

F. Procedures for Requesting a Variance. If requesting a variance from the requirements for secondary containment, the owner or operator shall:

(1) Notify the Secretary in writing of the intent to conduct and submit a demonstration for a variance from secondary containment as allowed in §§A – E of this regulation according to the following schedule:

(a) For existing tank systems, at least 24 months before the date that secondary containment shall be provided in accordance with Regulation .10-4A of this chapter; or

(b) For new tank systems, at least 30 days before entering into a contract for installation;

(2) As part of the notification required by §F(1) of this regulation, submit to the Secretary a description of the steps necessary to conduct the demonstration and a timetable for completing each of the steps;

(3) Address in the demonstration for a variance each of the factors listed in §D or E of this regulation, as appropriate; and

(4) Complete the demonstration for a variance within 180 days after notifying the Secretary of intent to conduct the demonstration.

**.10-6 Leaks, Spills, and Disposition of Leaking or Unfit-for-Use Tank Systems.**

A. The owner or operator of a tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, shall:

(1) Immediately remove the tank system from service;

(2) Immediately stop the flow of hazardous waste into the tank system or secondary containment system;

(3) Inspect the system to determine the cause of the release;

(4) Remove waste from the tank system or secondary containment system in accordance with the following:

(a) If the release was from the tank system, remove all waste within 24 hours after detection of the leak or, if the owner or operator demonstrates that doing so is not possible, remove at the earliest practicable time as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank system; and

(b) If the material was released to a secondary containment system, remove all released materials within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment;

(5) Contain visible releases to the environment by immediately conducting a visual inspection of the release and, based upon the inspection:

(a) Act to prevent further migration of the leak or spill to soils or surface water; and

(b) Remove, and properly dispose of, any visible contamination of the soil or surface water;

(6) Unless the quantity of the leak or spill is 1 pound or less and the leak or spill is immediately contained and cleaned up, file notifications and reports of the incident in accordance with the following:

(a) Report to the Secretary any release to the environment within 24 hours of the release's detection; and

(b) Submit to the Secretary within 30 days of detection of a release to the environment, a report containing the following information:

(i) Likely route of migration of the release,

(ii) Characteristics of the surrounding soil, such as soil composition, geology, and hydrogeology,

(iii) Results of any monitoring or sampling conducted in connection with the release, except that if sampling or monitoring data relating to the release are not available within 30 days, the owner or operator shall submit these data to the Secretary as soon as they become available,

(iv) Proximity to downgradient drinking water, surface water, and populated areas, and

(v) A description of response actions taken or planned;

(7) Close, repair, or provide secondary containment for the tank system in accordance with the following:

(a) Close the tank system in accordance with Regulation .10-7 of this chapter unless the owner or operator satisfies the requirements of §A(7)(b)–(d) of this regulation;

(b) If the cause of the release was a spill that has not damaged the integrity of the system, the owner or operator may return the system to service as soon as the released waste is removed, and repairs, if necessary, have been made;

(c) If the cause of the release was a leak from the primary tank system into the secondary containment system, the owner or operator shall repair the tank system before returning it to service;

(d) If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the owner or operator:

(i) Shall provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of Regulation .10-4 of this chapter before it is returned to service, unless the source of the leak is an above-ground portion of a tank system that can be inspected visually;

(ii) May, if the source is an above-ground component that can be inspected visually, return the component to service without secondary containment as long as the component is repaired and the requirements of §A(8) and (9) of this regulation are satisfied;

(iii) Shall ensure that, if a component is replaced to comply with the requirements of §A(7) of this regulation, the component satisfies the requirements for new tank systems or components in Regulations .10-3 and .10-4 of this chapter; and

(iv) Shall, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection, such as the bottom of an in-ground or on-ground tank, provide the entire component with secondary containment in accordance with Regulation .10-4 of this chapter before returning the tank system to use;

(8) Before returning to service a tank system that has been repaired in accordance with §A(7) of this regulation and for which the repair has been extensive, such as installation of an internal liner or repair of a ruptured primary containment or secondary containment vessel, obtain a certification by an independent, qualified, registered professional engineer in accordance with COMAR 26.13.07.03D that the repaired system is capable of handling hazardous wastes without release for the intended life of the system;

(9) Submit the certification required in §A(8) of this regulation to the Secretary not later than 5 days before the tank system is returned to use.

B. The owner or operator of a tank system for which a variance from secondary containment has been granted in accordance with Regulation .10-5D of this chapter, at which a release of hazardous waste has occurred from the primary tank system but has not migrated beyond the zone of engineering control, as established in the variance, shall:

(1) Comply, except for §A(6) of this regulation, with the other requirements of §A of this regulation;

(2) Decontaminate or remove contaminated soil to the extent necessary to:

(a) Enable the tank system for which the variance was granted to resume operation with the capability for the detection of releases at least equivalent to the capability it had before the release; and

(b) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water; and

(3) Comply with the requirements of Regulation .10-7C of this chapter if contaminated soil cannot be removed or decontaminated in accordance with §B(2) of this regulation.

C. The owner or operator of a tank system for which a variance from secondary containment has been granted in accordance with the requirements of Regulation .10-5D of this chapter, at which a release of hazardous waste has occurred from the primary tank system and has migrated beyond the zone of engineering control, as established in the variance, shall:

(1) Comply with the requirements of §A(1)–(6) of this regulation;

(2) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water, if possible, and decontaminate or remove contaminated soil;

(3) Comply with the requirements of Regulation .10-7C of this chapter if contaminated soil cannot be decontaminated or removed or if ground water has been contaminated; and

(4) Provide, if repairing, replacing, or reinstalling the tank system, secondary containment in accordance with the requirements of Regulation .10-4A—F of this chapter, or reapply for a variance from secondary containment and meet the requirements for new tank systems in Regulation .10-3 of this chapter if the tank system is replaced, even if contaminated soil can be decontaminated or removed and ground water or surface water has not been contaminated.

#### **.10-7 Closure and Post-Closure Care of Tank Systems.**

A. At the closure of a tank system, the owner or operator shall remove or decontaminate all waste residues, contaminated containment system components, contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste, unless COMAR 26.13.02.03D applies.

B. An owner or operator shall ensure that the closure plan, closure activities, cost estimates for closure, and financial responsibility for tank systems meet all of the requirements specified in Regulations .07 and .08 of this chapter.

C. If an owner or operator demonstrates that not all contaminated soils can be practicably removed or decontaminated as required in §A of this regulation, then the owner or operator shall close the tank system and perform post-closure care in accordance with the closure and post-closure care requirements of Regulation .14J of this chapter which apply to landfills. In addition, for the purposes of closure, post-closure, and financial responsibility, the tank system is then considered to be landfill, and the owner or operator shall meet all of the requirements for landfills specified in Regulations .07 and .08 of this chapter.

D. If an owner or operator has a tank system that does not have secondary containment that meets the requirements of Regulations .10-4B—F of this chapter, and has not been granted a variance from the secondary containment requirements in accordance with Regulation .10-5 of this chapter, then the owner or operator shall:

(1) Include in the closure plan for the tank system a:

(a) Plan for complying with §A of this regulation; and

(b) Contingent plan for complying with §C of this regulation;

(2) Prepare and submit as part of the permit application a contingent post-closure plan for complying with §C of this regulation;

(3) Reflect, in the cost estimates calculated for closure and post-closure care, the costs of complying with the contingent closure plan and the contingent post-closure plan, if those costs are greater than the costs of complying with the closure plan prepared for the expected closure under §A of this regulation;

(4) Base financial assurance on the cost estimates developed in accordance with §D(3) of this regulation; and

(5) Ensure that the contingent closure and post-closure plans meet all of the closure, post-closure, and financial responsibility requirements for landfills under Regulations .07 and .08 of this chapter.

#### **.11 Surface Impoundments.**

A. Applicability. This regulation applies to owners and operators of facilities that use surface impoundments to treat, store, or dispose of hazardous waste, except as Regulation .01 of this chapter otherwise provides.

B. General Design Requirements.

(1) A surface impoundment shall be designed to provide:

(a) At least 60 centimeters (2 feet) of freeboard; or

(b) An amount of freeboard other than 60 centimeters based on documentation acceptable to the Secretary that the specified amount of the freeboard will prevent overtopping. The amount of freeboard approved by the Secretary shall be specified in the permit.

(2) A surface impoundment shall be designed so that any flow of waste into the impoundment can be immediately shut off in the event of overtopping or liner failure.

(3) A surface impoundment shall be designed to prevent discharge into the land and ground water, and to surface water (except discharges authorized by a State discharge permit) during the life of the impoundment by use of a containment system which complies with §D of this regulation. The Secretary shall include the design of the containment system as a term and condition of the permit.

26.13.05.11

(4) Dikes shall be designed with sufficient structural integrity to prevent massive failure without dependence on any liner system included in the surface impoundment design.

(5) For a surface impoundment, except for an existing portion of a surface impoundment, a leachate detection, collection, and removal system shall be designed so that liquid will flow freely from the collection system to prevent the creation of pressure head within the collection system in excess of that necessary to cause the liquid to flow freely.

(6) The owner or operator would be exempted from the requirements of §B(3) of this regulation, if the Secretary finds, based on a demonstration by the owner or operator, the alternate design and operating practices, together with location characteristics, will prevent the migration of the hazardous constituents (see COMAR 26.13.05.06-1B) into the ground water or surface water at any future time. In deciding whether to grant an exemption, the Secretary will consider:

(a) The nature and quantity of the wastes;

(b) The proposed alternate design and operation;

(c) 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

(d) 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.

(7) Any facility or facility unit subject to this regulation shall be constructed and installed as designed.

#### C. General Operating Requirements.

(1) A surface impoundment shall be operated to prevent any overtopping due to wind and wave action, overfilling precipitation, or normal or abnormal operations, malfunction of level controllers, alarms, and other equipment, or human error.

(2) A surface impoundment shall maintain enough freeboard to prevent any overtopping of the dike by overfilling, wave action, malfunctions of level controllers, alarms, and other equipment, human error, or a storm. There shall be at least 60 centimeters (2 feet) of freeboard.

(3) A surface impoundment shall be operated to maintain at least the amount of freeboard specified by the Secretary in the permit.

(4) For a surface impoundment, except for an existing portion of a surface impoundment, a leachate detection, collection, and removal system installed to comply with §D of this regulation shall be operated so that leachate flows freely from the collection system and is removed as it accumulates or with sufficient frequency to prevent backwater within the collection system.

(5) Earthen dikes shall be kept free of:

(a) Perennial woody plants with root systems which could displace the earthen materials upon which the structural integrity of the dike is dependent; and

(b) Burrowing mammals which could remove earthen materials upon which the structural integrity of the dike is dependent or create leaks through burrows in the dike.

(6) Run-on shall be diverted away from a surface impoundment.

#### D. Containment Systems.

(1) Earthen dikes shall have a protective cover, such as grass, shale, or rock, to minimize wind and water erosion and to preserve the structural integrity of the dike.

(2) The owner or operator of a surface impoundment, except for an existing portion of a surface impoundment or a surface impoundment covered by COMAR 26.13.06.19D(1) and (2), shall construct a liner system designed to prevent discharge into the land during the life of the surface impoundment:

(a) With:

(i) A highly impermeable liner system in contact with the waste which will prevent the discharge of the waste or leachate into the liner or liners during the life of the surface impoundment based on the liner or liners' thickness, the saturated permeability of the liner or liners, and the pressure head of waste or leachate to which the liner or liners will be exposed; and

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.11

(ii) A leachate detection, collection, and removal system beneath the liner or liners in contact with the waste to detect, contain, collect, and remove any discharge from the liner system in contact with the waste; and

(b) Above the water table, which may be controlled to comply with this requirement, to ensure the detection of any discharge of waste or leachate through the liner system in contact with the waste, prevent the discharge of ground water to the leachate detection, collection, and removal system, and to preserve the structural integrity of the liner or liners.

(3) A highly impermeable liner beneath the drainage layer (for example, the bottom liner) is a necessary part of a leachate detection, collection, and removal system.

(4) The owner or operator of each new surface impoundment, each new surface impoundment unit at an existing facility, each replacement of an existing surface impoundment unit, and each lateral expansion of an existing surface impoundment unit, shall install two or more liners and a leachate collection system between the liners. The liners and leachate collection system shall protect human health and the environment. The requirements of this section shall apply with respect to all waste received after the issuance of the permit. The requirement for the installation of two or more liners in this subsection may be satisfied by the installation of a top liner designed, operated, and constructed of materials to prevent the migration of any constituent into the liner during the period the facility remains in operation, including any post-closure monitoring period, and a lower liner designed, operated, and constructed to prevent the migration of any constituent through the liner during this period. For the purpose of the preceding sentence, a lower liner shall be deemed to satisfy this requirement if it is constructed of at least a 3-foot thick layer of recompacted clay or other natural material with a hydraulic conductivity of no more than  $1 \times 10^{-7}$ th centimeter per second.

(5) Section D(4) of this regulation does not apply if the owner or operator demonstrates to the Secretary and the Secretary finds for the surface impoundment, that alternative design and operating practices, together with location characteristics, 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 systems.

(6) The double liner requirement set forth in §D(4) of this regulation may be waived by the Secretary for any monofill, if the monofill contains only hazardous wastes from foundry furnace emission controls or metal casting molding sand, and the wastes do not contain constituents which would render the wastes hazardous for reasons other than the toxicity characteristic in COMAR 26.13.02, and one of the following applies:

(a) All of the following:

(i) The monofill has at least one liner, as defined in §D(7) of this regulation, for which there is no evidence that the liner is leaking;

(ii) The monofill is located more than 1/4 mile from an underground source of drinking water as that term is defined in 40 CFR §144.3;

(iii) The monofill is in compliance with generally applicable ground water monitoring requirements for facilities with permits under COMAR 26.13.07;

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

(7) For the purposes of this section, 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 active life of the facility.

(8) In the case of any surface impoundment which has been exempted from the requirements of §D(4) of this regulation on the basis of a liner designed, constructed, installed, and operated to prevent hazardous waste from passing beyond the liner, at the closure of the impoundment, the owner or operator shall 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 the impoundment shall comply with appropriate post-closure requirements, including but not limited to ground water monitoring and corrective action.

(9) A containment system shall have a containment life equal to or greater than the life of the surface impoundment. (See "Landfill and Surface Impoundment Performance Evaluation", EPA, SW/869, September 1980 for methods to evaluate the containment life and effectiveness of a containment system.)

26.13.05.11

## (10) Liner systems shall be:

(a) Constructed of materials which have appropriate chemical properties and strength and of sufficient thickness to prevent failure due to pressure head, physical contact with the waste or leachate to which they are exposed, climatic conditions, and the stress of the installation and daily operations;

(b) Constructed on a foundation capable of providing support to the liner or liners and resistance to the pressure head above the liner or liners to prevent failure of the liner or liners due to settlement, compression, or uplift (see "Lining of Water Impoundment and Disposal Facilities", EPA/870, September 1980 for data and discussion of liner system materials, design, construction, operation, and maintenance);

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

(11) The sides and bottom of the impoundment shall be constructed of a material which prohibits the discharge of contaminants to ground water unless specifically authorized by a State discharge permit.

E. Waste Analysis and Trial Test. In addition to the waste analyses required by Regulation .02D, of this chapter, whenever a surface impoundment is to be used to chemically treat a hazardous waste which is substantially different from waste previously treated in that impoundment, or chemically treat hazardous waste with a substantially different process than any previously used in that impoundment, the owner or operator shall, before treating the different waste or using the different process:

(1) Conduct waste analyses and trial treatment tests (for example, bench scale or pilot plant scale tests); or

(2) Obtain written documented information on similar treatment of similar waste under similar operation conditions to show that this treatment will comply with Regulation .02H(2) of this chapter.

## F. Inspections and Testing.

## (1) Liners.

(a) During construction or installation, for purposes of this section, liners (except for existing portions of surface impoundments exempt from liner installation) shall include all cover systems, membranes, sheets, and/or coatings.

(b) During construction or installation, liner systems shall be inspected for uniformity, damage, and imperfections (for example, holes, cracks, thin spots, and foreign materials).

(c) Earth material liner systems shall be tested for compaction density, moisture content, and permeability after placement.

(d) Manufactured liner materials (for example, membranes, sheets, and coatings) shall be inspected to ensure tight seams and joints and the absence of tears or blisters.

