Land Disposal Restrictions (LDR)
HSWA established deadlines for EPA to determine the conditions under which land disposal of hazardous waste is protective of human health and the environment. Without a determination, Congress prohibited land disposal of hazardous waste.
What is Land Disposal?

Disposal in land-based units such as:

- Landfills, surface impoundments, waste piles
- Salt bed and salt dome formations
- Injection wells
- Underground mines and caves
- Land treatment facilities
- Concrete vaults or bunkers
What Are LDRs?

CRITERIA for land disposal that EPA has determined are protective of human health and environment, which include:

1. Identifying all applicable hazardous waste codes, because each type of hazardous waste may pose a different risk; and

2. Ensuring wastes are treated to comply with each wastes code’s assigned treatment standard prior to land disposal or long-term storage.
CRITERION 1: WHAT, WHEN, and HOW do I determine all applicable hazardous waste codes?
WHAT Treatment Standards Must be Met to Land Dispose?

- EPA establishes concentration-based or technology-based treatment standards based on Best Demonstrated Available Technologies (BDAT).
- Standards accommodate treatability groups.
- Treatability groups are based on waste number (e.g., D009), treatability subcategory (e.g., radioactive lead solids), and form (i.e., wastewater or nonwastewater).
Treatment Standards Also Include Underlying Hazardous Constituents

- 40 CFR 268.48 - Universal Treatment Standards (UTS) must be met for any underlying hazardous constituents present in the following wastes:
- Certain ignitable (D001) and corrosive (D002) characteristic hazardous wastes
  - Organic pesticide toxicity characteristic wastes (D012 - D017)
  - New organic toxicity characteristic wastes (D018-D043)
WHEN Must all Applicable Hazardous Waste Codes be Identified/Applied?

- From the initial point of generation through treatment and ultimate disposal (with a few exceptions)
- Whether the hazardous waste is being land disposed or not
HOW Does a Generator Know Which Treatment Standards Apply? Refer To 40 CFR 268.40

- 40 CFR 268.40 - Treatment Standards for Hazardous Wastes
- Consolidates treatment standards for all waste codes, wastewater and nonwastewater forms, technology-based and concentration-based standards
Are All Hazardous Wastes Affected?

- The LDR apply to all wastes that were considered hazardous on or before Nov. 8, 1984.
- EPA must evaluate newly listed wastes within six months of listing.
Let’s pause and take a closer look at LDR treatment standards
BACKGROUND:
- “Spent” liquid scintillation cocktails (measure the activity of radionuclides)
- Principal organics are xylene and toluene, which were used to mobilize constituents (i.e., used for their solvent properties)
- Formulation contained greater than 10% toluene before use
- [Other hazardous constituents] = BDL (below detection limit)

EXERCISE:
- Identify the applicable LDR treatment standard(s).
BACKGROUND:
- Spent battery (sulfuric) acid
- pH < 2
- [Cd] (Cadmium) = 3.3 mg/l (TCLP)
- [Cr] (Chromium) = 3.2 mg/l (TCLP)
- [Pb] (Lead) = 22 mg/l (TCLP)
- [Other hazardous constituents] = BDL (below detection limit)

EXERCISE:
- Locate the applicable treatment standard(s)
**BACKGROUND:**

- Untreated “spent” petroleum naphtha (parts degreaser)
- Flash point = -60°F
- > 10% Total Organic Carbon (TOC) as generated
- [Cd] (Cadmium) = 0.1 mg/l (TCLP)
- [Cr] (Chromium) = 3.2 mg/l (TCLP)
- [Pb] (Lead) = 1.2 mg/l (TCLP)
- [Other hazardous constituents] = BDL (below detection limit)

**EXERCISE:**

- Identify the applicable treatment standard(s)
CRITERION 2: How do I ensure wastes are treated to meet all applicable hazardous waste codes?
How Does an Off-Site TSDF Know Which Standards Apply?

- Notify off-site TSDFs
  - shipment has a waste subject to LDR or
  - shipment has a waste subject to an exemption or variance
- Certify any claims that a waste meets its applicable treatment standards
Why is notification necessary?

- Manifests used to ship hazardous waste to off-site facilities only require proper shipping name.
- Proper shipping name is typically based on greatest hazard, not necessarily on all LDR-regulated constituents present in the waste.
How Does a Facility Verify Compliance With the Treatment Standard?

- EPA designates standards as either constituent concentrations or specified technologies.
- If EPA specifies a concentration, facilities must analyze waste to verify compliance with the concentration.
- If EPA specifies a technology, facilities must use the specified technology before disposing of the treatment residue.
"I certify under penalty of law. . . I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."
Does Treatment Reduce RCRA Compliance Requirements?

- Meeting the treatment standard for listed wastes allows treatment residues to be disposed in land-based, RCRA-permitted units.
- Meeting the treatment standards for characteristic wastes allows residues to be disposed in Subtitle D units, provided the residue no longer exhibits a characteristic hazard.
Do Generators and TSDFs have to work within an established framework?

Generators and TSDFs MUST:

- Not dilute wastes as a substitute for treatment unless it complies with 40 CFR 268.3.
- Do recordkeeping and waste analysis [also applies to treatment at accumulation points (40 CFR 268.7)].
Also, Storage is Prohibited Except:

- Where accumulation is to facilitate treatment or recovery
- Where waste is subject to a variance, extension, or approved petition
Recordkeeping

- Retain records of:
  - notices/certifications
  - demonstrations/petitions
  - waste analyses

- **Generators** retention period of at least three years (five years in most authorized States), which is extended during an enforcement action

- **TSDFs** retain documents in operating record
Variance and Extensions

- National capacity variances
- Variances from the treatment standard
- Case-by case extensions
- "No-migration" petitions
Capacity Variance

EPA can grant a nationwide variance from the LDR because of inadequate treatment capacity.
Treatability Variance

Two types:
- Waste-specific
- Waste and site-specific
Case-by-Case Extension

- Regulatory process subject to publication in the *Federal Register* and to public comment
- Provides for a one-year extension of the deadline for imposing the LDR with a possible extension of an additional year
No-Migration Variance

- Must submit petition to the EPA Administrator
- Requires issuance of a public notice and provision of opportunity for public comment
- Requires establishing, with reasonable certainty, that there will be no migration from the unit for as long as the waste remains hazardous
Are LDR Requirements That Simple?

- LDR regulations constitute a complex framework with obscure points of regulation
- LDR requirements have been challenged in court several times
- Treatment standards have been revised in the course of making other changes
Summary

- Generate LDR waste
- Treat waste on-site or ship off-site for treatment to meet the applicable treatment standard
- Land dispose the residue