Session 4  Hazardous Waste Storage Units
Session 4 Agenda: 
Types of Hazardous Waste Storage Units

- Subpart I - Containers
- Subpart J - Tanks
- Subpart W – Drip Pads
- Subpart DD – Containment Buildings
- Subpart EE – Hazardous Waste Munitions and Explosives Storage
Hazardous Waste Storage Units

Containment Buildings

Munitions and Explosives Storage

Tanks

Containers

Drip Pads
Subpart I - Containers

- Definition of Container
- Design Standards
- Operating Requirements
- Inspections
- Closure
- Empty Containers
- Air Emissions (discussed in Session 12)
Containers – Definition

- “... any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.”

- Examples include: boxes, bags, drums, railcars, tanker trucks, roll-off boxes, test tubes, and vials

- Broad definition that encompasses all the different types of portable devices that may be used to handle hazardous waste
Containers – Design Standards

Must be in good condition
- Containers that are deteriorating (e.g., cracked, rusted) may not be used
- Waste stored in defective containers must be transferred to containers in good condition

Must be compatible with the waste
- Containers must be made, of or lined with materials that will not react with the waste in the container
- Incompatible wastes must not be placed in the same container
- Appendix V in Part 264/265 provides a list of potentially incompatible wastes
Containers – Design Standards (cont.)

- **Containment**
  - Permitted container storage areas must have a *secondary containment* system
  - Secondary containment provides a backup system to prevent release into the environment should primary containment (i.e., the container) fail
    
    Example: sloped concrete pad or other impervious base with curbing and drainage to a sump, tank, or other container
  
  - Secondary containment system must be free of cracks, able to contain the spill, and emptied quickly

§264.175
Containers – Operating Requirements

- Must be kept closed, except when adding or removing waste
- Must not be handled, opened, or stored in a manner that may cause them to leak
- Those holding ignitable or reactive wastes must be located at least 15 meters (50 feet) from the facility’s property line

§§264/265.173 & 176
Containers – Inspection and Closure

- **Inspections**
  - Must be visually inspected at least **once a week** for leaking and deteriorating containers

- **Closure**
  - All hazardous waste and associated residues must be removed
  - Remaining containers, liners, bases, and soil contaminated with hazardous waste must be decontaminated or removed
Empty Containers

- Any hazardous waste remaining in either a RCRA empty container or inner liner is not subject to regulation.

- A container or an inner liner removed from a container holding a non-acute hazardous waste if empty when:
  - All waste have been removed using practices commonly employed.
  - No more than:
    - 2.5 cm (1 inch) of material remains in the container.
    - 3% by weight remains for containers ≤ 119 gallons.
    - 0.3% by weight remains for containers > 119 gallons.
Empty Containers (cont.)

- Containers holding compressed gases are considered empty when the pressure in the container approaches atmospheric pressure.

- A container or inner liner of a container holding acutely hazardous waste is empty when:
  - The liner is removed
  - The container is triple rinsed with an appropriate solvent
  - An approved alternate method is used
Subpart J - Tanks

- Definition of Tank
- Design Standards
- Containment
- Operating Requirements
- Inspections
- Release Response
- Closure
- Air Emissions (Session 12)
Tanks - Definition

- “… a stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials which provides structural support”

- Examples include: Sumps and USTs
Tanks – Design Standards

- System Integrity Assessment of Existing Tank Systems
  - Tanks in existence on or before July 14, 1986
  - Verify that the tank was designed and maintained to contain the wastes without failing, collapsing, or rupturing

- Installation of New Tank Systems
  - Must be inspected by an independent qualified expert prior to use to ensure that the tank was not damaged during installation.
  - Tanks and ancillary equipment must be tested to make sure there are no leaks; any leaks discovered must be fixed