## (2) The owner or operator shall inspect:

(a) A surface impoundment which contains free liquids at least once each operating day to ensure compliance with §C(1)—(3) of this regulation, and to detect any leaks or other failures of the impoundment.

(b) Each surface impoundment including dikes, berms, and vegetation surrounding the dike, at least once a week and after storms to detect any evidence of or potential for leaks from the impoundment erosion of dikes, and to ensure compliance with §C(4).

(3) The structural integrity of any dike, including that portion of that dike which provides any freeboard, shall be certified against massive failure by a qualified engineer before the issuance or reissuance of a permit, or if the impoundment is not in service before being placed in service and after construction or before being returned to service. In certifying the structural integrity of the dike it shall be established that the dike will withstand the following:

(a) The stress of the pressure head of liquids placed into the impoundment;

(b) The weakening effect of earth materials being scoured due to leakage from the impoundment through and under the dike without relying on any liner system; and

(c) The weakening effect of earth materials being scoured due to leakage from the impoundment through and under the dike assuming leaks develop in the liner system.

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.11

(4) The requirements of §F(3) of this regulation shall be followed, at a minimum, at 6-month intervals after the initial certification.

G. Closure and Post-Closure Care.

(1) At closure, the owner or operator shall:

(a) Remove or decontaminate all waste residues, contaminated containment system components (liner, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless COMAR 26.13.02.03D applies, or he shall do §G(1)(b)–(c) if all hazardous waste is not removed or decontaminated;

(b) Eliminate free liquids by removing liquid wastes or solidifying the remaining wastes and waste residues;

(c) Stabilize remaining wastes to a bearing capacity sufficient to support final cover;

(d) Cover the surface impoundment with a final cover designed and constructed to at a minimum:

(i) Provide long-term minimization of the migration of liquids through the closed impoundment,

(ii) Function with minimum maintenance,

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

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

(v) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present; and any other requirements established by the Secretary; and

(e) Apply for a permit pursuant to Regulation .14 of this chapter and COMAR 26.13.07.

(2) If some waste residues or contaminated materials are left in place at final closure, the owner or operator shall comply with all post-closure requirements contained in Regulation .07 including maintenance and monitoring throughout the post-closure care period. The owner or operator shall:

(a) 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;

(b) Maintain and monitor the leak detection system, where such a system is present between double liner systems;

(c) Maintain and monitor the ground water monitoring system and comply with all applicable requirements of Regulations .06—.06-7 of this chapter;

(d) Prevent run-on and run-off from eroding or otherwise damaging the final cover.

(3) If an owner or operator plans to close a surface impoundment in accordance with §G(1)(a), of this regulation, and the impoundment does not comply with the liner requirements of §D(2)—(5) of this regulation, then:

(a) The closure plan for the impoundment under Regulation .07C of this chapter shall include both a plan for complying with §G(1)(a) and a contingency plan for complying with §G(1)(b)—(e) of this regulation if not all contaminated subsoils can be practicably removed at closure.

(b) The owner or operator shall prepare a contingency post-closure plan under Regulation .07H for complying with §G(2) if not all contaminated subsoils can be practicably removed at closure.

(c) The cost estimates calculated under Regulation .08 for closure and post-closure care of an impoundment subject to this paragraph shall 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 §G(1)(a) of this regulation.

(4) During the post-closure care period, if liquids leak into a leak detection system the owner or operator shall notify the Secretary of the leak within 24 hours after detecting the leak. The Secretary shall modify the permit to require compliance with the requirements of Regulations .06—.06-7 of this chapter.

H. Containment System Repairs; Contingency Plans.

(1) Whenever there is any indication of a possible failure of the containment system, the system shall be inspected in accordance with the provisions of the containment system evaluation and repair plan required by this section. Indications of possible failure of the containment system include at least an unplanned and non-sudden drop in the liquid level in the

26.13.05.11

impoundment, liquid detected in the leachate detection system, evidence of leakage or the potential for leakage in the dike, erosion of the dike, apparent or potential deterioration of the liner or liners based on observation or test samples of the liner materials, any mishandling of wastes placed in the impoundment, and foreign objects in the impoundment.

(2) Whenever there is a positive indication of failure of the containment system, the impoundment shall be removed from service. Indications of positive failure of the containment system include an unplanned sudden drop in the liquid level in the impoundment, waste detected in the leachate detection system, active leakage through the dike, or a breach (for example, a hole, tear, crack, or separation) in the liner system.

(3) If the surface impoundment must be removed from service as required by §H(2), of this regulation, the owner or operator shall:

- (a) Immediately shut off flow of or stop the addition of waters into the impoundment;
- (b) Immediately contain any leakage which occurred or is occurring;
- (c) Immediately cause the leak to be stopped;
- (d) If the leak cannot be stopped by any other means, empty the impoundment;
- (e) Take any other necessary steps to stop or prevent catastrophic failure; and
- (f) Notify the Secretary of the problems within 24 hours after detecting the problem.

(4) As part of the contingency plan required in Regulation .04, of this chapter, the owner or operator shall specify:

- (a) A procedure for complying with the requirements of §H(3) of this regulation;
- (b) A containment system evaluation and repair plan describing testing and monitoring techniques, procedures to be followed to evaluate the integrity of the containment system in the event of possible failure, a schedule of actions to be taken in the event of a possible failure, and a description of the repair techniques to be used in the event of leakage due to containment system failure or deterioration which does not require the impoundment to be removed from service.

(5) A surface impoundment that has been removed from service in accordance with the requirements of this section may not be restored to service unless the portion of the impoundment which was failing is repaired and the following steps are taken:

- (a) If the impoundment was removed from service as the result of actual or imminent dike failure, the dike's structural integrity shall be recertified in accordance with §F(3) of this regulation;
- (b) If the impoundment was removed from service as the result of a sudden drop in the liquid level, then:
  - (i) For any existing portion of the impoundment, a liner shall be installed in compliance with §D(5) of this regulation;
  - (ii) For any other portion of the impoundment, the repaired liner system shall be certified by a qualified engineer as meeting the design specifications approved in the permit.

(6) A surface impoundment that has been removed from service in accordance with §H(2) of this regulation and that is not being repaired shall be closed in accordance with §G of this regulation.

I. Special Requirements for Ignitable or Reactive Waste. Ignitable or reactive waste may not be placed in a surface impoundment, unless the:

(1) 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 wastes under COMAR 26.13.02.11 or .13, and Regulation .02H of this chapter is complied with; or

(2) Surface impoundment is used solely for emergencies.

J. Special Requirements for Incompatible Waste. Incompatible wastes, or incompatible wastes and materials (see Regulation .24 for examples), may not be placed in the same surface impoundment, unless Regulation .02H(2) of this chapter is complied with.

K. Special Requirements for Hazardous Wastes F020, F021, F022, F023, F026, and F027.

(1) Hazardous Wastes F020, F021, F022, F023, F026, and F027 may 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



## DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.12

the Secretary under the standards set out in this section, and in accordance with all other applicable requirements of this chapter. The factors to be considered are:

- (a) The volume, physical, and chemical characteristics of the wastes including their potential to migrate through soil or to volatilize or escape into the atmosphere;
- (b) The attenuative properties of underlying and surrounding soils or other materials;
- (c) The mobilizing properties of other materials co-disposed with these wastes; and
- (d) The effectiveness of additional treatment, design, or monitoring techniques.

(2) The Secretary 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.

### .12 Waste Piles.

#### A. Applicability.

(1) This regulation applies to owners and operators of facilities that store or treat hazardous waste in piles, except as Regulation .01 of this chapter provides otherwise.

(2) 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 §§B and D of this regulation and Regulations .06-- .06-7 of this chapter if:

- (a) Liquids or materials containing free liquids are not placed in the pile;
- (b) The pile is protected from surface water run-on by the structure or in some other manner;
- (c) The pile is designed and operated to control dispersal of the waste by wind, when necessary, by means other than wetting; and
- (d) The pile does not generate leachate through decomposition or other reactions.

#### B. Design and Operating Requirements.

(1) A waste pile except for an existing portion of a waste pile, shall have:

(a) 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 shall be:

(i) 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;

(ii) 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

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

(b) 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 Secretary will specify design and operating conditions in the permit to ensure that the leachate depth over the liner does not exceed 30 cm (1 foot). The leachate collection and removal system shall be:

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

(ii) Designed and operated to function without clogging through the scheduled closure of the waste pile.

(c) A containment system which complies with §D of this regulation.

26.13.05.12

(2) The owner or operator will be exempted from the requirements of §B(1) of this regulation if the Secretary 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 Regulation .06-1B of this chapter) into the ground water or surface water at any future time. In deciding whether to grant an exemption, the Secretary shall consider:

- (a) The nature and quantity of the wastes;
- (b) The proposed alternate design and operation;
- (c) 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
- (d) 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.

(3) The owner or operator shall 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 25-year storm.

(4) The owner or operator shall design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

(5) Collection and holding facilities (for example, tanks or basins) associated with run-on and run-off control systems shall be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.

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

(7) The Secretary will specify in the permit all design and operating practices that are necessary to ensure that the requirements of this section are satisfied.

C. Waste Analysis. In addition to the waste analysis required by Regulation .02D, of this chapter, the owner or operator shall analyze a representative sample of waste from each incoming movement before adding the waste to any existing pile, unless the only wastes the facility receives which are amenable to piling are compatible with each other, or the waste received is compatible with the waste in the pile to which it is to be added. This analysis conducted shall be capable of differentiating between the types of hazardous waste the owner or operator places in piles, so that mixing of incompatible waste does not inadvertently occur. The analysis shall include a visual comparison of color and texture.

#### D. Containment Systems.

(1) A containment system shall be designed, constructed, maintained, and operated to prevent discharge into the land, surface water, or ground water during the life of the waste pile. This includes the following:

(a) The system shall consist of a leachate and run-off collection and control system, and either:

(i) A base underlying and in contact with the waste pile that is made of a liner or liners which will prevent discharge into the land, surface water, or ground water during the life of the pile based on the liner or liners' thickness, the permeability of the liner or liners and the characteristics of the waste or leachate to which the liner or liners will be exposed. The liner or liners shall be of sufficient strength and thickness to prevent failure due to puncture, cracking, tearing, or other physical damage from equipment used to place waste in or on the pile, or to clean and expose the liner surface for inspection.

(ii) A base as in §D(1)(a)(i), of this regulation, except that the liner or liners need not be of sufficient strength and thickness to prevent failure due to physical damage from equipment used to clean and expose the liner surface for inspection, and a leachate detection, collection, and removal system beneath the base to detect, contain, collect, and remove any discharge from the base. The leachate detection, collection, and removal system shall be placed above the water table to ensure the detection of any discharge through the base, to prevent any discharge of ground water into the leachate detection, collection, and removal system, and to protect the structural integrity of the base.

(b) A highly impermeable liner beneath the drainage layer is a necessary part of the leachate detection, collection, and removal system. The ground water table may be controlled to comply with this requirement.

(2) A waste pile base shall be constructed:

(a) Of materials that have appropriate chemical properties and strength and of sufficient thickness to prevent failure due to pressure of and physical contact with the waste to which they are exposed, climatic conditions, and the stress of installation; and

(b) On a foundation capable of providing support to the liner or liners and to loads placed or moving above the liner or liners to prevent failure of the liner or liners due to settlement or compression.

(3) A containment system shall be protected from plant growth which could puncture any component of the system.

(4) A containment system shall have a containment life equal to or greater than the life of the pile.

E. Inspections and Testing.

(1) During construction or installation of the waste pile base, except in the case of an existing portion of a waste pile exempt from the requirements of §B(1), of this regulation, and immediately after installation:

(a) Liner systems and covers shall be inspected for uniformity, damage, and imperfections (for example, holes, cracks, thin spots, and foreign materials);

(b) Manufactured liner materials and covers (for example, membranes, sheets, and coatings) shall be inspected to ensure tight seams and joints and the absence of tears or blisters; and

(c) Soil-based and admixed liners and covers shall 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.

(2) Except as otherwise provided in §E(3), of this regulation, the owner or operator of a waste pile shall include in the inspection plan required under Regulation .02 of this chapter. A schedule of inspection of the devices controlling wind dispersal (if required) and run-on, and the waste pile containment system under §D of this regulation. The inspection schedule shall include periodic removal of the waste pile and testing of the underlying base to ensure that it has not deteriorated to the point where it is no longer capable of containment, is already leaking, or is otherwise in disrepair.

(3) If it is impractical to remove the waste pile and test the underlying base periodically because of the size of the pile or the type of base used (for example, a synthetic membrane which could be damaged during waste removal), the owner or operator may omit the pile base inspection from his inspection plan, provided that the pile has a leachate detection, collection, and removal system as specified in §D(1)(a)(ii) of this regulation.

(4) While a waste pile is in operation, it shall be inspected weekly and after storms to detect evidence of any of the following:

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

(b) The presence of liquids in leak detection systems, if installed;

(c) Proper functioning of wind dispersal control systems, if present; and

(d) The presence of leachate in and proper functioning of leachate collection and removal systems, if present.

F. Containment System Repairs, Contingency Plans.

(1) Whenever there is an indication of a possible failure of the containment system, the system shall be inspected in accordance with the provisions of the containment system evaluation and repair plan required by §F(4) of this regulation. Indications of possible failure of the containment system include liquid detected in the leachate detection system (when applicable), evidence of leakage or the potential for leakage in the base, erosion of the base, or apparent or potential deterioration of the liner and liners based on observation or test samples of the liner materials.

(2) Whenever there is a positive indication of a failure of the containment system, the waste pile shall be removed from service. Indications of positive failure of containment system include waste detected in the leachate detection system (when applicable), or a breach (for example, a hole, tear, crack, or separation) in the base.

(3) If the waste pile must be removed from service as required by §F(2), of this regulation, the owner or operator shall:

(a) Immediately stop adding wastes to the pile;

(b) Immediately contain any leakage which has or is occurring;

26.13.05.12

(c) Immediately cause the leak to be stopped; and

(d) If the leak cannot be stopped by another means, remove the waste from the base.

(4) As a part of the contingency plan required in Regulation .04, of this chapter, the owner or operator shall specify:

(a) A procedure for complying with the requirements of §F(3) of this regulation; and

(b) A containment system evaluation and repair plan describing:

(i) Testing and monitoring techniques;

(ii) Procedures to be followed to evaluate the integrity of the containment system in the event of a possible failure;

(iii) A schedule of actions to be taken in the event of a possible failure; and

(iv) A description of the repair techniques to be used in the event of leakage due to containment system failure or deterioration which does not require the waste pile to be removed from service.

(5) A waste pile that has been removed from service in accordance with §F(2) of this regulation may not be restored to service unless the containment system has been:

(a) Repaired; and

(b) Certified by a qualified engineer as meeting the design specifications approved in the permit.

(6) A waste pile that has been removed from service in accordance with §F(2) of this regulation and that is not being repaired shall be closed in accordance with §I of this regulation.

G. Special Requirements for Ignitable or Reactive Waste. Ignitable or reactive waste may not be placed in a pile unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the pile so that:

(a) The resulting waste, mixture, or dissolution of materials no longer meets the definition of ignitable or reactive waste under COMAR 26.13.02.11 and .13; and

(b) Regulation .02H of this chapter is complied with; or

(2) 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.

H. Special Requirements for Incompatible Wastes.

(1) Incompatible wastes, or incompatible wastes and materials, (see Regulation .24 of this chapter, for examples) may not be placed in the same pile, unless Regulation .02H(2) of this chapter is complied with.

(2) 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.

(3) Hazardous waste may not be piled on the same area where incompatible wastes or materials were previously piled, unless the area has been decontaminated sufficiently to ensure compliance with Regulation .02H(2) of this chapter.

I. Closure and Post-Closure Care.

(1) At closure, the owner or operator shall 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 COMAR 26.13.02.03D applies.

(2) 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 §I(1), of this regulation, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he shall close the facility and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills.

(3) The owner or operator of a waste pile that does not comply with the liner requirements of §B(1)(a) of this regulation and is not exempt from them in accordance with §A(2) or B(2) of this regulation shall:

(a) Include in the closure plan for the pile under Regulation .07C of this chapter, both a plan for complying with §I(1) of this regulation and a contingency plan for complying with §I(2) of this regulation if not all contaminated subsoils can be practicably removed at closure; and

(b) Prepare a contingency post-closure plan under Regulation .07H of this chapter for complying with §I(2) of this regulation, if not all contaminated subsoils can be practicably removed at closure.

