

3745-56-20 Applicability- surface impoundments.

Rules 3745-56-20 to 3745-56-31 of the Administrative Code apply to owners and operators of facilities that use surface impoundments to treat, store, or dispose of hazardous waste, except as rule 3745-54-01 of the Administrative Code provides otherwise.

Effective: 12/07/2004

119.032 review dates: 06/30/1999, Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.05, 3734.12

Prior effective dates: 01/07/1983, 08/30/1984, 05/29/1985 (Emer.), 08/29/1985, 11/11/1999

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 1×10^{-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 1×10^{-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 3×10^{-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."]~~

[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."]

Effective: 09/05/2010

R.C. 119.032 review dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

07/23/2010

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 01/07/1983, 08/30/1984, 05/29/1985 (Emer.),
08/29/1985, 12/30/1989, 02/11/1992, 04/15/1993,
12/07/2004

3745-56-22 Action leakage rate.

- (A) The director will approve an action leakage rate for surface impoundment units subject to paragraph (C) or (D) of rule 3745-56-21 of the Administrative Code. The action leakage rate is the maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding one 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 leak detection system, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the leak detection system, 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 paragraph (D) of rule 3745-56-26 of the Administrative Code to an average daily flow rate (gallons per acre per day) for each sump. Unless the director approves a different calculation, the average daily flow rate for each sump must be calculated weekly during the active life and closure period, and if the unit is closed in accordance with paragraph (B) of rule 3745-56-28 of the Administrative Code, monthly during the post-closure care period when monthly monitoring is required under paragraph (D) of rule 3745-56-26 of the Administrative Code.

Effective: 12/07/2004
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: None

3745-56-23

Response actions.

- (A) The owner or operator of surface impoundment units subject to paragraph (C) or (D) of rule 3745-56-21 of the Administrative Code 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 paragraph (B) of this rule.
- (B) If the flow rate into the leak detection system exceeds the action leakage rate for any sump, the owner or operator must:
- (1) Notify the director in writing of the ~~exceedence~~exceedance within seven days ~~of~~after the determination;
 - (2) Submit a preliminary written assessment to the director within fourteen days ~~of~~after 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;
 - (3) Determine to the extent practicable the location, size, and cause of any leak;
 - (4) 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;
 - (5) Determine any other short-term and longer-term actions to be taken to mitigate or stop any leaks; and
 - (6) Within thirty days after the notification that the action leakage rate has been exceeded, submit to the director the results of the analyses specified in paragraphs (B)(3), (B)(4), and (B)(5) of this rule, 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 director a report summarizing the results of any remedial actions taken and actions planned.
- (C) To make the leak and/or remediation determinations in paragraphs (B)(3), (B)(4), and (B)(5) of this rule, the owner or operator must:
- (1)
 - (a) Assess the source of liquids and amounts of liquids by source,

- (b) Conduct a fingerprint, hazardous 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
- (c) Assess the seriousness of any leaks in terms of potential for escaping into the environment; or

(2) Document why such assessments are not needed.

Effective: 09/05/2010

R.C. 119.032 review dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

07/23/2010

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 12/07/2004

3745-56-26 Monitoring and inspection.

- (A) During construction and installation, liners [except in the case of existing portions of surface impoundments exempt from paragraph (A) of rule 3745-56-21 of the Administrative Code] 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:
- (1) Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and
 - (2) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.
- (B) While a surface impoundment is in operation, it must be inspected weekly and after storms to detect evidence of any of the following:
- (1) Deterioration, malfunctions, or improper operation of overtopping control systems; and
 - (2) Sudden drops in the level of the impoundment's contents; and
 - (3) Severe erosion or other signs or deterioration in dikes or other containment devices.
- (C) Prior to the issuance of a permit, and after any extended period of time (at least six months) during which the impoundment was not in service, the owner or operator must obtain a certification from a qualified engineer that the impoundment's dike, including that portion of any dike which provides freeboard, has structural integrity. The certification must establish, in particular, that the dike:
- (1) Will withstand the stress of the pressure exerted by the types and amounts of wastes to be placed in the impoundment; and
 - (2) Will not fail due to scouring or piping, without dependence on any liner system included in the surface impoundment construction.
- (D)
- (1) An owner or operator required to have a leak detection system under paragraph (C) or (D) of rule 3745-56-21 of the Administrative Code 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.

- (2) 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 semi-annually. If at any time during the post-closure care period the pump operating level is exceeded at units on quarterly or semi-annual 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.
- (3) "Pump operating level" is a liquid level proposed by the owner or operator and approved by the director based on pump activation level, sump dimensions, and level that avoids backup into the drainage layer and minimizes head in the sump.

Effective: 12/07/2004

119.032 review dates: Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 01/07/1983, 08/30/1984, 12/30/1989

3745-56-27

Emergency repairs; and contingency plans- surface impoundments.

- (A) A surface impoundment ~~must~~shall be removed from service in accordance with paragraph (B) of this rule when:
- (1) The level of liquids in the impoundment suddenly drops and the drop is not known to be caused by changes in the normal flows out of the impoundment through the ~~inflow/outflow~~inflow or outflow devices; or
 - (2) The dike leaks.
- (B) When a surface impoundment ~~must be~~is removed from service as required by paragraph (A) of this rule, the owner or operator ~~must~~shall:
- (1) Immediately shut off the flow or stop the addition of wastes into the impoundment; and
 - (2) Immediately contain any surface leakage which has occurred or is occurring; and
 - (3) Immediately stop the leak; and
 - (4) Take any other necessary steps to stop or prevent catastrophic failure; and
 - (5) If a leak cannot be stopped by any other means, empty the impoundment; and
 - (6) Notify the director of the problem in writing within seven days after detecting the problem.
- (C) As part of the contingency plan required in rules 3745-54-50 to 3745-54-56 of the Administrative Code, the owner or operator ~~must~~shall specify a procedure for complying with ~~the requirements of~~ paragraph (B) of this rule.
- (D) No surface impoundment that has been removed from service in accordance with ~~the requirements of~~ this rule may be restored to service unless the portion of the impoundment which was failing is repaired and the following steps are taken:

- (1) If the impoundment was removed from service as the result of actual or imminent dike failure, the dike's structural integrity ~~must~~shall be recertified in accordance with paragraph (C) of rule 3745-56-26 of the Administrative Code; or
 - (2) If the impoundment was removed from service as a result of a sudden drop in the liquid level, then:
 - (a) For an existing portion of the impoundment, a liner ~~must~~shall be installed in compliance with paragraph (A) of rule 3745-56-21 of the Administrative Code; and
 - (b) For any other portion of the impoundment, the repaired liner system ~~must~~shall be certified by a qualified engineer as meeting the design specifications approved in the permit.
 - (3) The owner or operator shall comply with paragraph (F) of rule 3745-56-21 of the Administrative Code and shall have received approval from the director to restore the surface impoundment to service.
- (E) A surface impoundment that has been removed from service in accordance with ~~the requirements of this rule~~ and that is not being repaired ~~must~~shall be closed in accordance with ~~the provisions of~~ rule 3745-56-28 of the Administrative Code.

