RCRA Training Module

Solid Waste and Emergency Response
(5305W)
EPA530-K-05-008

Introduction to

Containment Buildings
(40 CFR Parts 264/265, Subpart DD)

United States
Environmental Protection
Agency

September 2005

CONTAINMENT BUILDINGS

CONTENTS

1. INTRODUCTION

Through the inception of the Resource Conservation and Recovery Act (RCRA) program, EPA has created a system of hazardous waste management that is protective of human health and the environment, yet not overly burdensome to industry. With the advent of the land disposal restrictions (LDR) in 1986, some waste management difficulties arose, particularly concerning bulky, large volume wastes that are not amenable to storage in tanks and containers (e.g., lead slags, spent potliners, and contaminated debris). Instead, these wastes were often stored and treated on concrete pads or floors in buildings. Because this type of management would be considered land disposal, it was prohibited without prior treatment, but no other feasible storage or treatment unit existed.

In 1992, EPA developed standards for a new hazardous waste management unit called a containment building (57 FR 37194; August 18, 1992). Containment buildings, which are essentially waste piles enclosed in a building, facilitate management of bulky materials without triggering LDR. This module outlines the regulatory standards in 40 CFR Parts 264/265, Subpart D, for containment buildings managing hazardous waste.

When you complete this training module, you will be able to explain the regulatory history and purpose of containment buildings. Specifically, you will be able to:

- discuss the relationship between LDR and containment buildings
- summarize the design and operating standards applicable to containment buildings
- describe the relationship between generator accumulation standards and containment buildings.

Use this list of objectives to check your knowledge of this topic after you complete the training session.

2. REGULATORY SUMMARY

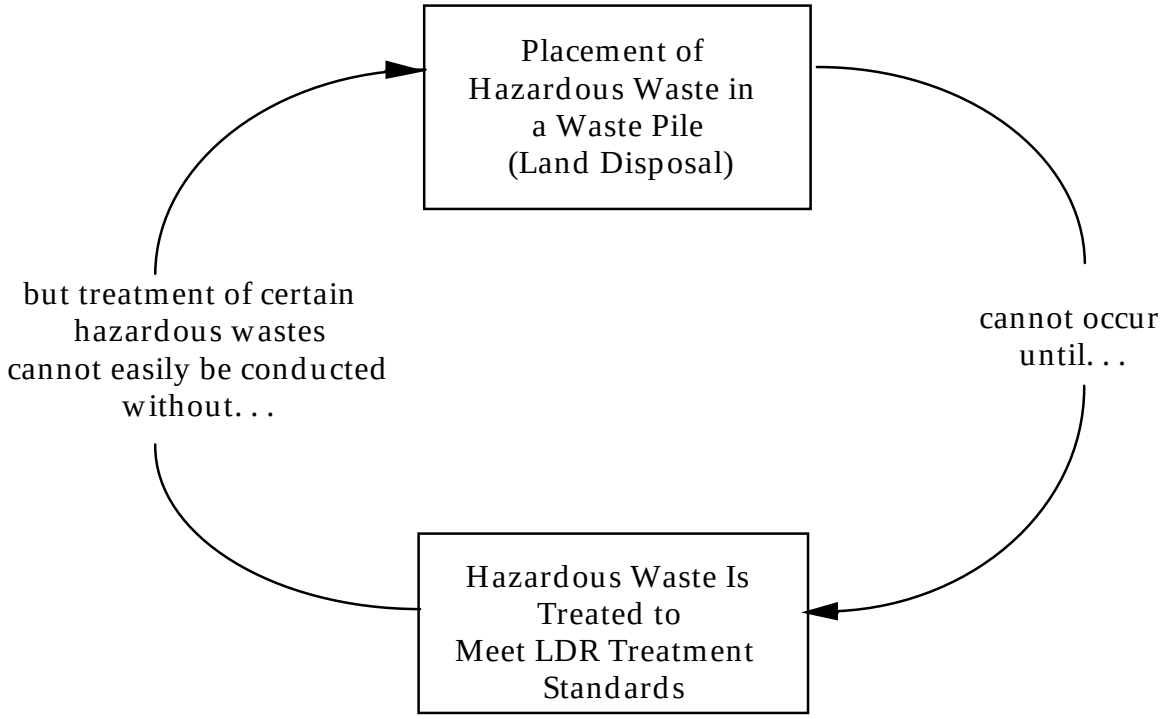
EPA chose to designate containment buildings as hazardous waste management units to address the difficulties associated with management of bulky, large volume hazardous wastes and the triggers for hazardous waste management requirements in the regulations. In response to the necessity for storage and treatment of such wastes in compliance with LDR, the provisions for containment buildings were promulgated on August 18, 1992 (57 FR 37194, 37211). Regulations applicable to containment buildings are codified in 40 CFR Part 264/265, Subpart DD.