(4) The cost estimates calculated under Regulation .08 of this chapter for closure and post-closure care of a pile subject to §I(3) of this regulation shall include the cost of complying with the contingent closure plan and the contingency post-closure plan, but are not required to include the cost of expected closure under §I(1) of this regulation.

J. Special Requirements for Hazardous Wastes F020, F021, F022, F023, F026, and F027.

(1) Hazardous Waste F020, F021, F022, F023, F026, and F027 may not be placed in waste piles that are not enclosed as defined in §A(2) of this regulation unless the owner or operator operates the waste pile in accordance with a management plan for these wastes that is approved by the Secretary under the standards set out in this section, and in accord with all other applicable requirements of this chapter. The factors to be considered are:

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

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

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

(d) The effectiveness of additional treatment, design, or monitoring techniques.

(2) The Secretary 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.

**.13 Land Treatment.**

A. Applicability. This regulation applies to owners and operators of facilities that treat or dispose of hazardous waste in land treatment units, except as Regulation .01 provides otherwise.

B. Treatment Program.

(1) An owner or operator subject to this regulation 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 Secretary will specify in the facility permit the elements of the treatment program, including:

(a) The wastes that are capable of being treated at the unit based on a demonstration under §C of this regulation;

(b) Design measures and operating practices necessary to maximize the success of degradation, transformation, and immobilization processes in the treatment zone in accordance with §D(1) of this regulation; and

(c) Unsaturated zone monitoring provisions meeting the requirements of §I of this regulation.

(2) The Secretary will specify in the facility permit the hazardous constituents that shall be degraded, transformed, or immobilized under this regulation. Hazardous constituents are constituents identified in COMAR 26.13.02.24 that are reasonably expected to be in, or derived from, waste placed in or on the treatment zone.

(3) The Secretary will specify the vertical and horizontal dimensions of the treatment zone in the facility permit. 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 shall be:

(a) Not more than 1.5 meters (5 feet) from the initial soil surface; and

(b) More than 1 meter (3 feet) above the seasonal high water table.

26.13.05.13

## C. Treatment Demonstration.

(1) For each waste that will be applied to the treatment zone, the owner or operator shall demonstrate, before application of the waste, that hazardous constituents in the waste can be completely degraded, transformed, or immobilized in the treatment zone.

(2) 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 §C(1), of this regulation, he shall obtain a treatment or disposal permit under COMAR 26.13.07.02--.19. The Secretary will specify in this permit 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 §C(3) of this regulation.

(3) Any field test or laboratory analysis conducted in order to make a demonstration under §C(1) of this regulation shall:

(a) Accurately simulate the characteristics and operating conditions for the proposed land treatment unit including the:

- (i) Characteristics of the waste (including the presence of constituents in COMAR 26.13.02.24);
- (ii) Climate in the area;
- (iii) Topography of the surrounding area;
- (iv) Characteristics of the soil in the treatment zone (including depth); and
- (v) Operating practices to be used at the unit;

(b) Be likely to show that hazardous constituents in the waste to be tested will be completely degraded, transformed, or immobilized in the treatment zone of the proposed land treatment unit; and

(c) Be conducted in a manner that protects human health and the environment considering:

- (i) The characteristics of the waste to be tested;
- (ii) The operating and monitoring measures taken during the course of the test;
- (iii) The duration of the test;
- (iv) The volume of waste used in the test;
- (v) In the case of field tests, the potential for migration of hazardous constituents to ground water or surface water.

## D. Design and Operating Requirements.

(1) The Secretary will specify in the facility permit how the owner or operator will design, construct, operate, and maintain the land treatment unit in compliance with this section.

(2) The owner and operator shall 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 shall design, construct, operate, and maintain the unit in accord with all design and operating conditions that were used in the treatment demonstration under §C of this regulation. At a minimum, the Secretary will specify the following in the facility permit:

- (a) The rate and method of waste application to the treatment zone;
- (b) Measures to control soil pH;
- (c) Measures to enhance microbial or chemical reactions (for example, fertilization, tilling); and
- (d) Measures to control the moisture content of the treatment zone.

(3) The owner or operator shall design, construct, operate, and maintain the treatment zone to minimize run-off of hazardous constituents during the active life of the land treatment unit.

(4) The owner or operator shall 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 25-year storm.

(5) The owner or operator shall design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.13

(6) Collection and holding facilities (for example, tanks or basins) associated with run-on and run-off control systems shall be emptied or otherwise managed expeditiously after storms to maintain the design capacity of the system.

(7) If the treatment zone contains particulate matter which may be subject to wind dispersal, the owner or operator shall manage the unit to control wind dispersal.

(8) The owner or operator shall inspect the unit weekly and after storms to detect evidence of:

- (a) Deterioration, malfunctions, or improper operation of run-on and run-off control systems; and
- (b) Improper functioning of wind dispersal control measures.

E. F. (Reserved)

G. Food-Chain Crops.

(1) The Secretary may allow the growth of food-chain crops in or on the treatment zone only if the owner or operator satisfies the condition of this section. The Secretary will specify in the facility permit the specific food-chain crops which may be grown.

(2) The owner or operator shall demonstrate that there is no substantial risk to human health caused by the growth of these crops in or on the treatment zone by demonstrating, before the planting of the crops, that hazardous constituents other than cadmium will not:

- (a) Be transferred to the food or feed portions of the crop by plant uptake or direct contact, and will not otherwise be ingested by food-chain animals (for example, by grazing); or
- (b) 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.

(3) The owner or operator shall make the demonstration required under §G(2) of this regulation before the planting of crops at the facility for all constituents identified in COMAR 26.13.02.24 that are reasonably expected to be in, or derived from, waste placed in or on the treatment zone.

(4) In making a demonstration under §G(2), of this regulation, the owner or operator may use field tests, greenhouse studies available data, or, in the case of existing units, operating data, and shall:

- (a) Base the demonstration on conditions similar to those present in the treatment zone, including soil characteristics (for example, pH, cation exchange capacity), specific wastes, application rates, application methods, and crops to be grown; and
- (b) Describe the procedures used in conducting any tests, including the sample selection criteria, sample size, analytical methods, and statistical procedures.

(5) If the owner or operator intends to conduct field tests or greenhouse studies in order to make the demonstration required under §G(2), of this regulation, he shall obtain a permit for conducting these activities.

(6) The owner or operator shall comply with the following conditions if cadmium is contained in wastes applied to the treatment zone:

(a) The pH of the waste and soil mixture shall be 6.5 or greater at the time of each waste application, except for waste containing cadmium at concentrations of 2 mg/kg (dry weight) or less;

(b) The annual application of cadmium from waste may 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 may not exceed:

<i>Time Period</i>	<i>Annual Cd Application Rate (kg/ha)</i>
Present to June 30, 1984	2.0
July 1, 1984 to Dec. 31, 1986	1.25
Beginning Jan. 1, 1987	0.5

DEPARTMENT OF THE ENVIRONMENT

26.13.05.13

(c) The cumulative application of cadmium from waste may not exceed 5 kg/ha if the waste and soil mixture has a pH of less than 6.5; and

(d) 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 may not exceed:

(i) 5 kg/ha if soil cation exchange capacity (CEC) is less than 5 meq/100g;

(ii) 10 kg/ha if soil CEC is 5-15 meq/100g; and

(iii) 20 kg/ha if soil CEC is greater than 15 meq/100g; or

(e) Animal feed shall be the only food-chain crop produced:

(i) The pH of the waste and soil mixture 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 shall be maintained whenever food-chain crops are grown.

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

(iii) Future property owners 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 may not be grown except in compliance with §G(5)(c).

H. (Reserved)

I. Unsaturated Zone Monitoring. An owner or operator subject to this regulation shall establish an unsaturated zone monitoring program to discharge the following responsibilities:

(1) Monitoring.

(a) The owner or operator shall monitor the soil and soil-pore liquid to determine whether hazardous constituents migrate out of the treatment zone.

(b) The Secretary will specify the hazardous constituents to be monitored in the facility permit. The hazardous constituents to be monitored are those specified under §B(2) of this regulation.

(c) The Secretary may require monitoring for principal hazardous constituents (PHCs) instead of the constituents specified under §B(2) of this regulation. 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 Secretary will establish PHCs if he finds, based on waste analyses, treatment demonstrations, 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.

(2) Installation of System. The owner or operator shall 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 shall consist of a sufficient number of sampling points at appropriate locations and depths to yield samples that:

(a) 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

(b) Indicate the quality of soil-pore liquid and the chemical make-up of the soil below the treatment zone.

(3) Establishment of Background Value.

(a) The owner or operator shall establish a background value for each hazardous constituent to be monitored under §I(1). The permit will specify the background values for each constituent or specify the procedures to be used to calculate the background values.

(b) Background soil values may be based on a one-time sampling at a background plot having characteristics similar to those of the treatment zone.

(c) Background soil-pore liquid values shall be based on at least quarterly sampling for 1 year at a background plot having characteristics similar to those of the treatment zone.



DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.13

(d) The owner or operator shall express all background values in a form necessary for the determination of statistically significant increases under §I(6) of this regulation.

(e) In taking samples used in the determination of all background values, the owner or operator shall use an unsaturated zone monitoring system that complies with §I(2)(a) of this regulation.

(4) The owner or operator shall conduct soil monitoring and soil-pore liquid monitoring immediately below the treatment zone. The Secretary will specify the frequency and timing of soil and soil-pore liquid monitoring in the facility permit after considering the frequency, timing, and rate of waste application, and the soil permeability. The owner or operator shall express the results of soil and soil-pore liquid monitoring in a form necessary for the determination of statistically significant increases under §I(6).

(5) The owner or operator shall 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 shall implement procedures and techniques for:

- (a) Sample collection;
- (b) Sample preservation and shipment;
- (c) Analytical procedures; and
- (d) Chain of custody control.

(6) Background Values.

(a) The owner or operator shall determine whether there is a statistically significant change over background values for any hazardous constituent to be monitored under §I(1) of this regulation the treatment zone each time he conducts soil monitoring and soil-pore liquid monitoring under §I(4) of this regulation.

(b) In determining whether a statistically significant increase has occurred, the owner or operator shall compare the value of each constituent, as determined under §I(4), of this regulation, to the background value for that constituent according to the statistical procedure specified in the facility permit under this paragraph.

(c) The owner or operator shall determine whether there has been a statistically significant increase below the treatment zone within a reasonable time period after completion of sampling. The Secretary 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.

(d) The owner or operator shall 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 Secretary will specify a statistical procedure in the facility permit that he finds:

- (i) Is appropriate for the distribution of the data used to establish background values; and
- (ii) 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.

(7) If the owner or operator determines, pursuant to §I(6) of this regulation, that there is a statistically significant increase of hazardous constituents below the treatment zone, he shall:

(a) Notify the Secretary of this finding in writing within 7 days. The notification shall indicate what constituents have shown statistically significant increases.

(b) Within 90 days, submit to the Secretary 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.

(8) If the owner or operator determines, pursuant to §I(6) of this regulation, 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 this subsection in addition to, or instead of, submitting a permit modification application under §I(7)(b) of this regulation, he is not relieved of the requirement to submit a permit modification application within the time specified in §I(7)(b) of this regulation, unless the demonstration made under this subsection successfully shows that a source other than the

regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. In making a demonstration under this subsection, the owner or operator shall:

- (a) Notify the Secretary in writing within 7 days of determining a statistically significant increase below the treatment zone that he intends to make a determination under this subsection;
- (b) Within 90 days, submit a report to the Secretary demonstrating that a source other than the regulated units caused the increase or that the increase resulted from error in sampling, analysis, or evaluation;
- (c) Within 90 days, submit to the Secretary an application for a permit modification to make any appropriate changes to the unsaturated zone monitoring program at the facility; and
- (d) Continue to monitor in accord with the unsaturated zone monitoring program established under this section.

J. Recordkeeping. The owner or operator shall include hazardous waste application dates and rates in the operating record required under Regulation .05D of this chapter.

K. Closure and Post-Closure Care.

(1) During the closure period the owner or operator shall:

- (a) Continue all operations (including pH control) necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone as required under §D(1), of this regulation, except to the extent these measures are inconsistent with §K(1)(h) of this regulation;
- (b) Continue all operations in the treatment zone to minimize run-off of hazardous constituents as required under §D(2) of this regulation;
- (c) Maintain the run-on control system required under §D(3) of this regulation;
- (d) Maintain the run-off management system required under §D(4) of this regulation;
- (e) Control wind dispersal of hazardous waste required under §D(6) of this regulation;
- (f) Continue to comply with any prohibition or conditions concerning growth of food-chain crops under §G of this regulation;
- (g) Continue unsaturated zone monitoring in compliance with §I, of this regulation, except that soil-pore liquid monitoring may be terminated 90 days after the last application of waste to the treatment zone; and
- (h) Establish a vegetative cover on the portion of the facility being closed at such time that the cover does not substantially impede degradation, transformation, or immobilization of hazardous constituents in the treatment zone. The vegetative cover shall be capable of maintaining growth without extensive maintenance.

(2) For the purpose of complying with Regulation .07F of this chapter, when closure is completed the owner or operator may submit to the Secretary certification by an independent qualified soil scientist, instead of an independent registered professional engineer, that the facility has been closed in accordance with the specifications in the approved closure plan.

(3) During the post-closure care period the owner or operator shall:

- (a) 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 these measures are consistent with other post-closure care activities;
- (b) Maintain a vegetative cover over closed portions of the facility;
- (c) Maintain the run-on control system required under §D(3) of this regulation;
- (d) Maintain the run-off management system required under §D(4) of this regulation;
- (e) Control wind dispersal of hazardous waste if required under §D(6) of this regulation;
- (f) Continue to comply with any prohibitions or conditions concerning growth of food-chain crops under §G of this regulation; and
- (g) Continue unsaturated zone monitoring in compliance with §I of this regulation except that soil-pore liquid monitoring may be terminated 90 days after the last application of waste to the treatment zone.

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.13

(4) The owner or operator is not subject to regulation under §K(1)(h) and (3) of this regulation if the Secretary 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 §K(4)(c) of this regulation. The owner or operator may submit a demonstration to the Secretary at any time during the closure or post-closure periods. For the purposes of this subsection:

(a) The owner or operator shall 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 §B(2) of this regulation. This includes the following:

(i) Background soil values may be based on a one-time sampling of a background plot having characteristics similar to those of the treatment zone;

(ii) The owner or operator shall express background values and values for hazardous constituents in the treatment zone in a form necessary for the determination of statistically significant increases under §K(4)(c) of this regulation.

(b) In taking samples used in the determination of background and treatment zone values, the owner or operator shall take samples at a 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.

(c) In determining whether a statistically significant increase has occurred, the owner or operator shall 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 shall use a statistical procedure that:

(i) Is appropriate for the distribution of the data used to establish background values; and

(ii) 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.

(5) The owner or operator is not subject to regulation under Regulations .06—.06-7 of this chapter if the Secretary finds that the owner or operator satisfied §K(4) of this regulation and if unsaturated zone monitoring under §I of this regulation indicates that hazardous constituents have not migrated beyond the treatment zone during the active life of the land treatment unit.

L. Special Requirements for Ignitable or Reactive Waste. The owner or operator may not apply ignitable or reactive waste to the treatment zone unless the waste is:

(1) Immediately incorporated into the soil so that:

(a) The resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under COMAR 26.13.02.11 or .13, and

(b) Regulation .02H(2) of this chapter is complied with; or

(2) Managed in such a way that it is protected from any material or conditions which may cause it to ignite or react.

M. Special Requirements for Incompatible Wastes. The owner or operator may not place incompatible wastes, or incompatible wastes and materials (see Regulation .24 of this chapter, for examples), in or on the same treatment zone, unless Regulation .02H(2) of this chapter is complied with.

N. Special Requirements for Hazardous Wastes F020, F021, F022, F023, F026, and F027.

(1) Hazardous Wastes F020, F021, F022, F023, F026, and F027 may 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 Secretary under the standards set out in this section, and in accord with all other applicable requirements of this chapter. The factors to be considered are:

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

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

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

26.13.05.14

(d) The effectiveness of additional treatment, design, or monitoring techniques.

(2) The Secretary 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 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.

#### .14 Landfills.

A. Applicability. This regulation applies to owners and operators of facilities that dispose of hazardous waste in landfills, except as Regulation .01 of this chapter provides otherwise.