Effective: 10/31/2015

Five Year Review (FYR) Dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

10/07/2015

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 01/07/1983, 08/30/1984, 12/30/1989, 02/11/1992

3745-56-28 Closure and post-closure.

- (A) At closure the owner or operator must:
- (1) Remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless paragraph (D) of rule 3745-51-03 of the Administrative Code applies; or
 - (2)
 - (a) Eliminate free liquids by removing liquid wastes or solidifying the remaining wastes and waste residues; and
 - (b) Stabilize remaining wastes to a bearing capacity sufficient to support final cover; and
 - (c) Cover the surface impoundment with a final cover designed and constructed to:
 - (i) Provide long-term minimization of the migration of liquids through the closed impoundment; and
 - (ii) Function with minimum maintenance; and
 - (iii) Promote drainage and minimize erosion or abrasion of the final cover; and
 - (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) If some waste residues or contaminated materials are left in place at final closure, the owner or operator must comply with all post-closure requirements contained in rules 3745-55-17 to 3745-55-20 of the Administrative Code, including maintenance and monitoring throughout the post-closure care period (specified in the permit under rule 3745-55-17 of the Administrative Code). The owner or operator must:
- (1) 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; and

- (2) Maintain and monitor the leak detection system in accordance with paragraphs (C)(2)(d) and (C)(3) of rule 3745-56-21 and paragraph (D) of rule 3745-56-26 of the Administrative Code, and comply with all other applicable leak detection system requirements of Chapters 3745-54 to 3745-57 and 3745-205 of the Administrative Code.
- (3) Maintain and monitor the ground water monitoring system and comply with all other applicable requirements of rules 3745-54-90 to 3745-54-101 of the Administrative Code; and
- (4) Prevent run-on and run-off from eroding or otherwise damaging the final cover.

(C)

- (1) If an owner or operator plans to close a surface impoundment in accordance with paragraph (A)(1) of this rule, and the impoundment does not comply with the liner requirements of paragraph (A) of rule 3745-56-21 of the Administrative Code and is not exempt from them in accordance with paragraph (B) of rule 3745-56-21 of the Administrative Code, then:
 - (a) The closure plan for the impoundment, under rule 3745-55-12 of the Administrative Code must include both a plan for complying with paragraph (A)(1) of this rule and a contingent plan for complying with paragraph (A)(2) of this rule in case not all contaminated subsoils can be practicably removed at closure; and
 - (b) The owner or operator must prepare a contingent post-closure plan under rule 3745-55-18 of the Administrative Code for complying with paragraph (B) of this rule in case not all contaminated subsoils can be practicably removed at closure.
- (2) The cost estimates calculated under rules 3745-55-42 and 3745-55-44 of the Administrative Code for closure and post-closure care of a surface impoundment subject to paragraphs (C) to (C)(2) of this rule must include the cost of complying with the contingent closure plan and the contingent post-closure plan, but are not required to include the cost of expected closure under paragraph (A)(1) of this rule.

Effective: 12/07/2004

119.032 review dates: 09/28/2001, Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 01/07/1983, 08/30/1984, 05/29/1985 (Emer.), 08/29/1985, 12/30/1989, 03/13/2002

3745-56-29 Special requirements for ignitable or reactive waste.

Ignitable or reactive waste shall not be placed in a surface impoundment, unless the waste and impoundment satisfy all applicable requirements of Chapter 3745-270 of the Administrative Code, and:

- (A) The waste is treated, rendered, or mixed before or immediately after placement in the impoundment so that the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under rule 3745-51-21 or 3745-51-23 of the Administrative Code and paragraph (B) of rule 3745-54-17 of the Administrative Code is complied with; or
- (B) The waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react; or
- (C) The surface impoundment is used solely for emergencies.

[Comment: As required by rule 3745-54-13 of the Administrative Code, the waste analysis plan must include analyses needed to comply with this rule. Also, paragraph (C) of rule 3745-54-17 of the Administrative Code requires waste analyses, trial tests, or other documentation to assure compliance with paragraph (B) of rule 3745-54-17 of the Administrative Code. As required by rule 3745-54-73 of the Administrative Code, the owner or operator must place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.]

Effective: 12/07/2000
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: 01/07/1983, 02/11/1992

3745-56-30 Special requirements for incompatible wastes.

Incompatible wastes, or incompatible wastes and materials (see the appendix to rule 3745-55-99 of the Administrative Code for examples) shall not be placed in the same surface impoundment unless paragraph (B) of rule 3745-54-17 of the Administrative Code is complied with.

Effective: 12/07/2000

119.032 review dates: Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 04/15/1981, 08/30/1984, 05/29/1985 (Emer.), 08/29/1985, 02/11/1992

3745-56-31 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 surface impoundment unless the owner or operator operates the surface impoundment in accordance with a management plan for these wastes that is approved by the director pursuant to the standards set out in paragraphs (A) to (A)(4) of this rule, and in accordance with all other applicable requirements of Chapters 3745-54 to 3745-57 and 3745-205 of the Administrative Code. The factors to be considered are:
- (1) The volume, physical, and chemical characteristics of the wastes, including their potential to migrate through soil or to volatilize or escape into the atmosphere;
 - (2) The attenuative properties of underlying and surrounding soils or other materials;
 - (3) The mobilizing properties of other materials co-disposed with these wastes; and
 - (4) The effectiveness of additional treatment, design, or monitoring techniques.
- (B) The director may determine that additional design, operating, and monitoring requirements are necessary for surface impoundments managing hazardous wastes F020, F021, F022, F023, F026, and F027 in order to reduce the possibility of migration of these wastes to ground water, surface water, or air so as to protect human health and the environment.