§§264/265.191 & 192
Corrosion Protection for New Tank Systems

- New tanks made wholly or partly of metal must be designed and installed with adequate corrosion protection if the system will be in contact with soil or water.
- An owner or operator must develop a written design plan or assessment that accounts for site specific information such as soil moisture and acidity.
- The unit must have one or more of the following corrosion protection methods:
  - Corrosion-resistant construction materials (e.g., fiberglass)
  - Corrosion-resistant coating in combination with cathodic protection
  - Electrical isolation devices
Tanks - Containment

- Secondary containment systems must be designed, installed, and operated to ensure that:
  - No waste is released to the surrounding soil, groundwater, or surface water
  - Construction material or liners are compatible with the waste to be stored or treated in the tank
  - The tank is capable of containing accumulated material until it is promptly removed (generally within 48 hours)
  - The tank has sufficient strength to prevent failure, and
  - The foundation can resist failure due to normal movement of the surrounding soils (e.g., settlement, compression, or uplift)

§§264/265.193(c)
Tanks – Containment (cont.)

- Tanks must be equipped with a **leak detection system** capable of detecting failure in either the primary or secondary containment structures.

- The leak detection system must be able to detect failure in either the main tank or secondary containment system within 24 hours.

- Commonly used detection devices include:
  - Thermal conductivity sensors
  - Electrical resistivity sensors
  - Vapor detectors

§§264/265.193(c)(3)
Owners and operators must meet these secondary containment requirements by using one of the following devices:

- An external liner that completely surrounds the unit with an impermeable material
- A vault (the tank rests in an underground area usually constructed with concrete floors and walls and an impermeable cover)
- A double-walled tank (or a “tank within a tank”)
- An EPA-approved alternative design
Hazardous waste tanks must be operated in a manner that minimizes or eliminates releases.

- Chemicals that may cause any part of the tank’s system to fail may not be placed in the unit.

Spills or overflows from the tank system must be prevented by using, at a minimum:

- Spill prevention controls (e.g., check valves)
- Overfill prevention controls (e.g., alarms and valve systems that automatically close when overfill is likely)
- Sufficient room within an uncovered tank between the surface of the waste and top of the tank (i.e., minimum freeboard)
Tanks – Inspections

- Owners and operators must **inspect their tanks daily** to verify hazardous waste tanks and components are operated and maintained in satisfactory condition
  - If a leak detection system is used to alert facility personnel to leaks, then **weekly inspections** are allowed

- Inspectors must thoroughly identify leaks, deterioration, corrosion, or structural fatigue in any portion of the tank or system components

- In addition to visual inspections, owners and operators must take into account data received from leak detection monitors and other tests

§§264/265.195
Tanks - Release Response

- A tank system, or secondary containment system from which there has been a leak or spill must be taken out of operation immediately
  - Stop the flow of waste into the tank
  - Inspect the system to determine the cause of the release
  - Remove any waste remaining in the tank within 24 hours
  - Remove and properly dispose of any contaminated media

- The owner or operator must notify the implementing agency, or the NRC, and submit a follow-up written report within 30 days

§§264/265.196
Tanks – Closure

- When possible, a storage or treatment tank must be “clean closed” by removing or decontaminating:
  - All waste residues
  - Contaminated containment system components
  - Contaminated soils
  - Contaminated structures and equipment

- If clean closure is not possible, an owner or operator can close the unit leaving contamination in place
  - Close as a landfill with waste in place
Containers vs. Tanks

Containers

- Mobile
- Requires secondary containment only under Part 264
- Empty container provisions
- Closure
  - Remove hazardous waste residues and decontaminate structures

Tanks

- Not mobile; stationary
- Requires secondary containment under Parts 264 and 265
- No empty tank provisions
- Closure
  - Clean close
  - Close as a landfill
Subpart W – Drip Pads

- Definition of Drip Pad
- Design Standards
- Operating Requirements
- Inspections
- Closure
Drip Pads – Definition

- “... an engineered structure consisting of a curbed, free-draining base, constructed of non-earthen materials and designed to convey preservative kick-back or drippage from treated wood, precipitation, and surface water run-on to an associated collection system at wood preserving plants”

- Drip pads are hazardous waste management units that are unique to the wood preserving industry
  - Used exclusively for the collection and temporary accumulation or storage of excess wood preservative prior to its removal from the unit
  - Regulated units will be found only at wood preserving facilities
Drip Pads – Definition (cont.)