##### B. Design and Operating Requirements.

(1) Any landfill not covered by §B(3) of this regulation or COMAR 26.13.06.22C shall have a liner system for all portions of the landfill, except for existing portions of the landfill. The liner system shall:

(a) Have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the landfill to the adjacent subsurface soil or ground water or surface water at any time during the active life, including the closure period, of the landfill. The liner shall be constructed of materials that prevent wastes from passing into the liner during the active life of the facility. The liner shall be:

(i) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients, including static head 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;

(ii) 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;

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

(iv) Located entirely above natural seasonal high water table. Minimal distance will be specified by the Secretary in the permit.

(b) Have a leachate collection and removal system immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the landfill. The Secretary will specify design and operating conditions in the permit to ensure that the leachate depth over the liner does not exceed 30 cm (1 foot). The leachate collection and removal system shall be:

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

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

(c) Be located in a geohydrologic setting which is compatible with hazardous waste land disposal as determined by the Secretary. Compatibility criteria shall include but not be limited to the:

(i) Attenuative capacity of the in-situ soils;

(ii) Hydraulic conductivity of the in-situ soils;

(iii) Thickness and classification of in-situ soils; and

(iv) Water table surface or potentiometric surface of each aquifer within 50 feet of the facility boundaries.

(2) The owner or operator will be exempted from the requirements of §B(1) of this regulation if the Secretary finds, based on a demonstration by the owner or operator, that alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents (see Regulation .06-1B of this chapter) into the ground water or surface water at any future time. In deciding whether to grant an exemption, the Secretary shall consider:

(a) The nature and quantity of the wastes;

(b) The proposed alternate design and operation;

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

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.14

(d) 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.

(3) The owner or operator of each new landfill, each new landfill unit at an existing facility, each replacement of an existing landfill unit, and each lateral expansion of an existing landfill unit, shall install two or more liners and a leachate collection system above and between the liners. The liners and leachate collection systems shall protect human health and the environment. The requirement for the installation of two or more liners in this subsection may be satisfied by the installation of a top liner designed, operated, and constructed of materials to prevent the migration of any constituent into the liner during the period the facility remains in operation, including any post-closure monitoring period, and a lower liner designed, operated, and constructed to prevent the migration of any constituent through the liner during this period. For the purposes of the preceding sentence, a lower liner shall be considered to satisfy this requirement if it is constructed of at least a 3-foot thick layer of recompacted clay or other natural material with a hydraulic conductivity of no more than  $1 \times 10^{-7}$ th centimeter per second.

(4) Section B(3) will not apply if the owner or operator demonstrates to the Secretary and the Secretary finds for the landfill, that alternative design and operating practices, together with location characteristics, 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 systems.

(5) The double liner requirement set forth in §B(3) of this regulation may be waived by the Secretary for any monofill, if:

(a) The monofill contains only hazardous wastes from foundry furnace emission controls or metal casting molding sand, and these wastes do not contain constituents which would render the wastes hazardous for reasons other than exhibiting the toxicity characteristic in COMAR 26.13.02.14 for one or more of EPA hazardous waste numbers D004—D017; and

(b) One of the following applies:

(i) The monofill has at least one liner for which there is no evidence that the liner is leaking, the monofill is located more than 1/4 mile from an underground source of drinking water, as defined in 40 CFR §144.3, and the monofill is in compliance with generally applicable ground water monitoring requirements for facilities with permits under COMAR 26.13.07; or

(ii) 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.

(6) The owner or operator shall design, construct, operate, and maintain a run-on control system capable of preventing flow onto the active portion of the landfill during peak discharge from at least a 25-year storm.

(7) The owner or operator shall design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

(8) Collection and holding facilities (for example, tanks or basins) associated with run-on and run-off control systems shall be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.

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

(10) The Secretary will specify in the permit all design and operating practices that are necessary to ensure that the requirements of this section are satisfied.

C. Monitoring and Inspection.

(1) During construction or installation, liners, except in the case of existing portions of liners exempt from §B, of this regulation, and cover systems (for example, membranes, sheets, or coatings) shall be inspected for uniformity, damage, and imperfections (for example, holes, cracks, thin spots, or foreign materials). Immediately after construction or installation:

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

(b) Soil-based and admixed liners and covers shall 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.

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

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

26.13.05.14

- (b) The presence of liquids in leak detection systems;
- (c) Proper functioning of wind dispersal control system, when present; and
- (d) The presence of leachate in and proper functioning of leachate collection and removal systems, when present.

D.—H. (Reserved)

I. Surveying and Record keeping. The owner or operator of a landfill shall maintain the following items in the operating record required under Regulation .05D of this chapter:

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

(2) The contents of each cell and the approximate location of each hazardous waste type within each cell.

J. Closure and Post-Closure Care.

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

- (a) Provide long-term minimization of migration of liquids through the closed landfill;
- (b) Function with minimum maintenance;
- (c) Promote drainage and minimize erosion or abrasion of the cover;
- (d) Accommodate settling and subsidence so that the cover's integrity is maintained; and
- (e) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

(2) After final closure, the owner or operator shall comply with all post-closure requirements, contained in Regulation .07G—J of this chapter, including maintenance and monitoring throughout the post-closure care period. The owner or operator shall:

(a) 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;

(b) Continue to operate the leachate collection and removal system:

- (i) During post-closure period, or
- (ii) Until leachate is no longer detected;

(c) Maintain and monitor the ground water monitoring system and comply with all other applicable requirements of Regulations .06—.06-7 of this chapter;

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

(e) Protect and maintain surveyed benchmarks used in complying with §I of this regulation.

.Reserved

L. Special Requirements for Ignitable or Reactive Waste. Except as provided in §L(2) of this regulation, ignitable or reactive waste may not be placed in a landfill, unless the waste is treated, rendered, or mixed before or immediately after placement in a landfill so that:

(1) The resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under COMAR 26.13.02.11 or .13; and

(2) Regulation .02H(2) of this chapter is complied with.

M. Special Requirements for Incompatible Wastes. Incompatible wastes, or incompatible wastes and materials (see Regulation .24 of this chapter for example), may not be placed in the same landfill cell, unless Regulation .02H(2) of this chapter is complied with.

N. Special Requirements for Liquid Waste.

(1) A person may not place waste which contains free liquids in a landfill, including bulk waste, non-containerized waste, or waste in containers.

(2) To demonstrate the absence or presence of free liquids, a person shall use Method 9095, Paint Filter Liquids Test, as described in "Test Methods for Evaluating Solid Waste. Physical/Chemical Methods", EPA Publication SW-846, which is incorporated by reference in COMAR 26.13.01.05A(4).

O. Special Requirements for Containers. Unless the containers are very small, such as ampules, an owner or operator shall ensure that containers are:

- (1) At least 90 percent full when placed in a landfill; or
- (2) Crushed, shredded, or similarly reduced in volume to the maximum extent practicable before burial in a landfill.

P. Special Requirements for Hazardous Wastes F020, F021, F022, F023, F026, and F027.

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

- (a) The volume, physical, and chemical characteristics of the wastes including their potential to migrate through the soil or to volatilize or escape into the atmosphere;
- (b) The attenuative properties of underlying and surrounding soils or other materials;
- (c) The mobilizing properties of other materials co-disposed with these wastes; and
- (d) The effectiveness of additional treatment, design, or monitoring requirements.

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

#### **.15 Repealed.**

#### **.16 Thermal Destruction of Hazardous Waste.**

##### **A. Definitions.**

- (1) As used in this regulation and in COMAR 26.13.07.22, the following terms have the meanings indicated.
- (2) "Acute hazardous waste" means hazardous waste that is classified pursuant to COMAR 26.13.02.19 as acute hazardous waste, except for quantities that satisfy the small quantity exclusion in COMAR 26.13.02.05C.
- (3) "Electric generating station" means a fuel burning facility constructed or operated by an electric company that provides electric energy for public consumption and whose activities are controlled by the Public Service Commission under Article 78, Annotated Code of Maryland.
- (4) "Installation" means any article, machine, equipment, or other contrivance, including, but not limited to, emission control equipment, processing equipment, manufacturing equipment, fuel burning equipment, incinerators, or any equipment or construction, capable of generating, causing, or reducing emissions, as defined in COMAR 26.11.01.01B(19).
- (5) "Installation that has an air quality permit to operate" means an installation subject to COMAR 26.11.02.13 for which an air quality permit to operate has been issued.
- (6) "Small quantity hazardous waste" means hazardous waste that satisfies the small quantity exclusion at COMAR 26.13.02.05C, except for polychlorinated biphenyls (PCBs).

##### **B. Applicability.**

(1) This regulation applies to owners and operators of installations used to thermally destroy hazardous waste, except as Regulation .01 of this chapter provides otherwise. The following facility owners and operators are examples of persons considered to thermally destroy hazardous waste:

- (a) Owners or operators of hazardous waste incinerators as defined by COMAR 26.13.01.03; or
- (b) Owners or operators who burn hazardous waste in boilers or in industrial furnaces in order to destroy the wastes.

DEPARTMENT OF THE ENVIRONMENT

26.13.05.16

(2) After consideration of the waste analysis included with the permit application, the Department, in establishing the permit conditions, will exempt the applicant from all requirements of this regulation except §§C, D, F(3), (4) and (5), H, and I, of this regulation if the:

(a) Department finds that the waste to be burned is:

(i) Listed as a hazardous waste in COMAR 26.13.02.15—.19 solely because it is ignitable (Hazard Code I), corrosive (Hazard Code C), or both,

(ii) Listed as a hazardous waste in COMAR 26.13.02.15—.19 solely because it is reactive (Hazard Code R) for characteristics other than those listed in COMAR 26.13.02.13A(4) and (5), and will not be burned when other hazardous wastes are present in the combustion zone,

(iii) A hazardous waste solely because it possesses the characteristics of ignitability, corrosivity, or both, as determined by the test for characteristics of hazardous wastes under COMAR 26.13.02.11—.13, or

(iv) A hazardous waste solely because it possesses any of the reactivity characteristics described by COMAR 26.13.02.13A(1)—(3) and (6)—(8), and will not be burned when other hazardous wastes are present in the combustion zone; and

(b) Waste analysis shows that the waste contains none of the hazardous constituents listed in COMAR 26.13.02.24, which would reasonably be expected to be in the waste.

(3) If the waste to be burned is one which is described by §B(2)(a)(i), (ii), (iii), or (iv) of this regulation, and contains insignificant concentration of the hazardous constituents listed in COMAR 26.13.02.24, then the Department may, in establishing permit conditions, exempt the applicant from all requirements of this regulation except §§C, D, F(3)—(5), H, and L, of this regulation, after consideration of the waste analysis included with the permit application, unless the Department finds that the waste will pose a threat to human health and the environment when burned in an incinerator.

(4) The owner or operator of a hazardous waste incinerator may conduct trial burns subject only to the requirements of COMAR 26.13.07.17.

C. General Requirements.

(1) Notwithstanding any other provision of this subtitle, a person who thermally destroys hazardous waste is subject to the requirements of this regulation. A person shall thermally destroy hazardous waste in accordance with the provisions of §C(2)—(4), of this regulation.

(2) Except for small quantity hazardous waste, the following hazardous waste, if thermally destroyed, shall be thermally destroyed only in a hazardous waste incinerator that has been permitted under COMAR 26.13.07.02—.20 to thermally destroy hazardous waste:

(a) Acute hazardous waste.

(b) Hazardous waste, with a heating value of less than 6,000 Btu/lb.

(c) Hazardous waste with a heating value of 6,000 Btu/lb. or greater, not used as a fuel for heat energy recovery, and containing material listed in COMAR 26.13.02.24.

(d) Hazardous waste with a heating value of 6,000 Btu/lb. or greater containing a constituent or constituents having a heating value of less than 6,000 Btu/lb. unless the:

(i) Applicant demonstrates to the satisfaction of the Department that it is unnecessarily costly to separate the waste; and

(ii) Hazardous waste with a heating value of 6,000 Btu/lb. or greater does not contain more than 1 percent by volume of the constituent or constituents having a heating value of less than 6,000 Btu/lb. except that if the constituents having a heating value of less than 6,000 Btu/lb. is primarily water the volume may be greater than 1 percent. However, the Department reserves the right to limit the amount of water present in the hazardous waste to be thermally destroyed such that the flame temperature is not reduced to a level where incomplete combustion of the hazardous waste may be expected.

(e) Hazardous waste or hazardous waste mixtures that the Department determines will create a public health or environmental hazard.



DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.16

- (3) All other hazardous waste, if thermally destroyed, may be thermally destroyed in:
- (a) A hazardous waste incinerator permitted under COMAR 26.13.07.02 --.20; or
  - (b) Any of the following installations that have a limited facility permit under COMAR 26.13.07.22:
    - (i) Industrial furnaces identified in COMAR 26.13.01; and
    - (ii) Boilers, as defined in COMAR 26.13.01, that are identified as industrial boilers located on the site of a facility engaged in a manufacturing process where substances are transformed into new products, including the component parts of products, by mechanical or chemical processes; or utility boilers used to produce electric power, steam, heated or cooled air or other gases or fluids for sale.
- (4) A hazardous waste may not be thermally destroyed in a manner inconsistent with the provision contained in COMAR 26.13.10.02B(3).
- (5) The requirements of the Federal Toxic Substances Control Act, 15 U.S.C. §2505(e) (TOSCA), and regulations adopted under that Act, 40 CFR §761, shall take precedence over the requirements of this regulation concerning polychlorinated biphenyls (PCBs), to the extent that there is any inconsistency between them. A person may not thermally destroy PCBs except in compliance with the Toxic Substances Control Act, 15 U.S.C. 2601 (TOSCA), and COMAR 26.13.07.

D. Waste Analysis.

- (1) As a portion of the trial burn plan required by COMAR 26.13.07.17B, or with the permit application, the owner or operator shall include an analysis of the waste feed sufficient to provide all information required by COMAR 26.13.07.02-6 and .17B. Owners or operators of new hazardous waste incinerators shall provide the information required by COMAR 26.13.07.17C to the greatest extent possible.
- (2) Throughout normal operation the owner or operator shall conduct sufficient waste analysis to verify that waste feed to the hazardous waste incinerator is within the physical and chemical composition limits specified in his permit under §H(2) of this regulation.

E. Principal Organic Hazardous Constituents (POHCs).

- (1) Principal Organic Hazardous Constituents (POHCs) in the waste feed shall be treated to the extent required by the performance standard of §F of this regulation.
- (2) One or more POHCs will be specified in the facility's permit from among those constituents listed in COMAR 26.13.02.24, for each waste feed to be burned. This specification will be based on the degree of difficulty of incineration of the organic constituents in the waste and on their concentration or mass in the waste feed, considering the results of waste analyses and trial burns or alternative data submitted with the facility's permit application. Organic constituents which represent the greatest degree of difficulty of incineration will be those most likely to be designated as POHCs. Constituents are more likely to be designated as POHCs if they are present in large quantities or concentrations in the waste.
- (3) Trial POHCs will be designated for performance of trial burns in accordance with the procedure specified in COMAR 26.13.07.17B for obtaining trial burn permits.

F. Performance Standards. A hazardous waste incinerator burning hazardous waste shall be designed, constructed, and maintained so that when operated in accordance with operating requirements specified under §H of this regulation it will meet the following performance standards:

(1) Destruction and Removal Efficiency.

- (a) Except as provided in §F(1)(b) of this regulation, it shall achieve a destruction and removal efficiency (DRE) of 99.99 percent for each principal organic hazardous constituent (POHC) designated under §E of this regulation in its permit for each waste feed. DRE is determined for each POHC from the following equation:

$$DRE = (W_{in} - W_{out}) \times 100 \text{ percent} / W_{in}$$

where

$W_{in}$  = Mass feed rate of one principal organic hazardous constituent (POHC) in the waste stream feeding the hazardous waste incinerator;

and

$W_{out}$  = Mass emission rate of the same POHC present in exhaust emissions before release to the atmosphere.

DEPARTMENT OF THE ENVIRONMENT

26.13.05.16

(b) An incinerator burning hazardous wastes F020, F021, F022, F023, F026, and F027 shall achieve a destruction and removal efficiency (DRE) of 99.9999 percent for each principal organic hazardous constituent (POHC) designated under §E of this regulation in its permit. This performance shall be demonstrated on POHCs that are more difficult to incinerate than tetra-, penta-, and hexachlorodibenzo-p-dioxins and dibenzofurans. DRE is determined for each POHC from the equation in §F(1)(a) of this regulation. In addition, the owner or operator of the incinerator shall notify the Secretary of his intent to incinerate hazardous wastes F020, F021, F022, F023, F026, and F027.