Effective: 12/07/2004

119.032 review dates: Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 01/30/1986

3745-56-50 Applicability- waste piles.

- (A) Rules 3745-56-50 to 3745-56-59 of the Administrative Code apply to owners and operators of facilities that store or treat hazardous waste in piles, except as rule 3745-54-01 of the Administrative Code provides otherwise.
- (B) Rules 3745-56-50 to 3745-56-59 of the Administrative Code do not apply to owners or operators of waste piles that are closed with wastes left in place. Such waste piles are subject to regulation under rules 3745-57-02 to 3745-57-17 of the Administrative Code (landfills).
- (C) The owner or operator of any waste pile that is inside or under a structure that provides protection from precipitation so that neither run-off nor leachate is generated is not subject to regulation under rule 3745-56-51 of the Administrative Code or rules 3745-54-90 to 3745-54-101 of the Administrative Code, provided that:
 - (1) Liquids or materials containing free liquids are not placed in the pile; and
 - (2) The pile is protected from surface water run-on by the structure or in some other manner; and
 - (3) The pile is designed and operated to control dispersal of the waste by wind, where necessary, by means other than wetting; and
 - (4) The pile will not generate leachate through decomposition or other reactions.

Effective: 12/07/2004

119.032 review dates: Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 01/07/1983, 08/30/1984, 05/29/1985 (Emer.), 08/29/1985, 10/20/1998, 03/13/2002

3745-56-51

Design and operating requirements.

(A) A waste pile (except for an existing portion of a waste pile) must have:

(1) A liner that is designed, constructed, and installed to prevent any migration of wastes out of the pile into the adjacent subsurface soil or ground water or surface water at any time during the active life (including the closure period) of the waste pile. The liner may be constructed of materials that may allow waste to migrate into the liner itself (but not into the adjacent subsurface soil or ground water or surface water) during the active life of the facility. 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, climate conditions, the stress of installation, and the stress of daily operation; and

(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

(2) A leachate collection and removal system immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the pile. The permit will contain and specify design and operating conditions to ensure that the leachate depth over the liner does not exceed thirty centimeters (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 pile and the leachate expected to be generated; and

(ii) Of sufficient strength and thickness to prevent collapse under the pressures exerted by overlaying wastes, waste cover materials, and by any equipment used at the pile and

(b) Designed and operated to function without clogging through the

scheduled closure of the waste pile.

(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 attenuative capacity and thickness of the liners and soils present between the pile 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 waste pile unit ~~on which construction commences after January 29, 1992~~, each lateral expansion of a waste pile unit ~~on which construction commences after July 29, 1992~~, and each replacement of an existing waste pile unit ~~that is to commence 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 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 1×10^{-7} centimeters per second.

- (b) The liners must comply with paragraphs (A)(1)(a), (A)(1)(b), and (A)(1)(c) of this rule.
- (2) 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 waste pile during the active life and post-closure care period. The permit will specify design and operating conditions to ensure that the leachate depth over the liner does not exceed thirty centimeters (one foot). The leachate collection and removal system must comply with paragraphs (C)(3)(c) and (C)(3)(d) of this rule.
 - (3) 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 per cent or more;
 - (b) Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-2} 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 3×10^{-5} meters squared per second or more;
 - (c) Constructed of materials that are chemically resistant to the waste managed in the waste pile 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 waste pile;
 - (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.
- (4) The owner or operator must collect and remove pumpable liquids in the leak detection system sumps to minimize the head on the bottom liner.
 - (5) 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 systems 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) Paragraph (C) of this rule does not apply to monofills that are granted a waiver by the director in accordance with paragraph (E) of rule 3745-56-21 of the Administrative Code.
- (F) The owner or operator of any replacement waste pile unit is exempt from paragraph (C) of this rule if:
- (1) The existing unit was constructed in compliance with the design standards of ~~sections~~Sections 3004(o)(1)(A)(i) and 3004(o)(5) of ~~the Resource Conservation and Recovery Act~~RCRA; and
 - (2) There is no reason to believe that the liner is not functioning as designed.

- (G) 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 pile during peak discharge from at least a twenty-five-year storm.
- (H) The owner or operator must design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a twenty-four-hour, twenty-five-year storm.
- (I) Collection and holding facilities (e.g., tanks or basins) associated with run-on and run-off control systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.
- (J) If the pile contains any particulate matter which may be subject to wind dispersal, the owner or operator must cover or otherwise manage the pile to control wind dispersal.
- (K) The permit will contain and specify 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."]~~

[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."]

Effective: 09/05/2010

R.C. 119.032 review dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

07/23/2010

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 01/07/1983, 08/30/1984, 12/07/2004

3745-56-52 Action leakage rate.

- (A) The director will approve an action leakage rate for waste piles subject to paragraph (C) or (D) of rule 3745-56-51 of the Administrative Code. The action leakage rate is the maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding one 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 leak detection system, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the leak detection system, 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 flow rate from the monitoring data obtained under paragraph (C) of rule 3745-56-54 of the Administrative Code to an average daily flow rate (gallons per acre per day) for each sump. Unless the director approves a different calculation, the average daily flow rate for each sump must be calculated weekly during the active life and closure period.

Effective: 12/07/2004
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: None

3745-56-53 Response actions.

- (A) The owner or operator of waste pile units subject to paragraph (C) or (D) of rule 3745-56-51 of the Administrative Code 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 paragraph (B) of this rule.
- (B) If the flow rate into the leak detection system exceeds the action leakage rate for any sump, the owner or operator must:
- (1) Notify the director in writing of the exceedance within seven days of the determination;
 - (2) Submit a preliminary written assessment to the director 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;
 - (3) Determine to the extent practicable the location, size, and cause of any leak;
 - (4) 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;
 - (5) Determine any other short-term and long-term actions to be taken to mitigate or stop any leaks; and
 - (6) Within thirty days after the notification that the action leakage rate has been exceeded, submit to the director the results of the analyses specified in paragraphs (B)(3), (B)(4), and (B)(5) of this rule, 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 director a report summarizing the results of any remedial actions taken and actions planned.
- (C) To make the leak and/or remediation determinations in paragraphs (B)(3), (B)(4), and (B)(5) of this rule, the owner or operator must:
- (1)
 - (a) Assess the source of liquids and amounts of liquids by source;
 - (b) Conduct a fingerprint, hazardous 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

- (c) Assess the seriousness of any leaks in terms of potential for escaping into the environment; or
- (2) Document why such assessments are not needed.

