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Solid Waste

EPA

Hazardous Waste Facilities Storage/Treatment Standards

A Summary of the Regulations

Standards for Owners and Operators of Hazardous Waste Facilities

The Resource Conservation and Recovery Act of 1976 (RCRA) calls for a national program to control hazardous waste. All wastes identified as hazardous in the regulations issued under Subtitle C of RCRA are tracked by manifests from where they originate to their final disposition at a facility with authority from the U.S. Environmental Protection Agency (EPA) or an authorized State to treat, store, or dispose of hazardous waste. Regulations for carrying out Subtitle C of RCRA are set forth in the Code of Federal Regulations (40 CFR Parts 260 to 266 and 122 to 124). The Federal hazardous waste program became effective November 19, 1980.

One portion of the EPA regulations covering owners and operators of hazardous waste facilities sets standards for containers, tanks, surface impoundments, and waste piles. These facilities are covered by two types of standards:

- general requirements for all hazardous waste management facilities
- specific requirements for the various types of facilities

The regulations covering hazardous waste management facilities--of which the standards for storage and treatment facilities are a part--apply to two types of facilities operating under the RCRA program for controlling hazardous waste:

- those with Interim Status. These facilities were in existence on November 19, 1980 (the effective date of the regulations). They have notified EPA of their hazardous waste activities and have applied for a permit, though processing of their applications has not been completed. During the processing period, they must comply with Interim Status Standards set forth in Part 265 of Title 40 of the Code of Federal Regulations. These selected minimum requirements will move their operations toward RCRA's goal of protecting human health and the environment.
- those with a permit, either from EPA or a State authorized to permit hazardous waste management facilities under RCRA. These facilities must comply with the General (Permit) Standards (Part 264), which are intended to ensure accomplishment of RCRA's goal. All new facilities are covered by the General Standards.

The Interim Status Standards specifically covering containers holding hazardous waste, and tanks, surface impoundments, and waste piles used for storage or treatment, were promulgated on May 19, 1980. Their effective date is November 19, 1980. The General Standards were promulgated in January 1981 and will be effective 6 months later. They are based on a strategy requiring a primary containment device designed to prevent leakage and overflow as long as the wastes remain in the storage facilities. An inspection program is required to monitor deterioration in the primary containment system so that it can be repaired or replaced before any hazardous waste is released in the environment; or, failing that, to detect leaks before they become major or result in significant contamination of soil, ground water, and surface water. Finally, where the primary containment devices are easily damaged or inspection is difficult, secondary containment devices are required for the various types of storage facilities.

Treatment and storage facilities may present hazards that are regulated under the special requirements for ignitable, reactive, or incompatible wastes. EPA is also developing additional standards for chemical, physical, and biological treatment, some of which may be applicable to treatment in tanks, surface impoundments, and waste piles. However, the present storage standards provide baseline protection to prevent contamination of the environment.

Standards for disposal of hazardous waste in surface impoundments and waste piles will be promulgated later as part of the regulations for land disposal.

This document summarizes the major features of the Interim Status and General Standards for tanks, containers, surface impoundments, and waste piles as they appear in the Federal Register of May 19, 1980 (45 FR33244-7) and the appropriate issue of January 1981. In addition, owners or operators of these facilities must comply with the general requirements for all hazardous waste facilities.

Containers Interim Status and General Standards

The standards for containers (defined as portable devices in which a material is stored, transported, treated, disposed of, or otherwise handled) require that the containers be in good condition. If a container begins to leak, the owner or operator must transfer the contents to a good drum, or manage the waste in some other way that complies with the facility standards. The container must be made of, or lined with, materials that are compatible with its contents. The container must always be closed during storage, except when waste is being added or removed.

At least weekly, the owner or operator must inspect areas where containers are stored, looking for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors. In addition, the owner or operator must meet the general inspection standards, including a written inspection schedule, records of inspections (as well as any repairs made), and retention of records for 3 years (Section 264.15).