(2) When producing stack emissions of more than 1.8 kilograms per hour (4 pounds per hour) of hydrogen chloride (HCl), it shall control HCl emissions such that the rate of emission is not greater than the larger of either 1.8 kilograms per hour or 1 percent of the HCl in the stack gas prior to entering any pollution control equipment.

(3) It may not emit particulate matter in excess of 68.7 milligrams per dry standard cubic meter (0.030 grain per dry standard cubic foot) when corrected as provided for at COMAR 26.11.08.05.

(4) Visible Emissions Standard.

(a) A person may not cause or permit the discharge of emissions from a hazardous waste incinerator that violate the visible emissions standards in COMAR 26.11.08.04.

(b) A person may apply for an exception to the visible emission standard in §F(4)(a) of this regulation using the procedures in COMAR 26.11.01.08.

(5) As provided in COMAR 26.11.08, hazardous waste incinerators are subject to all applicable substantive requirements of COMAR 26.11.02.12 for New Source Review (NSR) and Prevention of Significant Deterioration (PSD) Sources.

(6) For purposes of permit enforcement, compliance with the operating requirements specified in the permit under §H will be regarded as compliance with this section. However, evidence that compliance with those permit conditions is insufficient to ensure compliance with the performance requirements of this section may be information justifying modification, revocation, or reissuance of a permit under COMAR 26.13.07.11 or .20—.20-6.

G. Hazardous Waste Incinerator Permits.

(1) The owner or operator of a hazardous waste incinerator shall burn only wastes specified in his permit and only under operating conditions specified for those wastes under §H except:

(a) In approved trial burns under COMAR 26.13.07.17B; or

(b) Under exemptions created by §B.

(2) Other hazardous wastes shall be burned only after operating conditions have been specified in a new permit or a permit modification as applicable. Operating requirements for new wastes shall be based on either trial burn results or alternative data included with a permit application.

(3) The permit for a new hazardous waste incinerator shall establish appropriate conditions for each of the applicable requirements of this section, including but not limited to allowable waste feeds and operating conditions necessary to meet the requirements of §H, sufficient to comply with the following standards:

(a) For the period beginning with initial introduction of hazardous waste to the incinerator and ending with initiation of the trial burn, and only for the minimum time required to establish operating conditions required in §G(3)(b) of this regulation, not to exceed a duration of 720 hours operating time for incineration of hazardous waste, the operating requirements shall be those most likely to ensure compliance with the performance standards of §F of this regulation, based on the Department's engineering judgment. The Department may extend the duration of this period once for up to 720 additional hours when good cause for the extension is demonstrated by the applicant.

(b) For the duration of the trial burn, the operating requirements shall be sufficient to demonstrate compliance with the performance standards of §F of this regulation and shall be in accordance with the approved trial burn plan.

(c) For the period immediately following completion of the trial burn, and only for the minimum period sufficient to allow sample analysis, data computation, and submission of the trial burn results by the applicant, and review of the trial burn results and modification of the facility permit by the Department, the operating requirements shall be those most likely to ensure compliance with the performance standards of §F of this regulation based on the Department's engineering judgment.

(d) For the remaining duration of the permit, the operating requirements shall be those demonstrated, in a trial burn or by alternative data specified in the permit application, as sufficient to ensure compliance with the performance standards of §F of this regulation.

#### II. Operating Requirements.

(1) A hazardous waste incinerator shall be operated in accordance with operating requirements specified in the permits. These will be specified on a case-by-case basis as those demonstrated (in a trial burn or in alternative data as specified in §G(2) of this regulation and included in a facility's permit application) to be sufficient to comply with the performance standards of §F of this regulation.

(2) Each set of operating requirements will specify the composition of the waste feed, including acceptable variations in the physical or chemical properties of the waste feed which do not affect compliance with the performance requirements of §F of this regulation to which the operating requirements apply. For such waste feed, the permit will specify acceptable operating limits including the following conditions:

- (a) Carbon monoxide (CO) level in the stack exhaust gas;
- (b) Waste feed rate;
- (c) Combustion temperature;
- (d) An appropriate indicator of combustion gas velocity;
- (e) Allowable variations in incinerator system design or operating procedures; and
- (f) Such other operating requirements as are necessary to ensure that the performance standards of §F of this regulation are met.

(3) During start-up and shut-down of a hazardous waste incinerator, hazardous waste, except wastes exempted in accordance with §B, may not be fed into the incinerator unless the incinerator is operating within the conditions of operation (temperature, air feed rate, etc.) specified in the permit.

(4) Fugitive emissions from the combustion zone shall be controlled by:

- (a) Keeping the combustion zone totally sealed against fugitive emissions;
- (b) Maintaining a combustion zone pressure lower than atmospheric pressure; or
- (c) An alternate means of control demonstrated (with the permit application) to provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than atmospheric pressure.

(5) A hazardous waste incinerator shall be operated with a functioning system to automatically cut off waste feed to the incinerator when operating conditions deviate from limits established under §H(1) of this regulation.

(6) A hazardous waste incinerator shall cease operation when changes in waste feed, incinerator design, or operating conditions exceed limits designated in its permit.

#### I. Monitoring and Inspections.

(1) The owner or operator shall conduct, as a minimum, the following monitoring while incinerating hazardous waste:

(a) Combustion temperature, waste feed rate, and the indicator of combustion gas velocity specified in the facility permit shall be monitored on a continuous basis;

(b) CO shall be monitored on a continuous basis at a point in the hazardous waste incinerator downstream of the combustion zone and before release to the atmosphere;

(c) Upon request by the Department, sampling and analysis of the waste and exhaust emissions shall be conducted to verify that the operating requirements established in the permit achieve the performance standards of §F of this regulation.

(2) The hazardous waste incinerator and associated equipment (pumps, valves, conveyors, pipes, etc.) shall be subjected to thorough visual inspection, at least daily, for leaks, spills, fugitive emissions, and signs of tampering.

26.13.05.16

(3) The emergency waste feed cutoff system and associated alarms shall be tested at least weekly to verify operability, unless the applicant demonstrates to the Department that weekly inspections will unduly restrict or upset operations and that less frequent inspection will be adequate. At a minimum, operational testing shall be conducted at least monthly.

(4) This monitoring and inspection data shall be recorded and the records shall be placed in the operating log required by Regulation .05D of this chapter.

J. – K. (Reserved)

L. Closure. At closure, the owner or operator shall remove all hazardous waste and hazardous waste residues (including but not limited to ash, scrubber waters, and scrubber sludges) from the incinerator site.

M. Existing Hazardous Waste Incinerators. Not later than 6 months after the effective date of this regulation, the owner or operator of any existing hazardous waste incinerator shall submit a completed permit application for that hazardous waste incinerator, as provided for in COMAR 26.13.07.02--.19, or cease to operate the incinerator.

#### **.16-1 Miscellaneous Units.**

A. Applicability. The requirements in this regulation apply to owners and operators of facilities that treat, store, or dispose of hazardous waste in miscellaneous units, except as Regulation .01 of this chapter provides otherwise.

B. Environmental Performance Standards.

(1) A miscellaneous unit shall be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment.

(2) Permits for miscellaneous units are to contain such terms and provisions as necessary to protect human health and the environment, including, but not limited to, as appropriate:

- (a) Design and operating requirements;
- (b) Detection and monitoring requirements;
- (c) Requirements for responses to releases of hazardous waste or hazardous constituents from the unit; and

(d) All applicable requirements of Regulations .09 — .14 and .16 of this chapter, and COMAR 26.13.07 that are appropriate for the miscellaneous unit being permitted.

(3) For the purposes of §B(2), of this regulation, protection of human health and the environment includes, but is not limited to, prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in:

(a) The ground water or subsurface environment, considering the:

- (i) Volume and physical and chemical characteristics of the waste in the unit, including its potential for migration through soil, liners, or other containing structures;
- (ii) Hydrologic and geologic characteristics of the unit and the surrounding area;
- (iii) Existing quality of ground water, including other sources of contamination and their cumulative impact on the ground water;
- (iv) Quantity and direction of ground water flow;
- (v) Proximity to and withdrawal rates of current and potential ground water users;
- (vi) Patterns of land use in the region;
- (vii) Potential for deposition or migration of waste constituents into subsurface physical structures, and into the root zone of food-chain crops and other vegetation;
- (viii) Potential for health risks caused by human exposure to waste constituents; and
- (ix) Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;

(b) Surface water, wetlands, or on the soil surface, considering the:

- (i) Volume and physical and chemical characteristics of the waste in the unit;

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.17

- (ii) Effectiveness and reliability of containing, confining, and collecting systems and structures in preventing migration;
- (iii) Hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
- (iv) Patterns of precipitation in the region;
- (v) Quantity, quality, and direction of ground water flow;
- (vi) Proximity of the unit to surface waters;
- (vii) Current and potential uses of nearby surface waters and any water quality standards established for those surface waters;
- (viii) Existing quality of surface waters and surface soils, including other sources of contamination and their cumulative impact on surface waters and surface soils;
- (ix) Patterns of land use in the region;
- (x) Potential for health risks caused by human exposure to waste constituents; and
- (xi) Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;
- (c) The air, considering the:
- (i) Volume and physical and chemical characteristics of the waste in the unit, including its potential for the emission and dispersal of gases, aerosols, and particulates;
- (ii) Effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air;
- (iii) Operating characteristics of the unit;
- (iv) Atmospheric, meteorologic, and topographic characteristics of the unit and the surrounding area;
- (v) Existing quality of the air, including other sources of contamination and their cumulative impact on the air;
- (vi) Potential for health risks caused by human exposure to waste constituents; and
- (vii) Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.

C. Monitoring, Analysis, Inspection, Response, Reporting, and Corrective Action. Monitoring, testing, analytical data, inspection, response, and reporting procedures and frequencies shall ensure compliance with Regulations .02F, .03D, .05F—H, .06-7, and .16-1B of this chapter, as well as meet any additional requirements needed to protect human health and the environment as specified in the permit.

D. Post-Closure Care. A miscellaneous unit that is a disposal unit shall be maintained in a manner that complies with §B of this regulation during the post-closure care period. In addition, if a treatment or storage unit has contaminated soils or ground water that cannot be completely removed or decontaminated during closure, then that unit shall also meet the requirements of §B of this regulation during post-closure care. The post-closure plan under Regulation .07H of this chapter shall specify the procedures that will be used to satisfy this requirement.

**.17 Repealed.**

**.17-1 General Requirements for Drip Pads.**

A. Applicability.

(1) The requirements of this regulation and Regulations .17-2—.17-4 of this chapter apply to owners and operators of facilities that use new or existing drip pads to convey treated wood drippage, precipitation, or surface water run-off to an associated collection system.

(2) For the purposes of this regulation and Regulations .17-2—.17-4 of this chapter:

(a) "Existing drip pad" means a drip pad which is used to manage hazardous waste:

26.13.05.17

- (i) Having a waste code of F032 which has been constructed before December 6, 1990;
- (ii) Having a waste code of F032 and for which the owner or operator had a design and had entered into binding financial or other agreements for construction before December 6, 1990; or
- (iii) That is not used to manage waste with waste code F032, and which either has been constructed by September 10, 1997, or the owner or operator had a design and had entered into binding financial or other agreements for construction before September 10, 1997; and

(b) "New drip pad" means a drip pad that is not an existing drip pad.

(3) Requirement for Leak Collection System. For a drip pad used to manage hazardous waste:

(a) Having waste code F032, the requirement of Regulation .17-2C(6) and (7) of this chapter to install a leak collection system applies only if:

(i) The drip pad is constructed after December 24, 1992, except for a drip pad constructed after December 24, 1992 for which the owner or operator had a design and had entered into binding financial or other agreements for construction before December 24, 1992; and

(ii) The owner or operator has not complied with the requirements of Regulation .17-2A(2) of this chapter concerning drip pad permeability;

(b) That is not used to manage waste with waste code F032, the requirement of Regulation .17-2C(6) and (7) of this chapter to install a leak collection system applies only to a drip pad:

(i) That is constructed after September 10, 1997, except for a drip pad constructed after September 10, 1997 for which the owner or operator had a design and had entered into binding financial or other agreements for construction before September 10, 1997; and

(ii) For which the owner or operator has not complied with the requirements of Regulation .17-2A(2) of this chapter concerning drip pad permeability.

(4) The owner or operator of a drip pad that is inside or under a structure that provides protection from precipitation so that neither run-off nor run-on is generated is not subject to regulation under Regulation .17-2D(3)(a) or (b) of this chapter, as appropriate.

(5) The requirements of this regulation and Regulations .17-2—17-4 of this chapter are not applicable to the management of infrequent and incidental drippage in storage yards if the owner or operator:

(a) Maintains and complies with a written contingency plan that describes what actions the owner or operator shall take to immediately respond to the discharge of infrequent and incidental drippage;

(b) Implements the contingency plan required by §A(5)(a) of this regulation within:

(i) One consecutive working day of the occurrence of the drippage when the facility is in operation and is treating wood; or

(ii) 72 hours of the occurrence when the facility is not in operation and is not treating wood; and

(c) Assures that, at a minimum, the contingency plan required by §A(5)(a) of this regulation describes how the owner or operator will:

(i) Clean up the drippage;

(ii) Document the cleanup of the drippage;

(iii) Retain documents regarding cleanup for 3 years; and

(iv) Manage the contaminated media resulting from infrequent and incidental drippage in a manner consistent with applicable laws and regulations.

**B. Assessment of Existing Drip Pad Integrity.****(1) Evaluation of Existing Drip Pad.** The owner or operator shall:

(a) Evaluate each existing drip pad, as defined in §A(2)(a) of this regulation, and determine whether it meets all of the requirements of this regulation and Regulations .17-2—.17-4 of this chapter, except the requirements for liners and leak detection systems of Regulation .17-2C of this chapter;

(b) Have obtained and shall keep on file at the facility a written assessment of the drip pad that documents the extent to which the drip pad meets each of the design and operating standards of Regulation .17-2 of this chapter, except for the standards for liners and leak detection systems specified in Regulation .17-2C of this chapter;

(c) Assure that the assessment required by §B(1)(b) of this regulation:

(i) Has been reviewed and certified by an independent qualified registered professional engineer that attests to the results of the evaluation, and

(ii) Is reviewed, updated, and recertified annually until all upgrades, repairs, or modifications necessary to achieve compliance with all of the standards of Regulation .17-2 of this chapter are complete.

**(2) Written Plan.** The owner or operator of an existing drip pad, who intends to upgrade, repair, and modify the drip pad so that it meets the requirements of Regulation .17-2C of this chapter, shall:

(a) Develop a written plan for upgrading, repairing, and modifying the drip pad to meet the requirements of Regulation .17-2C of this chapter, and submit the plan, to the Secretary, not later than 2 years before the date that all repairs, upgrades, and modifications are scheduled to be complete;

(b) Describe in the written plan required by §B(2)(a) of this regulation all changes to be made to the drip pad in sufficient detail to document compliance with all the requirements of Regulation .17-2 of this chapter; and

(c) Have the written plan required by §B(2)(a) of this regulation reviewed and certified by an independent qualified registered professional engineer.

(3) Upon completion of all upgrades, repairs, and modifications determined to be necessary as a result of the assessment required by this section, the owner or operator shall submit, to the Secretary, the as-built drawings for the drip pad and a certification by an independent qualified registered professional engineer attesting that the drip pad conforms to the drawings.

(4) If a drip pad is found to be leaking or unfit for use, the owner or operator shall comply with the provisions of Regulation .17-21 of this chapter or close the drip pad in accordance with Regulation .17-4 of this chapter.

**C. Design and Installation of New Drip Pads.**

(1) Except as provided in §C(2) of this regulation, the owner and operator of a new drip pad shall ensure that the pad is designed, installed, and operated in accordance with all of the requirements of Regulations .17-2—.17-4 of this chapter.

(2) The owner and operator of a new drip pad shall either:

(a) Comply with:

(i) Regulation .17-2A(2) of this chapter concerning drip pad permeability; and

(ii) Regulation .17-2B of this chapter concerning assessment of the drip pad; or

(b) Install a liner and leakage detection and collection system that meets the requirements of Regulation .17-2C of this chapter.

**D. General Requirements for Existing Drip Pads.** The owner or operator of an existing drip pad shall either:

(1) Comply with Regulation .17-2A(2) of this chapter concerning drip pad permeability; or

(2) Install a liner and leakage detection and collection system that meets the requirements of Regulation .17-2C of this chapter.