Effective: 12/07/2004
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: None

3745-56-54 Monitoring and Inspection.

- (A) During construction or installation, liners [except in the case of existing portions or piles exempt from paragraph (A) of rule 3745-56-51 of the Administrative Code] 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:
 - (1) Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and
 - (2) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.

- (B) While a waste pile is in operation, it must be inspected weekly and after storms to detect evidence of any of the following:
 - (1) Deterioration, malfunctions, or improper operation of run-on and run-off control systems; and
 - (2) Proper functioning of wind dispersal control systems, where present; and
 - (3) The presence of leachate in and proper functioning of leachate collection and removal systems, where present.

- (C) An owner or operator required to have a leak detection system under paragraph (C) of rule 3745-56-51 of the Administrative Code 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.

Effective: 12/07/2004

119.032 review dates: Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 01/07/1983, 08/30/1984, 12/30/1989

3745-56-56 Special requirements for ignitable or reactive waste.

Ignitable or reactive waste shall not be placed in a waste pile unless the waste and the waste pile satisfy all applicable requirements of Chapter 3745-270 of the Administrative Code, and:

- (A) Addition of the waste to an existing pile results in the waste or mixture no longer meeting the definition of ignitable or reactive waste under rule 3745-51-21 or 3745-51-23 of the Administrative Code, and complies with paragraph (B) of rule 3745-54-17 of the Administrative Code; or
- (B) The waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react.

[Comment: As required by rule 3745-54-13 of the Administrative Code, the waste analysis plan shall include analyses needed to comply with this rule. Also, paragraph (C) of rule 3745-54-17 of the Administrative Code requires waste analyses, trial tests, or other documentation to assure compliance with paragraph (B) of rule 3745-54-17 of the Administrative Code. As required by rule 3745-54-73 of the Administrative Code, the owner or operator shall place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.]

Effective: 12/07/2000
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: 01/07/1983, 02/11/1992

3745-56-57 Special requirements for incompatible wastes.

- (A) Incompatible wastes, or incompatible wastes and materials (see the appendix to rule 3745-55-99 of the Administrative Code for examples), shall not be placed in the same pile, unless paragraph (B) of rule 3745-54-17 of the Administrative Code is complied with.
- (B) A pile of hazardous waste that is incompatible with any waste or other material stored nearby in other containers, piles, open tanks, or surface impoundments shall be separated from the other materials, or protected from them by means of a dike, berm, wall or other device.

[Comment: The purpose of this requirement is to prevent fires, explosions, gaseous emissions, leaching, or other discharge which could result from the contact or mixing of incompatible wastes or materials.]

- (C) Hazardous waste shall not be piled on the same base where incompatible wastes or materials were previously piled, unless the base has been decontaminated sufficiently to ensure compliance with paragraph (B) of rule 3745-54-17 of the Administrative Code.

[Comment: As required by rule 3745-54-13 of the Administrative Code, a waste analysis plan shall include analysis needed to comply with this rule. Also paragraph (C) of rule 3745-54-17 of the Administrative Code requires waste analyses, trial tests, or other documentation to assure compliance with paragraph (B) of rule 3745-54-17 of the Administrative Code. As required by rule 3745-54-73 of the Administrative Code, the owner or operator shall place the results of each waste analysis and trial test and any documented information in the operating record of the facility.]

Effective: 02/14/1995
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: 01/07/1983

3745-56-58 Closure and post-closure care.

- (A) At closure, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless paragraph (D) of rule 3745-51-03 of the Administrative Code applies.
- (B) If, after removing or decontaminating all residues and making all reasonable efforts to effect removal or decontamination of contaminated components, subsoils, structures, and equipment as required in paragraph (A) of this rule, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he must close the facility and perform post-closure care in accordance with rule 3745-57-10 of the Administrative Code.
- (C)
 - (1) The owner or operator of a waste pile that does not comply with the liner requirements of paragraph (A)(1) of rule 3745-56-51 of the Administrative Code and is not exempt from them in accordance with paragraph (C) of rule 3745-56-50 of the Administrative Code or paragraph (B) of rule 3745-56-51 of the Administrative Code must:
 - (a) Include in the closure plan for the pile in accordance with rule 3745-55-12 of the Administrative Code both a plan for complying with paragraph (A) of this rule and a contingent plan for complying with paragraph (B) of this rule in case not all contaminated subsoils can be practicably removed at closure; and
 - (b) Prepare a contingent post-closure plan in accordance with rule 3745-55-18 of the Administrative Code for complying with paragraph (B) of this rule in case not all contaminated subsoils can be practicably removed at closure.
 - (2) The cost estimates calculated in accordance with rules 3745-55-42 and 3745-55-44 of the Administrative Code for closure and post-closure care of a pile subject to this paragraph must include the cost of complying with the contingent closure plan and the contingent post-closure plan, but are not required to include the cost of expected closure under paragraph (A) of this rule.

Effective: 08/30/1984
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: 01/07/1983

3745-56-59

Special requirements for hazardous wastes F020, F021, F022, F023, F026, and F027- waste piles.

- (A) Hazardous wastes F020, F021, F023, F026, and F027 ~~must~~shall not be placed in waste piles that are not "enclosed" ([as defined in paragraph (C) of rule 3745-56-50 of the Administrative Code]) unless the owner or operator operates the waste pile in accordance with a management plan for these wastes that is approved by the director pursuant to ~~the standards set out in~~ paragraphs (A) to (A)(4) of this rule, and in accordance with all other applicable requirements of Chapters 3745-54 to 3745-57 and 3745-205 of the Administrative Code. The factors to be considered are:
- (1) The volume, physical, and chemical characteristics of the wastes, including ~~their~~the potential for these wastes to migrate through soil or to volatilize or escape into the atmosphere; ~~;~~
 - (2) The attenuative properties of underlying and surrounding soils or other materials; ~~;~~
 - (3) The mobilizing properties of other materials co-disposed with these wastes; ~~and,~~
 - (4) The effectiveness of additional treatment, design, or monitoring techniques.
- (B) The director may determine that additional design, operating, and monitoring requirements are necessary for piles managing hazardous wastes F020, F021, F022, F023, F026, and F027 in order to reduce the possibility of migration of these wastes to ground water, surface water, or air so as to protect human health and the environment.