Under the General Standards in Part 264, the storage areas for containers must have containment systems meeting the following specifications:

- o a base underlying the containers that is free of cracks or gaps and sufficiently impervious to contain leaks, spills, and accumulated rainfall until the collected material is detected and removed;
- o efficient drainage so that standing liquid does not remain on the base longer than 1 hour after a leak or precipitation, unless the containers are elevated or in some other manner protected from contact with accumulated liquids;
- o a collection system with sufficient capacity to hold 10 percent of the contents of containers, or the contents of the largest container, whichever is greater;
- o a means of preventing run-on into the containment system, unless the EPA Regional Administrator waives the requirement in the permit after determining that the collection system has enough excess capacity (in addition to that required to meet the previous provision) to accommodate any run-on that might enter the system.

Spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area promptly to prevent overflow of the collection system, and any materials removed must be managed as hazardous waste if they meet the definition of a hazardous waste in the regulations.

Special requirements for containers holding ignitable or reactive wastes specify that they must be located at least 15 meters (50 feet) from the facility's property line.

Incompatible wastes or other materials must not be placed in the same container. Also, hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material. To prevent fires, explosions, gaseous emissions, leaching, or other discharges of hazardous waste, containers holding incompatible wastes must be separated from each other or protected by dikes, berms, walls, or other devices. In addition, the owner or operator must meet the general requirements covering ignitable, reactive, or incompatible wastes, including separating and protecting waste from sources of ignition or reaction and confining smoking and open flames to specially designated locations (Sections 264.17, 265.17).

Finally, the General Standards require that, at closure, all hazardous waste and hazardous waste residues be removed from the containment system. Remaining containers, liners, bases, and soil must be decontaminated or removed. In addition, the general requirements for closing any hazardous waste facility must be followed, including:

- o a written closure plan identifying the steps necessary to close the facility completely within 6 months of receiving the final wastes (Sections 264.112, 265.112);
- o a cost estimate for closure, which must be amended for any changes in operations that affect costs and adjusted annually for inflation (Sections 264.142, 265.142);
- o a trust fund, letter of credit, or surety bond that guarantees there will be sufficient funds to close the facility properly (Sections 264.143, 265.143).

Tanks
Interim Status Standards

The Interim Status Standards for tanks (defined as stationary devices constructed primarily of nonearthen materials such as wood, concrete, steel, or plastic providing structural support) apply to all tanks used to treat or store hazardous waste.

Under the operating requirements:

- o hazardous wastes or treatment reagents must not be placed in a tank if they could cause the tank or its inner liner to fail in any manner before the end of its intended life;
- o uncovered tanks must be operated to provide at least 60 centimeters (2 feet) of "freeboard" (the empty space above the waste level), unless the tank is equipped with a containment structure, a drainage control system, or a diversion structure with a capacity that equals or exceeds the volume of the top 60 centimeters of the tank.

In addition to the waste analysis required in the General Standards, an analysis is necessary whenever a tank is to be used for a different waste or process than used previously. Alternatively, documented information on a similar waste or process waste can be substituted for the analysis.

In addition to the general inspection standards (see discussion of containers), regular inspections are required of the following:

- o equipment for control of overfilling--at least once each operating day
- o data gathered from monitoring equipment (pressure and temperature gauges, for example)--at least once each operating day
- o for uncovered tanks, the level of waste--at least once each operating day
- o construction materials of the above-ground portions of the tank--at least weekly
- o area immediately surrounding the tank--at least weekly

Also, the condition of the tank must be assessed regularly and procedures developed for responding to spills and leaks.

At closure, all hazardous waste and hazardous waste residues must be removed from tanks, discharge control equipment, and discharge confinement structures. They must be managed as hazardous wastes unless the owner or operator can demonstrate that they are not hazardous. In addition, the General Standards for closing any hazardous waste facility must be followed. (See discussion of containers.)

An ignitable or reactive waste can be placed in a tank only if:

- o it has been treated or mixed before or immediately after it is placed in the tank so that it is no longer ignitable or reactive
- o it is managed in such a way that it cannot ignite or react
- o the tank is used solely for emergencies

The owner or operator of a facility that treats or stores ignitable or reactive waste in covered tanks must comply with the buffer zone requirements of the National Fire Protection Association.

Incompatible wastes, or incompatible wastes and materials, must not be placed in the same tank unless special precautions are taken to prevent dangerous reactions. Also, hazardous waste must not be placed in an unwashed tank that previously held an incompatible waste or material unless special precautions are taken.

Tanks: General Standards

The General Standards for tanks apply to all tanks used to treat or store hazardous waste except covered underground tanks that cannot be entered for inspection. EPA is still studying that type of storage facility.