§260.10
Drip Pads – Design Standards

- **Pad**
  - Constructed of non-earthen materials (e.g., concrete, metal)
  - Provide sufficient structural strength to prevent unit failure

- **Drip Pad Surface**
  - Constructed with a raised berm around perimeter to prevent waste run-off into the environment
  - Sloped toward a liquid collection unit
  - Treated with impermeable sealers, coatings, or covers to meet specific permeability performance standards

§264.573(a) and §265.443(a)
Subpart W – Drip Pads

Drip Pads – Design Standards (cont.)

- Liquid Collection System
  - Must allow removal of waste for proper management and to prevent overflow
  - Must include run-on and run-off controls as necessary
  - Subject to regulation as a hazardous waste tank

- Liner and Leak Detection System
  - Is not subject to specific permeability criteria
  - Must signal releases from the drip pad at the earliest practicable time
  - Structurally sound and chemically compatible

§264.573 and §265.443
Drip Pads – Operating Standards

- Drip pads must be:
  - Free from cracks and show no signs of corrosion or other forms of deterioration
  - Cleaned frequently to allow for inspections of the entire drip pad surface without interference from accumulated wastes

- Drippage and precipitation must be emptied into a collection system as often as necessary to prevent waste from flowing over the curb around the perimeter of the unit

- Collection tanks must be emptied after storms to ensure that sufficient containment capacity is available for run-off

§264.573 and §265.443
Drip Pads – Inspections

- Newly installed or upgraded existing drip pads must be inspected to verify that the unit was properly constructed and that no damage occurred prior to use
  - An independent, qualified, registered, professional engineer must certify that the drip pad achieves all applicable design standards

- Drip pads must be **inspected weekly and after storms** to:
  - Ensure the pad and the liquid collection systems are functioning properly
  - Check for deterioration or leaks from the units

§264.574 and §265.444
Drip Pads – Closure

- Involves removal or decontamination of all associated waste residues, contaminated soils, and contaminated system components

- If all contaminated soils cannot be removed or decontaminated, the unit will be considered a landfill for purposes of closure

§264.575 and §265.445
Subpart DD – Containment Buildings

- Definition of Containment Building
- Design Standards
- Operating Requirements
- Inspections
- Response to Releases
- Closure
Containment Building – Definition

- “... a hazardous waste management unit that is used to store or treat hazardous waste under the provisions of subpart DD of parts 264 or 265”

- Completely enclosed structure (i.e., four walls, roof, floor) that is used to store or treat non-containerized waste
  - Generally used for the management of hazardous waste debris and other bulky and high volume hazardous wastes not amenable to storage or treatment in tanks or containers
  - Can be used as secondary containment for wastes stored in containers or tanks
Containment Building – Definition (cont.)
Containment Building – Design Standards

- **Building**
  - Constructed of man-made materials
  - Provide sufficient structural strength to prevent unit failure
  - Completely enclosed (floor/walls/roof)
  - Have a decontamination area for personnel, equipment, and vehicles

- **Doors/Windows**
  - Placed so as not to come into contact with waste
  - Have dust controls to minimize fugitive emissions

§§264/265.1100 and 1101
Containment Building – Design Standards (cont.)