Effective: 10/31/2015

Five Year Review (FYR) Dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

10/07/2015

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 08/30/1984, 01/30/1986, 12/07/2004

3745-56-70 Applicability; land treatment.

Rules 3745-56-70 to 3745-56-83 of the Administrative Code apply to owners or operators of facilities that treat or dispose of hazardous waste in land treatment units, except as rule 3745-54-01 of the Administrative Code provides otherwise.

Effective: 11/11/1999

119.032 review dates: 6/30/99, Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 08/30/1984, 05/29/1985 (Emer.), 08/29/1985

3745-56-71

Treatment program- land treatment.

- (A) An owner or operator subject to this rule ~~must~~shall establish a land treatment program that is designed to ensure that hazardous constituents placed in or on the treatment zone are degraded, transformed, or immobilized within the treatment zone. The permit ~~will~~shall specify the elements of the treatment program, including all of the following:
- (1) The wastes that are capable of being treated at the unit based on a demonstration under rule 3745-56-72 of the Administrative Code; ~~and~~.
 - (2) Design measures and operating practices necessary to maximize the success of degradation, transformation, and immobilization processes in the treatment zone in accordance with paragraph (A) of rule 3745-56-73 of the Administrative Code; ~~and~~.
 - (3) Unsaturated zone monitoring provisions ~~meeting the requirements of~~that comply with rule 3745-56-78 of the Administrative Code.
- (B) The permit ~~will~~shall specify the hazardous constituents that ~~must~~shall be degraded, transformed, or immobilized under ~~this rule~~rules 3745-56-70 to 3745-56-83 of the Administrative Code. Hazardous constituents are constituents identified in the ~~Appendix~~appendix to rule 3745-51-11 of the Administrative Code that are reasonably expected to be in, or derived from, waste placed in or on the treatment zone.
- (C) The permit ~~will~~shall specify the vertical and horizontal dimensions of the treatment zone. The "treatment zone" is the portion of the unsaturated zone below and including the land surface in which the owner or operator intends to maintain the conditions necessary for effective degradation, transformation, or immobilization of hazardous constituents. The maximum depth of the treatment zone ~~must~~shall be both of the following:
- (1) No more than 1.5 meters (five feet) from the initial soil surface; ~~and~~.
 - (2) More than one meter (three feet) above the seasonal high water table.

Effective: 2/12/2018

Five Year Review (FYR) Dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

01/10/2018

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 08/30/1984, 02/11/1992

3745-56-72

Treatment demonstration- land treatment.

- (A) For each waste that ~~will~~shall be applied to the treatment zone, the owner or operator ~~must~~shall demonstrate, prior to application of the waste, that hazardous constituents in the waste can be completely degraded, transformed, or immobilized in the treatment zone.
- (B) In making this demonstration, the owner or operator may use field tests, laboratory analyses, available data, or, in the case of existing units, operating data. If the owner or operator intends to conduct field tests or laboratory analyses in order to make the demonstration required under paragraph (A) of this rule, ~~he must~~the owner or operator shall obtain a treatment or disposal permit. The permit ~~will~~shall specify the testing, analytical, design, and operating requirements (including the duration of the tests and analyses, and, in the case of field tests, the horizontal and vertical dimensions of the treatment zone, monitoring procedures, closure and clean-up activities) necessary to ~~meet the requirements in~~comply with paragraph (C) of this rule.
- (C) Any field test or laboratory analysis conducted in order to make a demonstration under paragraph (A) of this rule ~~must~~shall do all of the following:
- (1) Accurately simulate the characteristics and operating conditions for the proposed land treatment unit including all of the following:
 - (a) The characteristics of the waste including the presence of constituents contained in the ~~Appendix~~appendix to rule 3745-51-11 of the Administrative Code; ~~and~~
 - (b) The climate in the area; ~~and~~
 - (c) The topography of the surrounding area; ~~and~~
 - (d) The characteristics of the soil in the treatment zone (including depth); ~~and~~
 - (e) The operating practices to be used at the unit.
 - (2) Be likely to show that hazardous constituents in the waste to be tested ~~will~~shall be completely degraded, transformed, or immobilized in the treatment zone of the proposed treatment unit; ~~and~~
 - (3) Be conducted in a manner that protects human health and the environment considering all of the following:
 - (a) The characteristics of the waste to be tested; ~~and~~

- (b) The operating and monitoring measures taken during the course of the test;
~~and.~~
- (c) The duration of the test;~~and.~~
- (d) The volume of waste used in the test;~~and.~~
- (e) In the case of field tests, the potential for migration of hazardous constituents to ground water or surface water.

Effective: 2/12/2018

Five Year Review (FYR) Dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

01/10/2018

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 08/30/1984, 02/11/1992

3745-56-73 Design and operating requirements.

The permit will specify how the owner or operator will design, construct, operate, and maintain the land treatment unit in compliance with this rule.

- (A) The owner or operator must design, construct, operate, and maintain the unit to maximize the degradation, transformation, and immobilization of hazardous constituents in the treatment zone. The owner or operator must design, construct, operate, and maintain the unit in accordance with all design and operating conditions that were used in the treatment demonstration under rule 3745-56-72 of the Administrative Code. At a minimum, the permit will specify the following:
 - (1) The rate and method of waste application to the treatment zone; and
 - (2) Measures to control soil pH; and
 - (3) Measures to enhance microbial or chemical reactions (e.g., fertilization, tilling); and
 - (4) Measures to control the moisture content of the treatment zone.
- (B) The owner or operator must design, construct, operate, and maintain the treatment zone to minimize run-off of hazardous constituents during the active life of the land treatment unit.
- (C) The owner or operator must design, construct, operate, and maintain a run-on control system capable of preventing flow onto the treatment zone during peak discharge from at least a twenty-five-year storm.
- (D) The owner or operator must design, construct, operate, and maintain a run-off 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 run-off control systems must be emptied or otherwise managed expeditiously after storms to maintain the design capacity of the system.
- (F) If the treatment zone contains particulate matter which may be subject to wind dispersal, the owner or operator must manage the unit to control wind dispersal.
- (G) The owner or operator must inspect the unit weekly and after storms to detect evidence of:
 - (1) Deterioration, malfunction, or improper operation of run-on and run-off control systems; and
 - (2) Improper functioning of wind dispersal control measures.