Tanks must be designed with strong enough shells--and, for closed tanks, vents or other ways of controlling pressure--to assure that they do not collapse or rupture. In processing a permit, EPA's Regional Administrator reviews the design of the tank, including the foundation, structural support, seams, and pressure controls. The minimum shell thickness is based on width, height, and materials of construction of the tank, plus the specific gravity of the waste to be placed in the tank.

Wastes and other materials (for example, treatment reagents) can be placed in the tank only if it is protected from accelerated corrosion, erosion, or abrasion through the use of one of these:

- an inner liner or coating that is compatible with the waste material and that is free of leaks, cracks, holes, or other deterioration
- other means of protection such as cathodic protection or corrosion inhibitors

Overfilling of tanks must be controlled by, for example, a system for cutting off waste feed or for bypassing the waste to a standby tank. For uncovered tanks, freeboard must be kept low enough to prevent overtopping by wave or wind action or by precipitation.

The five regular inspections required by Interim Status Standards are also required by the General Standards. The owners and operators must also meet the general inspection schedule. (See discussion of containers.) As part of this schedule, they must regularly assess the condition of the tank. Procedures for emptying a tank must be established to detect corrosion or erosion of the interior.

As part of the contingency plan (Sections 264.38-49), the owner or operator must specify the procedures to be used to respond to tanks' spills or leakage, including the procedures and timing for prompt removal of spilled waste and repair of the tank.

General Standards for closure and special requirements for ignitable, reactive, and incompatible wastes are similar to the Interim Status Standards.

Surface Impoundments Interim Status Standards

The Interim Status Standards for surface impoundments apply to surface impoundments that treat, store, or dispose of hazardous waste.

A surface impoundment must maintain at least 60 centimeters (2 feet) of freeboard.

All earthen dikes must have a protective cover (grass, shale, or rock, for example) to minimize erosion by wind and water and to preserve their structural integrity.

In addition to the waste analyses required by the General Standards, an analysis is necessary whenever a surface impoundment is to be used for a different waste or process than used previously. Alternatively, documented information on a similar waste or process waste can be substituted for the analysis.

The following inspections are required:

- o freeboard level--at least once each operating day
- o surface impoundment (including dikes and vegetation surrounding the dikes)--at least once a week

In addition, the general inspection standards must be followed. (See discussion of containers.)

At closure, the owner or operator may elect to remove from the impoundment:

- o standing liquids
- o waste and waste residues
- o any liners
- o underlying and surrounding contaminated soil

Any materials removed must be managed as hazardous waste unless the owner or operator can demonstrate that they are not hazardous. If the materials are not removed or remaining materials are not demonstrated to be nonhazardous, the impoundment must be closed and maintained after closure as a landfill. In addition, the General Standards for closing any hazardous waste facility must be followed. (See discussion of containers.)

Surface Impoundments General Standards

The General Standards for surface impoundments (defined as natural depressions, man-made excavations, or dike areas formed primarily of earthen materials, but sometimes lined with man-made materials, including holding, storing, settling, and aeration pits, ponds, and lagoons) currently apply only to surface impoundments used to treat or store hazardous waste.

The design requirements call for the following:

- o at least 60 centimeters (2 feet) of freeboard, or documentation that a different amount will prevent overtopping;
- o a system for immediately shutting off the flow of waste in the event of overtopping or liner failure;
- o a containment system for preventing discharge during the life of the impoundment into the land, surface water (except for discharges authorized by a permit under the National Pollutant Discharge Elimination System), and ground water;
- o dikes able to prevent massive failure without dependence on any liner system;
- o a system for detecting, collecting, and removing leachate. The liquid must be able to flow freely from the collection system.