26.13.05.17

**.17-2 Design and Operating Requirements.**

A. The owner or operator of a drip pad shall ensure that:

(1) The drip pad:

(a) Is constructed of non-carthen materials, excluding wood and non-structurally supported asphalt,

(b) Is sloped to efficiently drain treated wood drippage, rain and other waters, or solutions of drippage and water or other wastes to the associated collection system, and

(c) Has a curb or berm around the perimeter;

(2) For an existing drip pad which does not satisfy the requirements of §C of this regulation, and for a new drip pad for which the owner or operator has elected to comply with this provision, as provided in Regulation .17-1C(2)(a) of this chapter, the surface material of the drip pad:

(a) Has a hydraulic conductivity of less than or equal to  $1 \times 10^{-7}$  centimeters per second by, for example, sealing, coating, or covering a concrete drip pad with a surface material with a hydraulic conductivity of less than or equal to  $1 \times 10^{-7}$  centimeters per second, so that the entire surface where drippage occurs or may run across is capable of containing the drippage and mixtures of drippage and precipitation, materials, or other wastes while being routed to an associated collection system,

(b) Is maintained free of cracks and gaps that could adversely affect its ability to contain liquids, and

(c) Is chemically compatible with the preservatives that contact the drip pad; and

(3) The drip pad is of sufficient structural strength and thickness to prevent failure due to:

(a) Physical contact;

(b) Climatic conditions;

(c) Stresses associated with daily operations such as vehicular traffic and movement of wood;

(d) The stress of installation; and

(e) Any other relevant factors.

B. Written Assessment. If, as provided in Regulation .17-1C(2)(a) of this chapter, the owner or operator elects to comply with the requirements of §A(2) of this regulation, the owner or operator shall also:

(1) Obtain and keep on file at the facility a written assessment of the drip pad that evaluates the extent to which the drip pad meets the design and operating standards of this regulation, except for the requirements of §C of this regulation; and

(2) Have the assessment required by §B(1) of this regulation:

(a) Reviewed and certified by an independent, qualified registered professional engineer that attests to the results of the evaluation, and

(b) Updated, reviewed, and recertified annually.

C. The owner or operator of a drip pad who has chosen to install a liner and leakage detection and collection system, as provided in Regulation .17-1C(2)(b) of this chapter or Regulation .17-1D(1) of this chapter, shall ensure that the system complies with the following:

(1) A synthetic liner, which is designed, constructed, and installed to prevent leakage from the drip pad into surface water, ground water, or adjacent subsurface soil at any time during the active life and closure period of the drip pad, is installed below the drip pad;

(2) The liner required by §C(1) of this regulation is constructed of materials that will prevent waste from being absorbed into the liner and that will prevent releases into surface water, ground water, or adjacent subsurface soil during the active life of the facility;

(3) The liner required by §C(1) of this regulation is:

(a) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to:

(i) Pressure gradients such as static head and external hydrogeologic forces;



- (ii) Physical contact with the waste or with drip pad leakage;
- (iii) Climatic conditions;
- (iv) The stress of installation; and
- (v) The stress of daily operation, including stresses from vehicular traffic on the drip pad;
- (b) Placed upon a foundation or base capable of:
  - (i) Providing support to the liner;
  - (ii) Providing resistance to pressure gradients above and below the liner; and
  - (iii) Preventing failure of the liner due to settlement, compression, or uplift; and
- (c) Installed to cover all surrounding earth that could come in contact with the waste or leakage;
- (4) There is a leakage detection system immediately above the liner that is designed, constructed, maintained, and operated to detect leakage from the drip pad;
- (5) The leakage detection system required by §C(4) of this regulation is:
  - (a) Constructed of materials that are:
    - (i) Chemically resistant to the waste managed in the drip pad and the leakage that might be generated; and
    - (ii) Of sufficient strength and thickness to prevent collapse under the pressures exerted by overlaying materials and by any equipment used at the drip pad;
  - (b) Designed and operated to function without clogging through the scheduled closure of the drip pad; and
  - (c) Designed to detect the failure of the drip pad or the presence of a release of hazardous waste or accumulated liquid at the earliest practicable time;
- (6) There is a leakage collection system immediately above the liner that is designed, constructed, maintained, and operated to collect leakage from the drip pad so that it can be removed from below the drip pad; and
- (7) The date, time, and quantity of any leakage collected in and removed from the leakage collection system is documented in the facility operating log.

D. General Design and Operating Requirements. The owner or operator of a drip pad shall:

- (1) Maintain the drip pad so that it remains free of cracks, gaps, corrosion, or other deterioration that could cause hazardous waste to be released from the drip pad;
- (2) Ensure that the drip pad and associated collection system are designed and operated to convey, drain, and collect liquid resulting from drippage or precipitation in order to prevent run-off;
- (3) Unless the drip pad is protected by a structure, as described in Regulation .17-1A(4) of this chapter:
  - (a) Either:
    - (i) Design, construct, operate, and maintain a run-on control system capable of preventing flow onto the drip pad during peak discharge from at least a 24-hour, 25-year storm; or
    - (ii) Assure that the run-on control system has sufficient excess capacity to contain any surface water run-off that might enter the system; and
  - (b) Design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm;
- (4) Remove drippage and accumulated precipitation from the associated collection system as necessary to prevent overflow onto the drip pad;
- (5) Ensure that collection and holding units associated with run-on and run-off control systems are emptied or otherwise managed as soon as possible after storms to maintain the design capacity of the system; and

DEPARTMENT OF THE ENVIRONMENT

26.13.05.17

(6) Operate and maintain drip pads in a manner that minimizes tracking of hazardous waste or hazardous waste constituents off the drip pad as a result of activities by personnel or equipment.

E. The owner or operator shall:

(1) Evaluate the drip pad to determine whether it meets the requirements of §§A–D(3) of this regulation; and

(2) Obtain a statement from an independent qualified registered professional engineer certifying that the drip pad design meets the requirements of this regulation.

F. Cleaning Requirements.

(1) The owner or operator of a drip pad shall:

(a) Thoroughly clean the drip pad surface to remove accumulated residues of hazardous waste or other materials to allow weekly inspections of the entire drip pad surface without interference or hindrance from materials on the drip pad;

(b) Document, in the facility's operating record, the date, time, and cleaning procedure used for each cleaning required by §F(1)(a) of this regulation; and

(c) Determine if the residues resulting from each cleaning required in §F(1)(a) of this regulation are regulated as hazardous under COMAR 26.13.02 and, if so, manage them in accordance with COMAR 26.13.02–26.13.10, §3010 of RCRA, and applicable federal regulations.

(2) In satisfying the cleaning requirement of §F(1) of this regulation, the owner or operator may clean the drip pad less frequently than once every 7 days, if doing so does not prevent unobscured viewing the drip pad surface during inspection.

G. After treated wood from pressure and nonpressure processes has been removed from the treatment vessel, the owner or operator shall ensure that it is held on the drip pad until drippage has ceased.

H. The owner or operator of a drip pad shall maintain records sufficient to document that all treated wood is held on the pad following treatment in accordance with §G of this regulation.

I. Response to Releases and Potential Releases.

(1) Throughout the active life of the drip pad, and as specified in the facility's permit, upon detection of a release of hazardous waste, including discovery of leakage in the leak detection system, or upon detection of a condition that may have caused or has caused a release, the owner or operator shall:

(a) Enter a record of the discovery in the facility operating log;

(b) Immediately remove from service the affected portion of the drip pad;

(c) Determine the steps that shall be taken to repair the drip pad and clean up any leakage from below the drip pad, and establish a schedule for accomplishing the repairs;

(d) Within 24 hours after discovery of the release or the condition that may have caused the release, notify the Secretary of the situation; and

(e) Within 10 working days after discovery of the release or the condition that may have caused the release, provide written notice to the Secretary with a plan describing the steps that will be taken to repair the drip pad and clean up any leakage, and a schedule for accomplishing this work.

(2) The Secretary shall:

(a) Review the information submitted;

(b) Make a determination regarding whether the pad is to be removed from service completely or partially until repairs and clean up are complete; and

(c) Notify the owner or operator of the determination and the underlying rationale in writing.

(3) Upon completing all the repairs and implementing the clean up specified in the plan submitted in accordance with §I(1)(e) of this regulation, the owner or operator shall notify the Secretary in writing and provide a certification signed by an independent qualified registered professional engineer that the repairs and clean up have been completed according to the written plan.

J. The owner or operator shall maintain, as part of the facility operating log, documentation of past operating and waste handling practices, including:

- (1) Identification of preservative formulations used in the past;
- (2) A description of drippage management practices; and
- (3) A description of treated wood storage and handling practices.

**.17-3 Inspections.**

A. During construction or installation, the owner or operator shall ensure that liners and cover systems such as membranes, sheets, or coatings are inspected for uniformity, damage, and imperfections such as holes, cracks, thin spots, or foreign materials.

B. Immediately after construction or installation, the owner or operator shall have the liners inspected and certified as meeting the requirements of Regulation .17-2 of this chapter by an independent qualified registered professional engineer.

C. The owner or operator shall maintain the certification required by §B of this regulation at the facility as part of the facility operating record.

D. After installation, the owner or operator shall:

- (1) Inspect liners and covers to ensure tight seams and joints, and the absence of tears, punctures, or blisters; and
- (2) Maintain a record of the results of the inspection.

E. Inspection During Operation.

(1) While a drip pad is in operation, the owner or operator shall inspect drip pads weekly and after storms to detect evidence of any of the following:

- (a) Deterioration, malfunction, or improper operation of run-on and run-off control systems;
- (b) Presence of leakage within and proper functioning of leak detection systems; and
- (c) Deterioration or cracking of the drip pad surface.

(2) If deterioration or leakage is detected, the owner or operator shall comply with the requirements of Regulation .17-2I of this chapter.

**.17-4 Closure of Drip Pads.**

A. At closure, the owner or operator shall:

- (1) Remove or decontaminate:
  - (a) All waste residues;
  - (b) Contaminated containment system components such as the pad and the liners;
  - (c) Contaminated subsoils; and
  - (d) Structures and equipment contaminated with waste and leakage; and
- (2) Manage the waste listed in §A(1) of this regulation as hazardous waste.

B. The owner or operator shall close the facility and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills in Regulation .14J of this chapter if the owner or operator:

- (1) Has removed or decontaminated all residues and made all reasonable efforts to effect removal of contaminated components, subsoils, structures, and equipment as required in §A of this regulation; and
- (2) Finds that not all contaminated subsoils can be practicably removed or decontaminated.

C. For permitted units required to close in accordance with §B of this regulation:

- (1) The requirement to have a permit continues throughout the post-closure period; and

26.13.05.18

(2) The drip pad is considered to be a landfill for the purpose of closure, post-closure, and financial responsibility, and the owner or operator shall meet all of the requirements for landfills specified in Regulations .07 and .08 of this chapter.

D. The owner or operator of an existing drip pad, as defined in Regulation .17-1A of this chapter, that does not comply with the liner requirements of Regulation .17-2C(1) — (3) of this chapter, shall:

(1) Include in the closure plan for the drip pad under Regulation .07C of this chapter both a plan for complying with §A of this regulation and a contingent plan for complying with §§B—C of this regulation, in case not all contaminated subsoils can be practicably removed at closure; and

(2) Prepare a contingent post-closure plan under Regulation .07H of this chapter for complying with §§B—C of this regulation, in case not all contaminated subsoils can be practicably removed at closure.

E. For cost estimates calculated under Regulations .07 and .08 of this chapter for closure and post-closure care of a drip pad subject to §D of this regulation, the owner or operator:

(1) Shall include the cost of complying with the contingent closure plan and the contingent post-closure plan; and

(2) May exclude the cost of expected closure under §A of this regulation.

#### **.18 Containment Buildings — Applicability.**

A. The requirements of this regulation and Regulations .18-1—.18-3 of this chapter apply to facility owners or operators who store or treat hazardous waste in units designed and operated under Regulations .18-1 and .18-2 of this chapter.

B. A facility owner or operator who stores or treats hazardous waste in a containment building is not considered to be engaged in land disposal under §3004(k) of RCRA in operating the containment building if the containment building:

(1) Is designed and operated under Regulations .18-1 and .18-2 of this chapter;

(2) Is a completely enclosed, self-supporting structure;

(3) Is designed and constructed of manmade materials of sufficient strength and thickness to:

(a) Support themselves, the waste contents, and any personnel and heavy equipment that operates within the unit; and

(b) Prevent failure due to pressure gradients, settlement, compression, uplift, physical contact with the hazardous wastes to which the materials are exposed, climatic conditions, and the stresses of daily operation, including the movement of heavy equipment within the unit and contact of heavy equipment with containment walls;

(4) Has a primary barrier that is designed to be sufficiently durable to withstand the movement of personnel, wastes, and handling equipment within the unit;

(5) Has the following if the containment building is used to manage liquids:

(a) A primary barrier designed and constructed of materials to prevent migration of hazardous constituents into the barrier;

(b) A liquid collection system designed and constructed of materials to minimize the accumulation of liquid on the primary barrier; and

(c) A secondary containment system that:

(i) Has been designed and constructed of materials to prevent migration of hazardous constituents into the barrier of the secondary containment system; and

(ii) Has a leak detection and liquid collection system capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time;

(6) Has controls sufficient to prevent fugitive dust emissions to meet the no-visible-emission standard in Regulation .18-2B(5)—(7) of this chapter; and

(7) Is designed and operated to ensure containment and prevent the tracking of materials from the unit by personnel or equipment.

**.18-1 Containment Buildings — Design Standards.**

A. The owner and operator of a containment building being used to manage hazardous waste shall assure that the containment building meets the following design standards:

- (1) The containment building is a structure completely enclosed with a floor, walls, and a roof to:
  - (a) Prevent exposure of the interior to the elements, that is, precipitation, wind, and surface water run-on; and
  - (b) Assure containment of managed wastes;
- (2) Except as provided in §A(3) of this regulation, the floor and containment walls of the unit, including a secondary containment system required under §B of this regulation have been designed and constructed of manmade materials in accordance with the following requirements:
  - (a) The floor and containment walls are of sufficient strength and thickness to:
    - (i) Support themselves, the waste contents, and any personnel and heavy equipment that operates within the unit; and
    - (ii) Prevent failure due to pressure gradients, settlement, compression, uplift, physical contact with the hazardous wastes to which the materials are exposed, climatic conditions, and the stresses of daily operation, including the movement of heavy equipment within the unit and contact of heavy equipment with containment walls; and
    - (iii) Have sufficient structural strength to prevent collapse or other failure; and
  - (b) All surfaces in contact with hazardous wastes or intended to be in contact with hazardous wastes are chemically compatible with those wastes;
- (3) Lightweight doors and windows are not subject to the design requirements concerning structural strength in §A(1)—(2) of this regulation if:
  - (a) The incorporation of the lightweight doors and windows into the design of the containment building is appropriate to the nature of the waste management operation to take place in the unit;
  - (b) The lightweight doors and windows provide an effective barrier against fugitive dust emissions in accordance with the requirements of Regulation .18-2B(5)—(7) of this chapter; and
  - (c) The containment building design and the way in which it is operated assures that wastes will not come in contact with these openings; and
- (4) The containment building has a primary barrier that is:
  - (a) Designed to withstand the movement of personnel, waste, and handling equipment in the unit during the operating life of the unit; and
  - (b) Appropriate for the physical and chemical characteristics of the waste to be managed.

B. Except as provided in §E of this regulation, the owner and operator of a containment building used to manage hazardous waste that contains free liquids or that is treated with free liquids shall assure that the containment building meets the following design standards:

- (1) The containment building includes a primary barrier designed and constructed of materials to prevent the migration of hazardous constituents into the barrier, such as, for example, a geomembrane covered by a concrete wear surface;
- (2) The containment building includes a liquid collection and removal system to minimize the accumulation of liquid on the primary barrier of the containment building;
- (3) The primary barrier required by §B(1) of this regulation is sloped to drain liquids to the associated collection system;
- (4) The system required by §B(2) of this regulation provides for the collection and removal of liquids and wastes at the earliest practicable time to minimize hydraulic head on the containment system;
- (5) The containment building includes:
  - (a) A secondary containment system with a secondary barrier designed and constructed to prevent migration of hazardous constituents into the barrier; and

26.13.05.18

(b) A leak detection system that is capable of detecting failure of the primary barrier and collecting accumulated hazardous wastes and liquids at the earliest practicable time;

(6) The leak detection component of the secondary containment system required by §B(5)(b) of this regulation performs at least as well as a system that is, at a minimum:

(a) Constructed with a bottom slope of 1 percent or more; and

(b) Constructed of:

(i) A granular drainage material with a hydraulic conductivity of  $1 \times 10^{-2}$  centimeters/second or more and a thickness of 12 inches (30.5 centimeters) or more; or

(ii) Synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-5}$  square meters/second or more;

(7) If hazardous waste is to be treated in the containment building, each area in which hazardous waste treatment is conducted is designed to prevent the release of liquids, wet materials, or liquid aerosols to other portions of the building; and

(8) The secondary containment system is constructed of materials that are:

(a) Chemically resistant to the waste and liquids managed in the containment building; and

(b) Of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any equipment used in the containment building.