Effective: 08/30/1984
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: None

3745-56-76

Food-chain crops- land treatment.

The director may allow the growth of food-chain crops in or on the treatment zone only if the owner or operator satisfies the conditions of this rule. The permit ~~will~~shall specify the specific food-chain crops which may be grown.

- (A) The owner or operator ~~must~~shall demonstrate that there is no substantial risk to human health caused by the growth of such crops in or on the treatment zone by demonstrating, prior to the planting of such crops, that hazardous constituents other than cadmium meet one of the following:
- (1) ~~Will~~Shall not be transferred to the food or feed portions of the crop by plant uptake or direct contact, and ~~will~~shall not otherwise be ingested by food-chain animals (e.g., by grazing); ~~or~~.
 - (2) ~~Will~~Shall not occur in greater concentrations in or on the food or feed portions of crops grown on the treatment zone than in or on identical portions of the same crops grown on untreated soils under similar conditions in the same region.
- (B) The owner or operator ~~must~~shall make the demonstration required under this paragraph prior to the planting of crops at the facility for all constituents identified in the ~~Appendix~~appendix to rule 3745-51-11 of the Administrative Code that are reasonably expected to be in, or derived from, waste placed in or on the treatment zone.
- (C) In making a demonstration under this paragraph, the owner or operator may use field tests, greenhouse studies, available data, or in the case of existing units, operating data, and ~~must~~shall do both of the following:
- (1) Base the demonstration on conditions similar to those present in the treatment zone, including soil characteristics (e.g., pH, cation exchange capacity), specific wastes, application rates, application methods, and crops to be grown; ~~and~~.
 - (2) Describe the procedures used in conducting any tests, including the sample selection criteria, sample size, analytical methods, and statistical procedures.
- (D) If the owner or operator intends to conduct field tests or greenhouse studies in order to make the demonstration required under this paragraph, ~~he must~~the owner or operator shall obtain a permit ~~for conducting~~to conduct such activities.
- (E) The owner or operator ~~must~~shall comply with the following conditions if cadmium is contained in wastes applied to the treatment zone:

(1) The pH of the waste and soil mixture ~~must~~shall be 6.5 or greater at the time of each waste application, except for waste containing cadmium at concentrations of two milligrams per kilogram (mg/kg) (dry weight) or less; and

(a) The annual application of cadmium from waste ~~must~~shall not exceed 0.5 kilograms per hectare (kg/ha) on land used for production of tobacco, leafy vegetables, or root crops grown for human consumption. For other food-chain crops, the annual cadmium application rate ~~must~~shall not exceed the amounts in the following table:

Time	Annual Cd application rate (kilograms per hectare)(kg/ha)
Present to June 30, 1984	2.0
July 1, 1984 to December 31, 1986	1.25
Beginning January 1, 1987	0.5 <u>0.5</u>

(b) The cumulative application of cadmium from waste ~~must~~shall not exceed five kg/ha if the waste and soil mixture has a pH of less than 6.5; and

(c) If the waste and soil mixture has a pH of 6.5 or greater or is maintained at a pH of 6.5 or greater during crop growth, the cumulative application of cadmium from waste ~~must~~shall not exceed: five kg/ha if soil cation exchange capacity (CEC) is less than five milliequivalents per one hundred grams (meq/100g); ten kg/ha if soil CEC is ~~5-15~~five to fifteen meq/100g; and twenty kg/ha if soil CEC is greater than fifteen meq/100g; or

(2) Animal feed ~~must~~shall be the only food-chain crop produced; ~~and the following conditions apply:~~

(a) The pH of the waste and soil mixture ~~must~~shall be 6.5 or greater at the time of waste application or at the time the crop is planted, whichever occurs later, and this pH level ~~must~~shall be maintained whenever food-chain crops are grown; ~~and.~~

(b) There ~~must~~shall be an operating plan which demonstrates how the animal feed ~~will~~shall be distributed to preclude ingestion by humans. The operating plan ~~must~~shall describe the measures to be taken to safeguard against possible health hazards from cadmium entering the food chain, which may result from alternate land uses; ~~and.~~

- (c) Future property owners ~~must~~shall be notified by a stipulation in the land record or property deed which states that the property has received waste at high cadmium application rates and that food-chain crops ~~must~~shall not be grown except in compliance with paragraph (E)(2) of this rule.

Effective: 2/12/2018

Five Year Review (FYR) Dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

01/10/2018

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 08/30/1984, 02/11/1992

3745-56-78 Unsaturated zone monitoring.

An owner or operator subject to rules 3745-56-70 to 3745-56-83 of the Administrative Code must establish an unsaturated zone monitoring program to discharge the following responsibilities:

- (A) The owner or operator must monitor the soil and soil-pore liquid to determine whether hazardous constituents migrate out of the treatment zone.
 - (1) The permit will specify the hazardous constituents to be monitored. The hazardous waste constituents to be monitored are those specified under paragraph (B) of rule 3745-56-71 of the Administrative Code.
 - (2) The director may require monitoring for principal hazardous constituents (PHCs) in lieu of the constituents specified under paragraph (B) of rule 3745-56-71 of the Administrative Code. PHCs are hazardous constituents contained in the wastes to be applied at the unit that are the most difficult to treat, considering the combined effects of degradation, transformation, and immobilization. The director will establish PHCs if he finds, based on waste analysis, treatment demonstration, or other data, that effective degradation, transformation, or immobilization of the PHCs will assure treatment at at least equivalent levels for the other hazardous constituents in the wastes.
- (B) The owner or operator must install an unsaturated zone monitoring system that includes soil monitoring using soil cores and soil-pore liquid monitoring using devices such as lysimeters. The unsaturated zone monitoring system must consist of a sufficient number of sampling points at appropriate locations and depths to yield samples that:
 - (1) Represent the quality of background soil-pore liquid quality and the chemical make-up of soil that has not been affected by leakage from the treatment zone; and
 - (2) Indicate the quality of soil-pore liquid and the chemical make-up of the soil below the treatment zone.
- (C) The owner or operator must establish a background value for each hazardous constituent to be monitored under paragraph (A) of this rule. The permit will specify the background values for each constituent or specify the procedures to be used to calculate the background values.
 - (1) Background soil values may be based on a one-time sampling at a background plot having characteristics similar to those of the treatment zone; and
 - (2) Background soil-pore liquid values must be based on at least quarterly sampling for one year at a background plot having characteristics similar to those of the treatment zone; and