The operating requirements call for:

- o preventing any overtopping owing to wind and wave action, overfilling, and precipitation
- o maintaining the required amount of freeboard
- o maintaining the leachate detection, collection, and removal system so that liquid flows freely from the collection system and is removed as it accumulates
- o keeping earthen dikes free of plant roots and burrowing mammals that could impair their structural integrity
- o diverting run-on away from the impoundment

The containment system must include:

- o earthen dikes with protective cover (grass, shale, or rock, for example) to minimize erosion by wind and water and to preserve their structural integrity;
- o a liner system designed to prevent discharge into the land during the life of the surface impoundment. The liner system must:
  - -- be constructed of a highly impermeable material in contact with the waste
  - -- be equipped with a leachate detection, collection, and removal system
  - -- be located above the water table
  - -- be constructed of materials and on a foundation that prevents failure owing to pressure, physical contact with the waste, or leachate, climatic conditions, and stress of installation

A number of inspections and tests are required. During construction or installation, liner systems must be inspected for uniformity, damage, and imperfections. While in operation, the following regular inspections are required:

- o a surface impoundment containing free liquids--at least once each operating day
- o all surface impoundments (including dikes, berms, and vegetation surrounding the dike)--at least once a week and after storms

The structural integrity of any dike must be certified against massive failure by a qualified engineer before a permit is issued or reissued; if the impoundment is not in service, it must be certified prior to being placed in service after construction or being returned to service (Section 264.226). In addition, the owner or operator must meet the general inspection standards. (See discussion of containers.)

The standards for repairing the containment system and planning for contingencies impose the following requirements:

- o Whenever there is any indication of a possible failure of a containment system (for example, a gradual drop in liquid level or erosion of the dike), the system must be inspected.
- o Whenever there is a positive indication of a failure of a containment system (for example, waste in the leachate detection system), the impoundment must be removed from service. Then the owner or operator must:

-- immediately shut off the flow of waste into the impoundment
-- immediately contain any leakage
-- immediately stop the leak
-- empty the impoundment if the leak cannot be stopped

As part of the contingency plan, the owner or operator must specify:

- a procedure for complying with the requirement for closing a surface impoundment
- a plan for evaluating the containment system and for repairing it if it fails but the impoundment does not have to be removed from service

A surface impoundment that has been removed from service may be reopened only if the containment system has been repaired and if a qualified engineer certifies that it meets the design specifications of its permit. If the surface impoundment is not reopened, it must be closed according to the closure requirements.

At closure, all hazardous waste and hazardous waste residues must be removed from the impoundment. All components of the containment system and related structures must be decontaminated or removed. In addition, the General Standards for closing any hazardous waste facility must be followed. (See discussion of containers.)

Ignitable or reactive waste can be placed in a surface impoundment only if:

- it has been treated or mixed before or immediately after it is placed in the impoundment so that it is no longer ignitable or reactive
- it is managed in such a way that it cannot ignite or react
- the impoundment is used solely for emergencies

Incompatible wastes, or incompatible waste and materials, must not be placed in the same surface impoundment unless special precautions are taken.

General Standards for ignitable, reactive, and incompatible wastes are similar to the Interim Status Standards.

Waste Piles Interim Status Standards

The Interim Status Standards for waste piles apply to facilities that treat or store noncontainerized accumulations of solid, nonflowing hazardous waste.

Waste piles must be protected from dispersion by wind.

In addition to the waste analyses required by the General Standards, an incoming waste must be analyzed unless the only wastes the facility receives that are amendable to piling are compatible with each other, or the incoming waste is compatible with the waste already in the pile.

If leachate or run-off from a pile is a hazardous waste, then either:

- the pile must be placed on an impermeable base that is compatible with the waste, run-on must be diverted from the pile, and any leachate and run-off must be collected and managed as a hazardous waste, or

- the pile must be protected from precipitation and run-on by some other means, and no liquids or wastes containing free liquids may be added.

Waste Piles General Standards

The General Standards for waste piles apply to piles that treat or store hazardous waste and that are designed and operated to prevent discharge into the land, surface water, and ground water. Regulations on other kinds of piles may be issued later.

Under the design requirements, dispersal of waste by wind or water erosion must be controlled. A containment system must be in place to prevent discharges into the environment during the life of the pile.

Under the operating requirements:

- the Regional Administrator specifies practices needed to control wind dispersal of hazardous waste from piles, where necessary
- run-on must be diverted away from piles
- leachate and run-off from piles must be collected and controlled. If the collected material is a hazardous waste, it must be managed according to RCRA regulations. If it is discharged through a point source to waters of the United States, it is subject to Section 402 of the Clean Water Act as amended.