2.1 APPLICABILITY

A containment building is a completely enclosed structure (i.e., possessing four walls, a roof, and a floor) that houses an accumulation of noncontainerized waste. Prior to designation of containment buildings as hazardous waste management units, equivalent to tanks or containers, the accumulation of noncontainerized waste within a roofed structure would have been considered an indoor waste pile subject to the standards in Subpart L of Part 264/265. Because of bulky physical dimensions or large volumes, hazardous wastes like debris are more amenable to storage and treatment in waste piles than in tanks or containers. Placement of untreated hazardous debris in waste piles, however, violates the land disposal restrictions in Part 268.

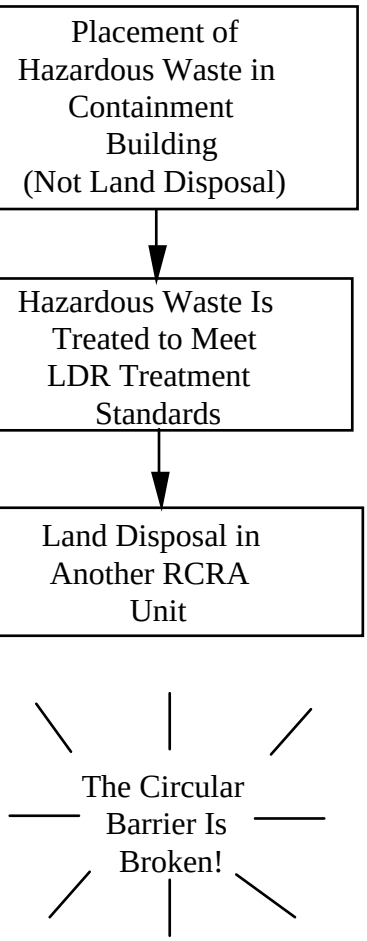
Under LDR, hazardous waste may not be placed on the land unless it meets certain standards that require treatment of the waste to reduce its hazardousness (for more information on LDR, see the module entitled Land Disposal Restrictions). Before land disposal, many wastes will be stored or treated to meet the LDR treatment standards in tanks and containers -- units that are not considered "land disposal units." Managing hazardous waste in certain types of units, including landfills, surface impoundments, and waste piles, constitutes "land disposal," which may not occur until the waste has been treated to meet LDR standards. Certain bulky hazardous wastes are not amenable to treatment in tanks or containers and must be treated in waste piles. Since the definition of "land disposal" includes placement of waste in a waste pile, doing so is prohibited unless the waste first meets all applicable treatment standards. Thus, to perform the treatment required before land disposal, the waste must first be land disposed. Under this scenario, the land disposal restrictions form a circular barrier to any management of certain hazardous wastes (Figure 1). EPA developed the concept of containment buildings to break this circular barrier and allow for proper handling of all hazardous waste.

Figure 1
THE CIRCULAR BARRIER
TO TREATMENT OF CERTAIN HAZARDOUS WASTES



EPA interprets the statutory definition of land disposal to exclude containment buildings based on the belief that the completely enclosed unit can provide containment comparable to that offered by tanks or containers when the building is designed and operated in compliance with the regulations in Part 264/265, Subpart DD. Thus, containment buildings join tanks, containers, and drip pads as hazardous waste management units into which placement of waste does not constitute land disposal. Containment buildings can therefore be used for treatment or storage of hazardous waste at permitted or interim status treatment, storage, and disposal facilities (TSDFs), as well as for temporary accumulation of hazardous wastes by a generator before off-site management without triggering or violating any treatment requirements under LDR (Figure 2).

