained, and operated to prevent:

(1) Overtopping resulting from normal or abnormal operations;

(2) Overfilling;

(3) Wind and wave action;

(4) Rainfall;

(5) Run-on;

(6) Malfunctions of level controllers, alarms, and other equipment; and

(7) Human error.

(H) A surface impoundment must have dikes that are designed, constructed, and maintained with sufficient structural integrity to prevent massive failure of the dikes. In ensuring structural integrity, it must not be presumed that the liner system will function without leakage during the active life of the unit.

(I) The director will specify in the permit all design and operating practices that are necessary to ensure that the requirements of this rule are satisfied.

~~[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see rule 3745-50-11 of the Administrative Code titled "Incorporated by reference."]~~

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