The containment system must consist of:

- a system for collecting and controlling leachate and run-off
- a base liner to prevent discharge during the life of the pile into the land, surface water, or ground water. The liner must be able to prevent failure due to physical damage from equipment used to place waste on the pile or to clean and expose the liner for inspection. The liner does not have to be able to prevent failure due to physical damage if there is a system below the liner, but above the water table, to detect, contain, collect, and remove any discharge through the base.

The base of the pile must be constructed of materials and on a foundation that prevent failure due to pressure, physical contact with the waste, climatic conditions, and the stress of installation. Finally, the containment system must be protected from plant growth that could puncture any component.

During construction or installation of the waste pile base, liner systems (including manufactured liner materials) must be inspected. In addition, the owner or operator must meet the general inspection standards. (See discussion of containers.)

The standards for repairing the containment system and planning for contingencies impose the following requirements:

- whenever there is any indication of a possible failure of a containment system (for example, liquid detected below the base or deterioration of the liner), the system must be inspected;
- whenever there is a positive indication of a failure of a containment system (for example, waste in the leachate detection system), the pile must be removed from service. Then the owner or operator must:

-- immediately stop adding waste to the pile
-- immediately contain any leakage
-- immediately stop the leak
-- remove the waste if the leak cannot be stopped

As part of the contingency plan, the owner or operator must specify:

- a procedure for complying with the requirement for closing a waste pile
- a plan for evaluating the containment system and for repairing it if it fails but the pile does not have to be removed from service

A waste pile that has been removed from service may be reopened only if the containment system has been repaired and if a qualified engineer certifies that it meets the design specifications of its permit. If the pile is not reopened, it must be closed according to the closure requirements.

Ignitable or reactive waste can be placed in a waste pile only if:

- its addition to an existing pile results in a mixture that is no longer ignitable or reactive
- it is managed in such a way that it cannot ignite or react

Incompatible wastes must be managed as follows:

- Incompatible wastes, or incompatible wastes and materials, must not be placed in the same pile unless special precautions are taken.
- A pile of hazardous waste that is incompatible with any waste or material stored nearby must be separated from the other materials or protected by some device.
- Hazardous waste must not be piled on an area where incompatible wastes or materials were previously piled unless the area has been decontaminated.

At closure, all hazardous waste and hazardous waste residues must be removed from the pile. Any component of the containment system that is contaminated must be decontaminated or removed. In addition, the general standards for closing any hazardous waste facility must be followed. (See discussion of containers.)

The General Standards for ignitable, reactive, and incompatible wastes are similar to the Interim Status Standards.

Major Features	40 CFR Parts 264/265
Where to Find Them in the Regulations	CONTAINERS--Subpart I

Applicability (264.170, 265.170)
Condition of Containers (264.171, 265.171)
Compatibility of Waste with Container (264.172, 265.172)
Management of Containers (264.173, 265.173)
Inspections (264.174, 265.174)
Containment (264.175)
Ignitable and Reactive Wastes (264.176, 265.176)
Incompatible Wastes (264.177, 265.177)
Closure (264.178)

TANKS--Subpart J

Applicability (264.190, 265.190)
Design of Tanks (264.191)
General Operation (264.192, 265.192)
Waste Analysis and Trial Tests (265.193)
Inspections (264.194, 265.194)
Closure (264.197, 265.197)
Ignitable or Reactive Waste (264.198, 265.198)
Incompatible Wastes (264.199, 265.199)

SURFACE IMPOUNDMENTS--Subpart K

Applicability (264.220, 265.220)
General Design (264.221)
General Operation (264.222, 265.222)
Containment Systems (264.223, 265.223)
Waste Analysis and Trial Tests (265.225)
Inspections and Testing (264.226)
Inspections (265.226)
Repairs, Contingency Plans (264.227)
Closure (264.228)
Closure and Postclosure (265.228)
Ignitable or Reactive Waste (264.229, 265.229)
Incompatible Wastes (264.230, 265.230)

WASTE PILES--Subpart L

Applicability (264.250, 265.250)

General Design (264.251)

Protection from Wind (265.251)

General Operation (264.252)

Waste Analysis (265.252)

Containment Systems (264.253)

Containment (265.253)

Inspections and Testing (264.254)

Repairs, Contingency Plans (264.255)

Ignitable or Reactive Waste (264.256, 265.256)

Incompatible Wastes (264.257, 265.257)

Closure (264.258)