Figure 2
CONTAINMENT BUILDINGS AND LDR



While containment buildings were primarily developed to serve as management units for hazardous debris and other bulky and high volume hazardous wastes, EPA does not restrict their usage to these waste types. In fact, containment buildings may be employed for storage or treatment of any nonliquid hazardous waste. Liquid or semi-liquid wastes are typically more difficult to handle and pose an increased risk of a release into the surrounding environment. For this reason, such wastes are generally prohibited from management in containment buildings. Liquid wastes include wastes that flow under their own weight to fill the container in which they are placed, are readily pumpable, or release such large quantities of liquid into the unit that the liquid collection and removal system cannot prevent accumulation. Wastes that contain free liquids but do not meet the given definition of liquid (i.e., wastes that do not flow, are not pumpable, and do not release a sufficiently large quantity of liquids) may be placed in a containment building, provided the unit conforms to several relevant design limits specified later in this module. As an alternative, liquid wastes may be placed in tanks that are located inside the containment building. In such cases, the building serves as secondary containment for the hazardous waste tank and must comply with all applicable secondary containment provisions in Subpart J of Part 264/265.

In addition to storage, containment buildings can be used for treatment of hazardous waste by generators or TSDFs. Any method of treatment may be employed except for thermal treatment processes.

As discussed above, liquid hazardous wastes may not be placed in containment buildings for storage or treatment. When required as part of treatment to meet LDR, however, the addition of liquids is permissible under certain conditions. If treatment of a hazardous waste requires the addition of liquids, such treatment must be conducted in designated "liquid-proof" areas within the unit, and any excess liquids must be removed as soon as practicable to preserve the integrity and effectiveness of the unit and the secondary containment system.

2.2 DESIGN STANDARDS

The performance standards for most hazardous waste management units vary depending on whether the unit is permitted or is operating under interim status. In the regulations for containment buildings, however, EPA promulgated virtually the same design and operating criteria for both permitted and interim status units.

EPA wrote the standards for containment buildings to parallel those provided for hazardous waste tanks. Design standards comprise a significant portion of the Subpart DD regulations, and are crucial to protection of human health and the environment. These standards primarily consist of requirements for structural soundness and specific measures to prevent infiltration of waste into the unit or migration into the adjacent environment. Because of the importance of such standards, before use, a professional engineer must certify that the unit is satisfactorily designed and installed according to the specifications discussed below.

Section 264/265.1101(a) detail the design standards to which the building itself must conform. The containment building must be completely enclosed with walls, a floor, and a roof. The floor, walls, and roof must be constructed of manmade materials possessing sufficient structural strength to withstand movement of wastes, personnel, and heavy equipment within the unit. Doors and windows need not meet these standards, but the building must be strategically designed with interior walls and partitions to ensure that wastes do not come into contact with them. Dust control devices, such as air-lock doors or negative air pressure systems (which pull air into the containment building), must be used as necessary to prevent fugitive dust from escaping through these building exits. All surfaces in the containment building that come into contact with waste during treatment or storage must be chemically compatible with that waste. Incompatible wastes that could cause unit failure cannot be placed in containment buildings.

The remaining containment building design standards establish a system of barriers between hazardous wastes in the unit and the surrounding environment. The floor of the containment building is considered the unit's primary barrier, since it is the first measure used to prevent wastes from being released into the ground beneath the building. Construction materials vary with the type of wastes to be managed in the containment building, but concrete floors are typical. If liquids are not managed in the containment building, no further design criteria are

applicable. Figure 3 summarizes the standards required for containment building design if no liquids are to be managed in the unit.