- (3) The owner or operator must express all background values in a form necessary for the determination of statistically significant increases under paragraph (F) of this rule; and
 - (4) In taking samples used in the determination of all background values, the owner or operator must use an unsaturated zone monitoring system that complies with paragraph (B)(1) of this rule.
- (D) The owner or operator must conduct soil monitoring and soil-pore liquid monitoring immediately below the treatment zone. The permit will specify the frequency and timing of soil and soil-pore liquid monitoring after considering the frequency, timing, and rate of waste application, and the soil permeability. The owner or operator must express the results of soil and soil-pore liquid monitoring in a form necessary for the determination of statistically significant increases under paragraph (F) of this rule.
- (E) The owner or operator must use consistent sampling and analysis procedures that are designed to ensure sampling results that provide a reliable indication of soil-pore liquid quality and the chemical make-up of the soil below the treatment zone. At a minimum, the owner or operator must implement procedures and techniques for:
- (1) Sample collection; and
 - (2) Sample preservation and shipment; and
 - (3) Analytical procedures; and
 - (4) Chain of custody control.
- (F) The owner or operator must determine whether there is a statistically significant change over background values of any hazardous constituent to be monitored under paragraph (A) of this rule below the treatment zone each time he conducts soil monitoring and soil-pore liquid monitoring under paragraph (D) of this rule.
- (1) In determining whether a statistically significant increase has occurred, the owner or operator must compare the value of each constituent, as determined under paragraph (D) of this rule, to the background value for that constituent according to the statistical procedure specified in the facility permit under paragraphs (F) to (F)(3)(b) of this rule.
 - (2) The owner or operator must determine whether there has been a statistically significant increase below the treatment zone within a reasonable time period after completion of sampling. The director will specify that time period in the facility permit after considering the complexity of the statistical test and the availability of laboratory facilities to perform the analysis of soil and soil-pore liquid samples.

- (3) The owner or operator must determine whether there is a statistically significant increase below the treatment zone using a statistical procedure that provides reasonable confidence that migration from the treatment zone will be identified. The permit will specify a statistical procedure that:
 - (a) Is appropriate for the distribution of the data used to establish background values; and
 - (b) Provides a reasonable balance between the probability of falsely identifying migration from the treatment zone and the probability of failing to identify real migration from the treatment zone.
- (G) If the owner or operator determines, pursuant to paragraph (F) of this rule, that there is a statistically significant increase of hazardous constituents below the treatment zone, he must:
 - (1) Notify the director of this finding in writing within seven days. The notification must indicate what constituents have shown statistically significant increases; and
 - (2) Within ninety days, submit to the director an application for a permit modification to modify the operating practices at the facility in order to maximize the success of degradation, transformation, or immobilization processes in the treatment zone.
- (H) If the owner or operator determines, pursuant to paragraph (F) of this rule, that there is a statistically significant increase of hazardous constituents below the treatment zone, he may demonstrate that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. While the owner or operator may make a demonstration under paragraphs (H) to (H)(4) of this rule in addition to, or in lieu of, submitting a permit modification application under paragraph (G)(2) of this rule, he is not relieved of the requirement to submit a permit alteration application within the time specified in paragraph (G)(2) of this rule unless the demonstration made under paragraphs (H) to (H)(4) of this rule successfully shows that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. In making a demonstration under paragraphs (H) to (H)(4) of this rule, the owner or operator must:
 - (1) Notify the director in writing within seven days of determining a statistically significant increase below the treatment zone that he intends to make a determination under paragraphs (H) to (H)(4) of this rule; and
 - (2) Within ninety days, submit a report to the director demonstrating that a source other than the regulated units caused the increase or that the increase resulted from error in sampling, analysis, or evaluation; and
 - (3) Within ninety days, submit to the director an application for a permit modification to make any appropriate changes to the unsaturated zone monitoring program at the facility; and

- (4) Continue to monitor in accordance with the unsaturated zone monitoring program established under this rule.

Effective: 12/07/2004
119.032 review date: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: 08/30/1984

3745-56-79 Recordkeeping.

The owner or operator must include hazardous waste application dates and rates in the operating record required under rule 3745-54-73 of the Administrative Code.

Effective: 08/30/1984
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: None

3745-56-80 **Closure and post-closure care.**

(A) During the closure period, the owner or operator must:

- (1) Continue all operations (including pH control) necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone as required under paragraph (A) of rule 3745-56-73 of the Administrative Code, except to the extent such measures are inconsistent with paragraph (A)(8) of this rule; and
- (2) Continue all operations in the treatment zone to minimize run-off of hazardous constituents as required under paragraph (B) of rule 3745-56-73 of the Administrative Code; and
- (3) Maintain the run-on control system required under paragraph (C) of rule 3745-56-73 of the Administrative Code; and
- (4) Maintain the run-off management system required under paragraph (D) of rule 3745-56-73 of the Administrative Code; and
- (5) Control wind dispersal of hazardous waste if required under paragraph (F) of rule 3745-56-73 of the Administrative Code; and
- (6) Continue to comply with any prohibitions or conditions concerning growth of food-chain crops under rule 3745-56-76 of the Administrative Code; and
- (7) Continue unsaturated zone monitoring in compliance with rule 3745-56-78 of the Administrative Code except that soil-pore liquid monitoring may be terminated ninety days after the last application of waste to the treatment zone; and
- (8) Establish a vegetative cover on the portion of the facility being closed at such time that the cover will not substantially impede degradation, transformation, or immobilization of hazardous constituents in the treatment zone. The vegetative cover must be capable of maintaining growth without extensive maintenance.

(B) For the purpose of complying with rule 3745-55-15 of the Administrative Code, when closure is completed the owner or operator may submit to the director certification by an independent, qualified soil scientist, in lieu of ~~an independent registered~~ a qualified professional engineer, that the facility has been closed in accordance with the specifications in the approved closure plan.