- **Contact Surfaces**
  - Chemically compatible with waste

- **Primary Barrier (floor)**
  - Constructed of man-made material (typically concrete)
  - Structurally sound
  - Chemically compatible with waste
Containment Building – Design Standards (if liquids are present)

- Primary barrier sloped toward liquid collection device

- Liquid collection system must allow for removal of waste for proper management

- Leak detection system must detect release of waste at earliest practicable time

- Secondary Barrier:
  - Structurally sound and chemically resistant to the waste
  - Must contain and allow for removal of accumulating wastes
  - Required only for “wet areas” within the unit

§§264/265.1100 and 1101
Containment Buildings – Operating Requirements

- Maintain the floor so that it is free of significant cracks, corrosion, or deterioration

- Repair or replace surface coatings or liners that are subject to wear from movement of waste, personnel, or equipment as often as needed

- Limit the height of wastes piled within the unit

- Maintain dust control devices at all openings to prevent emissions from the unit

- Provide a decontamination area within the building

§§264/265.1100 and 1101
Containment Buildings – Inspections

- Must be inspected at least once every seven days, with all activities and results recorded in the operating log.

- Inspections involve:
  - Evaluating the units integrity
  - Assessing nearby soils and surface waters to detect any signs of waste release
  - Assessing information collected from monitoring and leak detection equipment

§§264/265.1101(c)(4)
Containment Buildings – Release Response

- If a release is discovered, the owner or operator must:
  - Take the leaking portion of the unit out of service
  - Take all appropriate steps to repair the leak and contain the released waste

- Implementing agency must be notified of the discovery and the proposed schedule of repairs

- Upon completion of repairs and cleanup, a qualified, registered, professional engineer must verify that the facility has complied with the plan

§§264/265.1101(c)(3)
Containment Buildings – Closure

- Removal or decontamination of all associated waste residues, contaminated soils, and contaminated system components and equipment
  - Includes the 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
Subpart EE – Munitions and Explosive Storage

- Military Munitions (40 CFR Part 266, Subpart M)
  - Definition of Military Munition
  - Military Munitions are Solid Wastes When …
  - Military Munitions Storage Standards

- Design and Operating Standards

- Closure
Military Munitions – Definition

- “Includes all types of both conventional and chemical ammunition products and their components; produced by or for the military for national defense and security” (62 FR 662; February 12, 1997)

- “Military” includes DOD, DOE, Coast Guard, National Guard, and parties acting as agents for DOD managing military munitions
Military munitions are solid waste when…

- Disposed of, burned, or incinerated
- Removed from storage for disposal
- Leaking, deteriorated, or damaged
- Determined to be solid waste by a military official
- Collected from a range and sent off site for treatment or disposal

Discharge of ammunition is a normal and expected use, not hazardous waste disposal

§266.202
Military Munitions – Storage Standards

- Conditional exemption
  - Hazardous waste military munitions are subject to hazardous storage regulations, **except** when all of the conditions in §266.205(a)(1) are met
  - Chemical military munitions are **not exempt**

- Chemical military munitions are not subject to LDR storage prohibition of §268.50

- Hazardous waste storage units
  - Hazardous Waste Munitions and Explosives Storage (EE)
  - Containers (I)
  - Tanks (J)
Hazardous waste munitions and explosives storage units must be designed and operated with containment systems, controls, and monitoring, that:

- Minimize the potential for detonation or other means of release of hazardous waste or constituents
- Provide a primary barrier designed to contain the waste
- Provide that the waste and containers will not be standing in precipitation (for wastes stored outdoors)
- Provide a secondary containment system for liquid wastes
- Provide monitoring and inspection procedures that assure the controls and containment systems are working as designed
Hazardous waste munitions and explosives may be stored in one of the following:
- Earth-covered magazines
- Above-ground magazines
- Outdoor or open storage areas

Stored in accordance with a SOP specifying procedures to ensure safety, security, and environmental protection.

Packaged to ensure safety in handling and storage.

Inventoried at least annually.

§§264/265.1201(b) and (c)
Subpart EE - Closure

- Removal or decontamination of all associated waste residues, contaminated soils, and contaminated system components and equipment
- If not all contaminated soils can be removed or decontaminated, the unit will be considered a landfill for purposes of closure
Session 4 – Review

- Subpart I - Containers
- Subpart J - Tanks
- Subpart W – Drip Pads
- Subpart DD – Containment Buildings
- Subpart EE – Hazardous Waste Munitions and Explosives Storage