Figure 3
CONTAINMENT BUILDING DESIGN STANDARDS

Regulated Portion of Unit	Design Criteria (if no liquids are present)	Citations
Building	• must be constructed of man-made materials	§264/265.1100(a)
	• must provide sufficient structural strength to prevent unit failure	§264/265.1101(a)(2)
	• must be completely enclosed (floor/walls/roof)	§264/265.1101(a)(1)
	• must have a decontamination area for personnel, equipment, and vehicles	§264/265.1101(c)(1)(iii)
Doors/Windows	• must be placed so as not to come into contact with waste	§264/265.1101(a)(2)(ii)
	• must have dust controls to minimize fugitive emissions	§264/265.1101(a)(2)(i)
Contact Surfaces	• must be chemically compatible with waste	§264/265.1101(a)(2)
Primary Barrier (floor)	• must be constructed of man-made material (typically concrete)	§264/265.1100(a)
	• must be structurally sound and chemically compatible with waste	§264/265.1101(a)(4)

If, however, the containment building is used to manage hazardous wastes containing free liquids or if treatment to meet LDR treatment standards requires the addition of liquids, the unit must be equipped with a liquid collection system, a leak detection system, and a secondary barrier (§264/265.1101(b)). The floor should be sloped toward a sump, trough, or other liquid collection device to minimize standing liquids in the containment building and to facilitate liquid removal. A leak detection system must be constructed immediately beneath the unit's floor to indicate any failure in the integrity of the floor and subsequent release of waste at the earliest practicable time. A secondary barrier such as a liner must be constructed around the unit to contain and to allow for rapid removal of any wastes escaping the primary barrier before such wastes reach adjacent soils, surface water, or groundwater. As with the unit floor, the secondary barrier must be structurally sound and chemically resistant to wastes and liquids managed in the containment building. In buildings where only certain areas are delineated for management of liquid-containing wastes, these secondary containment standards are mandatory only for "wet areas," provided waste liquids cannot migrate to the "dry areas" of the containment building

(§264/265.1101(d)). In view of the high cost of remediation, however, EPA recommends that the entire unit be provided with secondary containment to guard against unanticipated releases. Figure 4 summarizes the additional design criteria for containment buildings used to manage liquids.

Figure 4
ADDITIONAL DESIGN CRITERIA FOR CONTAINMENT BUILDINGS MANAGING LIQUIDS

Regulated Portion of Unit	Design Criteria (if liquids are present)	Citations
Primary Barrier	• must be sloped toward liquid collection device	§264/265.1101(b)(2)(i)
Liquid Collection System	• must allow for removal of waste for proper RCRA management	§264/265.1100(c)(3) §264/265.1101(b)(2)
Leak Detection System	• must detect release of waste at earliest practicable time	§264/265.1100(c)(3) §264/265.1101(b)(3)
Secondary Barrier	• must be structurally sound and chemically resistant to the waste	§264/265.1101(b)(3)(iii)
	• must contain and allow for removal of accumulating wastes	§264/265.1101(b)(3)
	• is required only for "wet areas" within the unit, but recommended for both "wet" and "dry areas"	§264/265.1101(d)

2.3 OPERATING STANDARDS

The owner or operator of each new or existing containment building must implement operating controls and practices (§264/265.1101(c)). Containment building operating standards focus primarily on maintenance and inspection of the unit, recordkeeping requirements, and provisions for response to releases of hazardous waste.

As a matter of good housekeeping, the owner and operator of the unit must maintain the floor so that it is free of significant cracks, corrosion, or deterioration. Surface coatings or liners that are subject to wear from movement of waste, personnel or equipment must be replaced by the owner and operator as often as needed. EPA placed certain limitations on how high hazardous waste may be piled within containment buildings to ensure that no releases will occur should wastes slide under their own weight. If the outer walls of the containment building are used to support the piles of waste, hazardous waste cannot be piled higher than the portion of the wall that meets the required design standards (also known as "containment walls") (§264/265.1101(c)(1)(ii)). If a containment building has stalls or "crowd walls" that are used to segregate hazardous wastes and these crowd walls prevent waste from contacting the containment walls at any time, EPA

does not limit the height of the piles of waste, as long as the owner and operator can assure that the waste will always be contained within the building's containment walls.