(C) During the post-closure care period the owner or operator must:

- (1) Continue all operations (including pH control) necessary to enhance degradation and transformation and sustain immobilization of hazardous constituents in the treatment zone to the extent that such measures are consistent with other post-closure activities; and
 - (2) Maintain a vegetative cover over closed portions of the facility; and
 - (3) Maintain the run-on control system required under paragraph (C) of rule 3745-56-73 of the Administrative Code; and
 - (4) Maintain the run-off management system required under paragraph (D) of rule 3745-56-73 of the Administrative Code; and
 - (5) Control wind dispersal of hazardous waste if required under paragraph (F) of rule 3745-56-73 of the Administrative Code; and
 - (6) Continue to comply with any prohibitions or conditions concerning growth of food-chain crops under rule 3745-56-76 of the Administrative Code; and
 - (7) Continue unsaturated zone monitoring in compliance with rule 3745-56-78 of the Administrative Code except that soil-pore liquid monitoring may be terminated ninety days after the last application of waste to the treatment zone.
- (D) The owner or operator is not subject to regulation under paragraph (A)(8) or (C) of this rule if the director finds that the level of hazardous constituents in the treatment zone soil does not exceed the background value of those constituents by an amount that is statistically significant when using the test specified in paragraph (D)(3) of this rule. The owner or operator may submit such a demonstration to the director at any time during the closure or post-closure care periods. For the purposes of paragraphs (D) to (D)(3)(b) of this rule:
- (1) The owner or operator must establish background soil values and determine whether there is a statistically significant increase over those values for all hazardous constituents specified in the facility permit under paragraph (B) of rule 3745-56-71 of the Administrative Code.
 - (a) Background soil values may be based on a one-time sampling of a background plot having characteristics similar to those of the treatment

zone; and

- (b) The owner or operator must express background values and values for hazardous constituents in the treatment zone in a form necessary for the determination of statistically significant increase under paragraph (D)(3) of this rule.
 - (2) In taking samples used in a determination of background and treatment zone values, the owner or operator must take samples at the sufficient number of sampling points and at appropriate locations and depths to yield samples that represent the chemical make-up of soil that has not been affected by leakage from the treatment zone and the soil within the treatment zone, respectively.
 - (3) In determining whether a statistically significant increase has occurred, the owner or operator must compare the value of each constituent in the treatment zone to the background value for that constituent using a statistical procedure that provides reasonable confidence that constituent presence in the treatment zone will be identified. The owner or operator must use a statistical procedure that:
 - (a) Is appropriate for the distribution of the data used to establish background values; and
 - (b) Provides a reasonable balance between the probability of falsely identifying hazardous constituent presence in the treatment zone and the probability of failing to identify real presence in the treatment zone.
- (E) The owner or operator is not subject to regulation under rules 3745-54-90 to 3745-54-101 of the Administrative Code if the director finds that the owner or operator satisfies paragraph (D) of this rule and if unsaturated zone monitoring under rule 3745-56-78 of the Administrative Code indicates that hazardous constituents have not migrated beyond the treatment zone during the active life of the land treatment unit.

Effective: 09/05/2010

R.C. 119.032 review dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

07/23/2010

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 08/30/1984, 04/01/1990, 10/20/1998, 03/13/2002,
12/07/2004

3745-56-81 Special requirements for ignitable or reactive waste.

The owner or operator must not apply ignitable or reactive waste to the treatment zone unless the waste and the treatment zone meet all applicable requirements of Chapter 3745-270 of the Administrative Code, and:

- (A) The waste is immediately incorporated into the soil so that:
 - (1) The resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under rule 3745-51-21 or 3745-51-23 of the Administrative Code; and
 - (2) Paragraph (B) of rule 3745-54-17 of the Administrative Code is complied with; or
- (B) The waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react.

Effective: 03/13/2002

119.032 review dates: 09/28/2001, Exempt

Promulgated under: 119.03

Statutory authority: 3734.12

Rule amplifies: 3734.12

Prior effective dates: 08/30/1984, 02/11/1992, 12/07/2000

3745-56-82 Special requirements for incompatible wastes.

The owner or operator must not place incompatible wastes, or incompatible wastes and materials in or on the same treatment zone, unless paragraph (B) of rule 3745-54-17 of the Administrative Code is complied with.

Effective: 08/30/1984
119.032 review dates: Exempt
Promulgated under: 119.03
Statutory authority: 3734.12
Rule amplifies: 3734.12
Prior effective dates: None

3745-56-83

Special requirements for hazardous wastes ~~F020, F021, F022, F023, F026, and F027~~F020, F021, F022, F023, F026, and F027- land treatment.

- (A) Hazardous wastes ~~F020, F021, F022, F023, F026, and F027~~ F020, F021, F022, F023, F026, and F027 shall not be placed in a land treatment unit unless the owner or operator operates the facility in accordance with a management plan for these wastes that is approved by the director pursuant to ~~the standards set out in~~ paragraphs (A) to (A)(4) of this rule, and in accordance with all other applicable requirements of Chapters 3745-54 to 3745-57 and 3745-205 of the Administrative Code. The factors to be considered are:
- (1) The volume, physical, and chemical characteristics of the wastes, including ~~their~~the potential for the wastes to migrate through soil or to volatilize or escape into the atmosphere;
 - (2) The attenuative properties of underlying and surrounding soils or other materials;
 - (3) The mobilizing properties of other materials co-disposed with these wastes; ~~and,~~
 - (4) The effectiveness of additional treatment, design, or monitoring techniques.
- (B) The director may determine that additional design, operating, and monitoring requirements are necessary for land treatment facilities managing hazardous wastes ~~F020, F021, F022, F023, F026, and F027~~F020, F021, F022, F023, F026, and F027 in order to reduce the possibility of migration of these wastes to ground water, surface water, or air so as to protect human health and the environment.

Effective: 10/31/2015

Five Year Review (FYR) Dates: Exempt

CERTIFIED ELECTRONICALLY

Certification

10/07/2015

Date

Promulgated Under: 119.03
Statutory Authority: 3734.12
Rule Amplifies: 3734.12
Prior Effective Dates: 01/30/1986, 12/07/2004