C. Determination of the Presence of Free Liquids. For the purposes of §B of this regulation, a person shall determine whether free liquids are present by:

(1) The paint filter liquids test, Method 9095A of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods EPA SW-846, which is incorporated by reference in COMAR 26.13.01.05A(4);

(2) A visual examination; or

(3) Another appropriate means acceptable to the Secretary.

D. For a containment building that contains areas both with and without secondary containment, the owner or operator shall assure that each area is designed in accordance with the requirements of this regulation.

E. Waiver of Secondary Containment Requirements. Notwithstanding any other provisions of this regulation and Regulations .18 and .18-2 of this chapter, the Secretary may waive the requirements for secondary containment for a permitted containment building if the owner or operator demonstrates that:

(1) The only free liquids in the unit are limited amounts of liquids used to provide dust suppression required to meet occupational health and safety requirements; and

(2) Containment of managed wastes and liquids can be assured without a secondary containment system.

F. Containment Building as an External Liner for a Tank. A person may use a containment building to serve as an external liner system for a tank for the purposes of providing secondary containment for the tank under Regulation .10-4D of this chapter if the containment building meets the requirements of Regulation .10-4B—C of this chapter.

### **.18-2 Containment Buildings — Operating Requirements.**

A. General. The owner or operator of a containment building shall use controls and practices to ensure containment of hazardous waste within the unit.

B. Measures to Ensure Containment. To ensure containment of hazardous waste within a containment building, the owner or operator of the containment building shall, at a minimum:

(1) Maintain the primary barrier to be free of significant cracks, gaps, corrosion, or other deterioration that could cause hazardous waste to be released from the primary barrier;

(2) Maintain the level of the hazardous waste being managed in the containment building within the containment walls of the unit so that the height of any containment wall is not exceeded;

(3) Take measures to prevent the tracking of hazardous waste out of the containment building by personnel or by equipment used in handling the waste;

(4) In preventing hazardous waste from being tracked out of the containment building:

- (a) Designate an area for the decontamination of equipment; and
- (b) Collect and properly manage any rinsate generated in decontaminating equipment;

(5) Take measures to control fugitive dust emissions so that no opening of the containment building, such as doors, windows, vents, cracks, etc., exhibits any visible emissions;

Agency Note: See 40 CFR Part 60, Appendix A, Method 22 - "Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares" for a method for determining whether there are visible emissions from a source.

(6) Use sound air pollution control practices in operating and maintaining all particulate collection devices associated with control of fugitive dust emissions, such as fabric filters or electrostatic precipitators;

Agency Note: See 40 CFR Part 60, Subpart 292 for guidance on what constitutes sound air pollution control practices.

(7) Maintain the state of no visible emissions required by §B(5) of this regulation effectively at all times during routine operating and maintenance conditions, including when vehicles and personnel are entering and exiting the unit; and

(8) Assure that incompatible hazardous wastes or treatment reagents are not placed in the unit or its secondary containment system if the wastes or reagents could cause the unit or secondary containment system to leak, corrode, or otherwise fail.

C. Certification. The owner or operator shall:

(1) Obtain a certification by a qualified registered professional engineer that the containment building design meets the requirements of Regulation .18-1 of this chapter and §§A and B of this regulation;

(2) Obtain the certification required by §C(1) of this regulation before operating the containment building for the management of hazardous waste; and

(3) Keep the certification required by §C(1) of this regulation on site.

D. Response to Releases of Hazardous Waste.

(1) Throughout the active life of the containment building, if the owner or operator detects a condition that could lead to or has caused a release of hazardous waste, the owner or operator shall promptly repair the condition.

(2) Upon detection of a condition that has led to a release of hazardous waste, such as detection of leakage from the primary barrier of a containment building, the owner or operator shall:

- (a) Enter a record of the discovery in the facility operating record;
- (b) Immediately remove from service the portion of the containment building affected by the condition;
- (c) Determine the steps that must be taken to repair the containment building;
- (d) Remove any leakage from the secondary collection system;
- (e) Establish a schedule for accomplishing cleanup of the release and repairs to the containment building;
- (f) Within 7 days after the discovery of the condition, notify the Secretary of the condition verbally or in writing; and
- (g) Within 14 working days after the discovery of the condition, provide to the Secretary, in writing, a:
  - (i) Description of the steps taken to repair the containment building;
  - (ii) Description of any additional steps needed to repair the containment building;
  - (iii) Description of the steps required to perform any additional cleanup needed as a result of the release; and
  - (iv) Schedule for accomplishing the work described in §D(2)(g)(i)–(iii) of this regulation.

(3) The Secretary shall:

(a) Review the information submitted in accordance with §D(2)(g) of this regulation;

(b) Make a determination of whether the containment building shall be removed from service completely or partially until repairs and cleanup are completed; and

26.13.05.18

(c) Provide the owner or operator with a written notification specifying the determination made in accordance with §D(3)(b) of this regulation and the underlying rationale for the determination.

(4) Upon completing all repairs and cleanup performed in response to the release, the owner or operator shall:

(a) Notify the Secretary in writing that the repairs and cleanup have been completed; and

(b) Provide the Secretary with a verification signed by a qualified, registered professional engineer that the repairs and cleanup have been completed according to the written plan submitted in accordance with §D(2)(g) of this regulation.

E. Inspections. At least once every 7 days, the owner or operator shall:

(1) Perform an inspection of the containment building to detect signs of releases of hazardous waste;

(2) Include, as part of the inspection to detect releases of hazardous waste, evaluation of data gathered from:

(i) Monitoring equipment;

(ii) Leak detection equipment; and

(iii) Observation of the containment building and the area immediately surrounding the containment building; and

(3) Record, in the facility's operating record, data gathered in accordance with §E(2) of this regulation.

F. For a containment building that contains areas with secondary containment and areas without secondary containment, the owner or operator shall:

(1) Operate each area in accordance with the requirements of this regulation;

(2) Take measures to prevent the release of liquids or wet materials into areas without secondary containment; and

(3) Maintain, in the facility's operating record, a written description of the operating procedures used to maintain the integrity of areas without secondary containment.

### **.18-3 Containment Buildings — Closure and Post-Closure Care.**

A. At closure of a containment building, the owner or operator shall:

(1) Remove or decontaminate all waste residues, contaminated system components such as liners, contaminated subsoils, and structures and equipment contaminated with waste and leachate; and

(2) Manage the removed materials and wastes generated in performing decontamination as hazardous waste unless COMAR 26.13.02.03D applies.

B. The owner or operator shall assure that the closure plan, closure activities, cost estimates for closure, and financial responsibility for containment buildings meet all of the requirements specified in Regulations .07 and .08 of this chapter.

C. 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 §A of this regulation, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated:

(1) The owner or operator shall close the facility and perform post-closure care in accordance with the closure and post-closure requirements that apply to landfills in Regulation .14J of this chapter; and

(2) For the purposes of closure, post-closure, and financial responsibility, the containment building is then considered to be a landfill, and the owner or operator shall meet all of the requirements for landfills specified in Regulations .07 and .08 of this chapter.

### **.19 Underground Injection Control.**

A person may not dispose of hazardous waste by underground injection.

### **.20 Record-Keeping Instructions.**

A. The record-keeping provisions of Regulation .05D of this chapter specify that an owner or operator shall keep a written operating record at the facility. This regulation provides additional instructions for keeping portions of the operating record. See Regulation .05D(2) of this chapter for additional record-keeping requirements.



DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.20

B. For each hazardous waste received, treated, stored, or disposed of at a facility, the owner or operator shall record the following information in the facility's operating record and maintain this information in the operating record until closure of the facility:

(1) A description of the waste, including:

(a) The common name of the waste and the EPA Hazardous Waste Number or Numbers from COMAR 26.13.02 which apply to the waste.

(b) The waste's physical form, such as liquid, sludge, solid, or contained gas.

(c) If the waste is not listed in COMAR 26.13.02.15 — .19, a description of the process that produced it, such as "solid filter cake from production of \_\_\_\_\_, EPA Hazardous Waste Code W051", and

(d) The EPA or State Hazardous Waste Number from COMAR 26.13.02.10 — .19 that is associated with the waste, or, if the waste contains more than one listed hazardous waste or when more than one hazardous waste characteristic applies to the waste, all applicable EPA or State Hazardous Waste Numbers;

(2) The estimated or manifest-reported weight, or volume and density, when applicable, in one of the units of measure specified in Table 1; and

(3) The method or methods (by handling code or codes as specified in Table 2) and date or dates of treatment, storage, or disposal.

**Table 1**

<i>Unit of Measure</i>	<i>Symbol*</i>
Gallons (U.S.)	G
Gallons per hour	E
Gallons per day	U
Liters	L
Liters per hour	H
Liters per day	V
Short tons per hour	D
Metric tons per hour	W
Short tons per day	N
Metric tons per day	S
Pounds per hour	J
Kilograms per hour	R
Cubic yards	Y
Cubic meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu's per hour	I

\* Single character symbols are used here for data processing purposes.

**Table 2**  
**Handling Codes for Treatment, Storage, and Disposal Methods**

Enter the handling code or codes listed below that most closely represents the technique or techniques used at the facility to treat, store, or dispose of each quantity of hazardous waste received.

1. Storage

S01	Container (barrel, drum, etc.)
S02	Tank
S03	Waste Pile
S04	Surface impoundment
S05	Drip pad
S06	Containment building (storage)
S99	Other storage (specify)

2. Treatment

(a) Thermal Treatment

T06	Liquid injection incinerator
T07	Rotary kiln incinerator
T08	Fluidize bed incinerator
T09	Multiple hearth incinerator
T10	Infrared furnace incinerator
T11	Molten salt destructor
T12	Pyrolysis
T13	Wet air oxidation
T14	Calcination
T15	Microwave discharge
T18	Other (specify)

(b) Chemical Treatment

T19	Absorption mound
T20	Absorption field
T21	Chemical fixation
T22	Chemical oxidation
T23	Chemical precipitation
T24	Chemical reduction
T25	Chlorination
T26	Chlorinolysis
T27	Cyanide destruction
T28	Degradation
T29	Detoxification
T30	Ion exchange
T31	Neutralization
T32	Ozonation

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.20

- T33 Photolysis
- T34 Other (specify)

(c) Physical Treatment

(1) Separation of Components

- T35 Centrifugation
- T36 Clarification
- T37 Coagulation
- T38 Decanting
- T39 Encapsulation
- T40 Filtration
- T41 Flocculation
- T42 Flotation
- T43 Foaming
- T44 Sedimentation
- T45 Thickening
- T46 Ultrafiltration
- T47 Other (specify)

(2) Removal of Specific Components

- T48 Absorption molecular sieve
- T49 Activated carbon
- T50 Blending
- T51 Catalysis
- T52 Crystallization
- T53 Dialysis
- T54 Distillation
- T55 Electrodialysis
- T56 Eletrolysis
- T57 Evaporation
- T58 High gradient magnetic separation
- T59 Leaching
- T60 Liquid ion exchange
- T61 Liquid liquid extraction
- T62 Reverse osmosis
- T63 Solvent recovery
- T64 Stripping
- T65 Sand filter
- T66 Other (specify)

DEPARTMENT OF THE ENVIRONMENT

26.13.05.20

(d) Biological Treatment

- T67 Activated sludge
- T68 Aerobic lagoon
- T69 Aerobic tank
- T70 Anaerobic tank
- T71 Composting
- T72 Septic tank
- T73 Spray irrigation
- T74 Thickening filter
- T75 Trickling filter
- T76 Waste stabilization pond
- T77 Other (specify)
- T78-79 (Reserved)

(e) Boilers and Industrial Furnaces

- T80 Boiler
- T81 Cement kiln
- T82 Lime kiln
- T83 Aggregate kiln
- T84 Phosphate kiln
- T85 Coke oven
- T86 Blast furnace
- T87 Smelting, melting, or refining furnace
- T88 Titanium dioxide chloride process oxidation reactor
- T89 Methane reforming furnace
- T90 Pulping liquor recovery furnace
- T91 Combustion device used in the recovery of sulfur values from spent sulfuric acid
- T92 Halogen acid furnaces
- T93 Other industrial furnaces listed in COMAR 26.13.01.03 (specify)

(f) Other Treatment

- T94 Containment building (treatment)

3. Disposal

- D79 Underground Injection
- D80 Landfill
- D81 Land treatment
- D82 Ocean disposal
- D83 Surface impoundment (to be closed as a landfill)
- D99 Other disposal (specify)

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.21

4. Miscellaneous (Regulation .16-1 of this chapter)

X02	Open burning or open detonation
X02	Mechanical processing
X03	Thermal unit
X04	Geologic repository
X99	Other miscellaneous under Regulation .16-1 of this chapter (specify)

**.21 Hazardous Waste Munitions and Explosives Storage.**

A. Applicability.

(1) This regulation applies to owners and operators who store munitions and explosive hazardous wastes, except as Regulation .01 of this chapter and §A(2) and (3) of this regulation otherwise provide.

(2) Depending on the explosive hazards of the waste, a person may be permitted to manage hazardous waste munitions and explosives in the following types of units rather than under this regulation:

- (a) Containment buildings, subject to Regulations .18—.18-3 of this chapter;
- (b) Containers, subject to Regulation .09 of this chapter; or
- (c) Tanks, subject to Regulations .10—.10-7 of this chapter.

(3) COMAR 26.13.10.30 provides an alternate set of management standards for the storage of waste military munitions.

B. Design and Operating Standards.

(1) The owner or operator of a hazardous waste munitions and explosives storage unit shall assure that the unit is designed and operated with containment systems, controls, and monitoring programs that:

(a) Minimize the potential for detonation or other means of release of hazardous waste, hazardous constituents, hazardous decomposition products, or contaminated run-off, to soil, ground water, surface water, and the atmosphere;

(b) Provide a primary barrier designed to contain the hazardous waste, such as a tank or a container, including a shell;

(c) For wastes stored outdoors, provide that the waste and containers will not be in standing precipitation;

(d) For liquid wastes, provide:

(i) A secondary containment system and operational procedures that assure that any released liquids are contained, quickly detected, and removed from the waste area; or

(ii) A vapor detection system and operational procedures that assure that any released liquids or vapors are quickly detected, and an appropriate response is taken, such as additional overpacking of the waste or removal of the waste from the waste storage area; and

(e) Provide monitoring and inspection procedures that assure that:

(i) The controls and containment systems are working as designed; and

(ii) Releases that may adversely impact human health or the environment are not escaping from the unit.

(2) A person may use one of the following to store hazardous waste munitions and explosives under this regulation:

(a) An earth-covered magazine that:

(i) Is constructed of waterproofed reinforced concrete or structural steel arches;

(ii) Incorporates steel doors that are kept closed when the magazine is not being accessed;

(iii) Is designed and constructed to be of sufficient strength and thickness to support the weight of any explosives or munitions stored and any equipment used in the unit, and to withstand the stresses of movement activities within the unit;

(iv) Provides adequate working space for personnel and equipment in the unit; and

26.13.05.22

(v) Will, as a result of the magazine's location and the design of the magazine's walls and earthen covers, direct an explosion in the unit in a safe direction, so as to minimize the propagation of an explosion to adjacent units and to minimize other effects of any explosion;

(b) An above-ground magazine that is located and designed so as to minimize the propagation of an explosion to adjacent units and to minimize other effects of any explosion; or

(c) An outdoor or open storage area that is designed and located so as to minimize the propagation of an explosion to adjacent units and to minimize other effects of any explosion.

(3) Standard Operating Procedure for Storage.

(a) A person shall store hazardous waste munitions and explosives in accordance with a standard operating procedure specifying procedures to ensure safety, security, and environmental protection.