Dust control devices must be maintained at all openings to prevent visible emissions from the unit under routine operating or maintenance activities, including times when vehicles and personnel enter or exit the unit. A decontamination area must be constructed within the containment building, and site-specific decontamination procedures must be followed as necessary to prevent waste from being tracked out of the unit on personnel or equipment. Examples of possible decontamination activities include washing vehicles and equipment prior to leaving the building, dedicating vehicles for use only within the unit, and requiring employees to wear paper or cloth booties and coveralls which can be removed before exiting the containment building. Under this controlled environment, wastes and associated rinsate can be collected for proper waste management.

2.4 INSPECTIONS

Containment buildings must be inspected at least once every seven days, with all activities and results recorded in the operating log (§264/265.1101(c)(4)). Such inspections involve evaluation of unit integrity and visual assessment of adjacent soils and surface waters to detect any signs of waste release. Data from monitoring or leak detection equipment should also be considered.

2.5 RESPONSE TO RELEASES

If a release is discovered during an inspection, the owner or operator must remove the affected portion of the unit from service and take all appropriate steps for repair and release containment. The implementing agency must be notified of the discovery and of the proposed schedule for repair. Upon completion of all necessary repairs and cleanup, a qualified, registered, professional engineer must verify that the plan submitted to the implementing agency was followed. This verification need not come from an independent engineer.

2.6 CLOSURE

At closure of a containment building, all applicable provisions in Subparts G and H of Part 264/265 must be followed. More information on the closure requirements can be found in the module entitled Closure and Post-Closure. Beyond these guidelines, §264/265.1102 requires removal or decontamination of all associated waste residues, contaminated soils, and contaminated system components and equipment (e.g., inner and outer building walls, filters used in dust control systems, forklifts, and other vehicles used in the building). If it is determined that not all contaminated soils can be removed or decontaminated, the unit will be considered a landfill for purposes of closure, post-closure, and financial assurances, and must follow the closure requirements in §264/265.310. Although closure as a landfill may be necessary, the containment building regulations do not specifically mandate preparation of contingent landfill closure and post-closure plans.

3. SPECIAL ISSUES

There are two issues that often recur within the containment building regulations. The first results when small quantity generators choose to manage their waste in containment buildings per the regulations in §262.34(a)(1)(iv). The other issue occurs when waste piles are converted into containment buildings.

3.1 GENERATOR ACCUMULATION

Containment buildings may be used for temporary accumulation. Per the regulations in §262.34(a)(1)(iv), a generator may accumulate hazardous waste in a containment building for up to 90 days without a permit, provided the individual:

- complies with the technical standards in Part 265, Subpart DD
- obtains certification from a professional engineer that the building conforms to the design standards specified in §265.1101
- prepares a written description of the procedures used to ensure that wastes remain in the unit for no more than 90 days
- maintains documentation that those procedures are followed.

As stated in §262.34(a)(1)(iv), generator accumulation containment buildings are exempt from most of the closure and financial assurance requirements in Part 265, Subparts G and H. Nevertheless, after the useful life of the building has expired, generators must close the unit in accordance with §§265.111 and 265.114, which relate to the closure performance standard and disposal or decontamination of equipment, structures, and soils.

Since §262.34(d) does not include a provision for use of these units, all generators of more than 100 kilograms of waste per month who manage wastes in containment buildings must comply with the requirements applicable to large quantity generators in §262.34(a). Consequently, small quantity generators using containment buildings do not have the 180 days of accumulation time customarily afforded to a small quantity generator's tanks or containers. The maximum generator accumulation time period in containment buildings is 90 days. Generators using containment buildings must also comply with the large quantity generator requirements for personnel training, development of a full contingency plan, and biennial reporting. Conditionally exempt small quantity generators, however, are not subject to either the containment building management standards or the time limit of 90 days.

3.2 CONVERSION OF WASTE PILES INTO CONTAINMENT BUILDINGS

Another special issue concerns converting a waste pile into a containment building. TSDFs operating indoor waste piles under the regulations in Part 264/265, Subpart L, may convert those units to containment buildings by completing a few administrative actions. For permitted waste

piles, the conversion to containment building status is accomplished through submittal of a permit modification. Interim status waste piles may be converted to containment buildings only after receiving approval from the Agency and submitting a revised permit application. After the conversion, only the standards in Part 264/265, Subpart DD, would be applicable.