(b) A person may use the standard operating procedure to fulfill the requirements of Regulation .02E of this chapter concerning security and inspection, Regulation .03 of this chapter concerning preparedness and prevention procedures, and Regulation .04 of this chapter concerning contingency plan and emergency procedures if the standard operating procedure serves the same purpose as these requirements.

(4) A person managing hazardous waste munitions and explosives under this regulation shall assure that:

(a) The items are:

(i) Packaged to ensure safety in handling and storage; and

(ii) Inventoried at least once each calendar year, with no more than 365 days elapsing between inventory dates; and

(b) Hazardous waste munitions and explosives and their storage units are inspected and monitored as necessary to ensure:

(i) Explosives safety; and

(ii) That there is no migration of contaminants out of the unit.

C. Closure and Post-Closure Care.

(1) At the closure of a magazine or unit that was used to store hazardous waste munitions and explosives under this regulation, the owner or operator shall:

(a) Remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoil, and structures and equipment contaminated with waste; and

(b) Manage the materials in §C(1)(a) of this regulation as hazardous waste unless COMAR 26.13.02.03D applies.

(2) The owner or operator shall assure that the closure plan, closure activities, cost estimates for closure, and financial responsibility for the magazines or units operated under this regulation meet all of the requirements specified in Regulations .07 and .08 of this chapter, except that the owner or operator may defer closure of the unit as long as it remains in service as a munitions or explosives magazine or storage unit.

(3) If the owner or operator finds, 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 §C(1) of this regulation, that not all contaminated subsoils can be practicably removed or decontaminated, the owner or operator shall close the facility and perform post-closure care in accordance with the closure and post-closure requirements of Regulation .14J of this chapter applying to landfills.

**.22 EPA Interim Primary Drinking Water Standards.**

<i>Parameter</i>	<i>Maximum Level (milligrams/liter)</i>
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Fluoride	1.4 - 2.4
Lead	0.05
Mercury	0.002
Nitrate (as N)	10
Selenium	0.01
Silver	0.05
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
2,4-D	0.1
2,4,5-TP Silvex	0.01

	<i>Maximum Level</i>
Radium	5 pCi/liter
Gross Alpha	15 pCi/liter
Gross Beta	4 millirem/yr
Turbidity	1/TU
Coliform Bacteria	1/100 milliliter

(Comment: Turbidity is applicable only to surface water supplies.)

**.23 Cochran's Approximation to the Behrens-Fisher Student's t-test.**

A. Using all the available background data ( $n_b$  readings), calculate the background mean ( $x_b$ ) and background variance  $S_b^2$ . For the single monitoring well under investigation ( $n_m$  reading), calculate the monitoring mean ( $x_m$ ) and monitoring variance  $S_m^2$ . For any set of data ( $x_1, x_2 \dots x_n$ ), the mean is calculated by:

$$\bar{X} = \frac{X_1 + X_2 \dots + X_n}{n}$$

and the variance is calculated by:

$$s^2 = \frac{(X_1 - \bar{X})^2 + (X_2 - \bar{X})^2 \dots + (X_n - \bar{X})^2}{n-1}$$

where "n" denotes the number of observations in the set of data.

B. The t-test uses these data summary measures to calculate a t-static ( $t^*$ ) and a comparison t-statistic ( $t_c$ ). The  $t^*$  value is compared to the  $t_c$  value and a conclusion reached as to whether there has been a statistically significant change in any indicator parameter.

26.13.05.23

C. The t-statistic for all parameters except pH and similar monitoring parameters is:

$$t^* = \frac{X_m - \bar{X}_b}{\sqrt{\frac{S_m^2}{n_m} + \frac{S_b^2}{n_b}}}$$

D. If the value of this t-statistic is negative then there is no significant difference between the monitoring data and background data. It should be noted that significantly small negative values may be indicative of a failure of the assumption made for test validity or errors have been made in collecting the background data.

E. The t-statistic ( $t_c$ ) against which  $t^*$  will be compared, necessitates finding  $t_b$  and  $t_m$  from standard (one-tailed) tables where,  $t_b$  = t-tables with  $(t_b^{-1})$  degrees of freedom, at the 0.05 level of significance.

F.  $t_m$  = t-tables with  $(n_m^{-1})$  degrees of freedom, at the 0.05 level of significance.

G. Finally, the special weighting  $W_B$  and  $W_M$  are defined as:

$$W_B = \frac{S_B^2}{n_B} \quad \text{and} \quad W_m = \frac{S_m^2}{n_m}$$

and so the comparison t-statistic is:

$$t_c = \frac{W_B t_B + W_m t_m}{W_B + W_m}$$

H. The t-statistic ( $t^*$ ) is now compared with the comparison t-statistic ( $t_c$ ) using the following decision-rule:

(1) If  $t^*$  is equal to or larger than  $t_c$ , then conclude that there most likely has been a significant increase in this specific parameter;

(2) If  $t^*$  is less than  $t_c$ , then conclude that most likely there has not been a change in this specific parameter.

I. The t-statistic for testing pH and similar monitoring parameters is constructed in the same manner as previously described except the negative sign (if any) is discarded and the caveat concerning the negative value is ignored. The standard (two-tailed) tables are used in the construction  $t_c$  for pH and similar monitoring parameters.

J. If  $t^*$  is equal or larger than  $t_c$ , then conclude that there most likely has been a significant increase (if the initial  $t^*$  had been negative, this would imply a significant decrease). If  $t^*$  is less than  $t_c$ , then conclude that there most likely has been no change.

K. A further discussion of the test may be found in Statistical Methods (6th Edition, Section 4.14) by G.W. Snedecor and W.G. Cochran, or Principles and Procedures of Statistics (1st Edition, Section 5.8) by R.G.D. Steel and J.H. Torrie.



**Standard t-Tables**  
**0.05 Level of Significance**

<i>Degrees of Freedom</i>	<i>t-values (one-tail)</i>	<i>t-values (two-tail)</i>
1	6.314	12.708
2	2.920	4.303
3	2.353	3.182
4	2.132	2.776
5	2.015	2.571
6	1.943	2.447
7	1.895	2.365
8	1.860	2.306
9	1.833	2.262
10	1.812	2.228
11	1.796	2.201
12	1.782	2.179
13	1.771	2.160
14	1.761	2.145
15	1.753	2.131
16	1.746	2.120
17	1.740	2.110
18	1.734	2.101
19	1.729	2.093
20	1.725	2.086
23	1.714	2.069
24	1.711	2.064
25	1.708	2.060
30	1.697	2.042
40	1.684	2.021

**.24 Examples of Potentially Incompatible Waste.**

A. Many hazardous wastes, when mixed with other waste or materials at a hazardous waste facility, can produce effects which are harmful to human health and environment, such as:

- (1) Heat or pressure;
- (2) Fire or explosion;
- (3) Violent reaction;
- (4) Toxic dusts, mists, fumes, or gases; or
- (5) Flammable fumes or gases.

DEPARTMENT OF THE ENVIRONMENT

26.13.05.24

B. Below are examples of potentially incompatible wastes, waste components, and materials, along with the harmful consequences which result from mixing materials in one group with materials in another group. The list is intended as a guide to owners or operators of treatment, storage, and disposal facilities, and to enforcement and permit granting officials, to indicate the need for special precautions when managing these potentially incompatible waste materials or components.

C. This list is not intended to be exhaustive. An owner or operator must, as the regulations require, adequately analyze his wastes so that he can avoid creating uncontrolled substances or reactions of the type listed below, whether they are listed below or not.

D. It is possible for potentially incompatible wastes to be mixed in a way that precludes a reaction (e.g., adding acid to water rather than water to acid) or that neutralizes them (e.g., a strong acid mixed with a strong base), or that controls substances produced (e.g., by generating flammable gases in a closed tank equipped so that ignition cannot occur, and burning the gases in an incinerator).

E. In the lists below, the mixing of a Group A material with a Group B material may have the potential consequence as noted:

*Group 1-A*

Acetylene sludge  
Alkaline caustic liquids  
Alkaline cleaner  
Alkaline corrosive liquids  
Alkaline corrosive battery fluid  
Caustic wastewater  
Lime sludge and other corrosive alkalines  
Lime wastewater  
Lime and water  
Spent caustic

*Group 1-B*

Acid sludge  
Acid and water  
Battery acid  
Chemical cleaners  
Electrolyte, acid  
Etching acid liquid or solvent  
Pickling liquor and other corrosive acids  
Spent acid  
Spent mixed acid  
Spent sulfuric acid

Potential consequences: Heat generation; violent reaction.

*Group 2-A*

Aluminum  
Beryllium  
Calcium  
Lithium  
Magnesium  
Potassium  
Sodium  
Zinc powder  
Other reactive metals and metal hydrides

*Group 2-B*

Any waste in Group 1-A or 1-B

Potential consequences: Fire or explosion; generation of flammable hydrogen gas.

*Group 3-A*

Alcohols  
Water

*Group 3-B*

Any concentrated waste in Groups 1-A or 1-B  
Calcium  
Lithium  
Metal hydrides  
Potassium  
SO<sub>2</sub>Cl<sub>2</sub>, SOCl<sub>2</sub>, PCl<sub>3</sub>, CH<sub>3</sub>SiCl<sub>3</sub>  
Other water-reactive waste

Potential consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases.

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.24

<i>Group 4-A</i>	<i>Group 4-B</i>
Alcohols	Concentrated Group 1-A or 1-B wastes
Aldehydes	
Halogenated hydrocarbons	Group 2-A wastes
Nitrated hydrocarbons	
Unsaturated hydrocarbons	
Other reactive organic compounds and solvents	

Potential consequences: Fire, explosion, or violent reaction.

<i>Group 5-A</i>	<i>Group 5-B</i>
Spent cyanide and sulfide solutions	Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulfide gas.

<i>Group 6-A</i>	<i>Group 6-B</i>
Chlorates	Acetic acid and other organic acids
Chlorine	
Chlorites	Concentrated mineral acids
Chromic acid	Group 2-A wastes
Hypochlorites	Group 4-A wastes
Nitrates	Other flammable and combustible wastes
Nitric acid, fuming	
Perchlorates	
Permanganates	
Peroxides	
Other strong oxidizers	

Potential consequences: Fire, explosion, or violent reaction.

Source: "Law, Regulations, and Guidelines for Handling of Hazardous Waste", California Department of Health, February 1975.

**Administrative History**

Effective date:

- Regulations .01—.18 adopted as an emergency provision effective November 18, 1980 (7:25 Md. R. S-1); adopted permanently effective April 3, 1981 (8:7 Md. R. 642)
- Regulations .01, .05G, .06, .08A, .11C, .12D, and .14C amended effective January 18, 1982 (9:1 Md. R. 20)
- Regulations .01—.12, .18 amended effective January 31, 1983 (10:2 Md. R. 110)
- Regulations .01A, B, .02F, .05D, H, .07C, D, G, H, .08A, .09G, .10D, F, .11A-1, C, E—G, .12A, B, D, D-1, E, G, .13, .14, .15A, .16A, .18 (Appendix IV) amended, .15-1 adopted, .06 repealed and new .06 adopted, .10I, .12C-1, and .18 (Appendices VI—XIII) repealed effective February 13, 1984 (11:3 Md. R. 202)
- Regulations .01A, .02D, F, .05G, .06A, I, .07A, D, I, .10D, .11B, F, F-1, .12D-1, .14A—C, J, L, .15-1A, D amended, and .01C adopted effective July 30, 1984 (11:15 Md. R. 1330)
- Regulation .01A amended effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .02I, J adopted effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .04G amended effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .05A, D amended effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .06A amended effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .06L adopted effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .07B amended effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .07C—J repealed and new C—J adopted effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .08A amended effective April 18, 1988 (15:8 Md. R. 1009)
- Regulation .09F, H, and I amended effective April 18, 1988 (15:8 Md. R. 1009)

DEPARTMENT OF THE ENVIRONMENT

26.13.05.24

Regulation .10D, E amended effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .10I adopted effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .11A-1, B, C, E, F, F-1 amended effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .12B, D-1 amended effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .12I adopted effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .13N adopted effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .14B, C amended effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .14P adopted effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .15A amended effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .15-1B, C, and F amended effective April 18, 1988 (15:8 Md. R. 1009)  
 Regulation .16G adopted effective April 18, 1988 (15:8 Md. R. 1009)

Regulation .10C-1 – I recodified to .10D – J  
 Regulation .11A-1 – F recodified to .11B – G  
 Regulation .11F-1 – I recodified to .11H – K  
 Regulation .12D-1 and D-2 recodified to .12E and F  
 Regulation .12E – H recodified to .12G – J  
 Regulation .15-1 recodified to Regulation .16  
 Regulations .16 – .18 recodified to Regulations .17 – .19  
 Appendix I – Appendix V codified as Regulations .20 – .24

Chapter recodified from COMAR 10.51.05 to COMAR 26.13.05

Regulation .01A amended effective May 24, 1993 (20:10 Md. R. 853)  
 Regulation .01C amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .02D amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .02F amended effective April 1, 1991 (18:6 Md. R. 690); May 24, 1993 (20:10 Md. R. 853)  
 Regulation .04G amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .05B amended effective May 24, 1993 (20:10 Md. R. 853)  
 Regulation .05D amended effective April 1, 1991 (18:6 Md. R. 690); December 23, 1991 (18:25 Md. R. 2759); May 24, 1993 (20:10 Md. R. 853)  
 Regulation .05F amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .06A amended effective April 1, 1991 (18:6 Md. R. 690)  
 Regulation .06K amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .07A, E, and F amended effective May 24, 1993 (20:10 Md. R. 853)  
 Regulation .07B, C, E, G, and H amended effective April 1, 1991 (18:6 Md. R. 690)  
 Regulation .07B, F amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .08A amended effective April 1, 1991 (18:6 Md. R. 690)  
 Regulation .08B amended effective November 9, 1992 (19:22 Md. R. 1991)  
 Regulation .10 repealed and new Regulations .10—10-7 adopted effective May 24, 1993 (20:10 Md. R. 853)  
 Regulation .10G amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .11D amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .14B, N amended effective December 23, 1991 (18:25 Md. R. 2759)  
 Regulation .16-1 adopted effective April 1, 1991 (18:6 Md. R. 690) (Regulation .16-1 was initially adopted as Regulation .17. The recodification to Regulation .16-1 negated the need for some changes to cross-references shown in the Maryland Register.)  
 Regulation .20A amended effective December 23, 1991 (18:25 Md. R. 2759)

Chapter revised effective April 11, 1994 (21:7 Md. R. 533)

Regulation .01A amended effective August 28, 1995 (22:17 Md. R. 1321)  
 Regulation .01 amended effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .05F, H amended effective May 5, 1997 (24:9 Md. R. 659)  
 Regulation .07D amended effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .08A amended effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .08B amended effective August 28, 1995 (22:17 Md. R. 1321)  
 Regulation .10A amended effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .14N amended effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .16A, F amended effective May 8, 1995 (22:9 Md. R. 648)  
 Regulation .16D amended effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .17-1 adopted effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .17-2 adopted effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .17-3 adopted effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .17-4 adopted effective September 10, 1997 (24:5 Md. R. 413)  
 Regulation .21 repealed effective May 5, 1997 (24:9 Md. R. 659)

Chapter revised effective October 16, 2000 (27:20 Md. R. 1843)

Regulation .01A amended effective November 1, 2002 (29:21 Md. R. 1647); May 1, 2008 (35:8 Md. R. 809)  
 Regulation .01D amended effective May 1, 2008 (35:8 Md. R. 809)

DISPOSAL OF CONTROLLED HAZARDOUS SUBSTANCES

26.13.05.24

- Regulation .02C amended effective November 1, 2002 (29:21 Md. R. 1647)
- Regulation .02-1 recodified from COMAR 26.13.06.01 effective October 16, 2000 (27:20 Md. R. 1843)
- Regulation .04G amended effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .05 amended effective September 11, 2006 (33:18 Md. R. 1507)
- Regulation .05A, C amended effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .05B amended effective November 1, 2002 (29:21 Md. R. 1647)
- Regulation .07 amended effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .08B amended effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .16F amended effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .17-3E amended effective November 1, 2002 (29:21 Md. R. 1647)
- Regulation .18 adopted effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .18-1 adopted effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .18-2 adopted effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .18-3 adopted effective May 1, 2008 (35:8 Md. R. 809)
- Regulation .21 adopted effective May 1, 2008 (35:8 Md. R. 809)

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