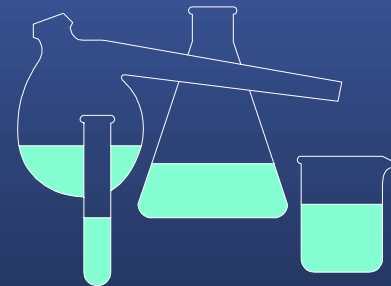


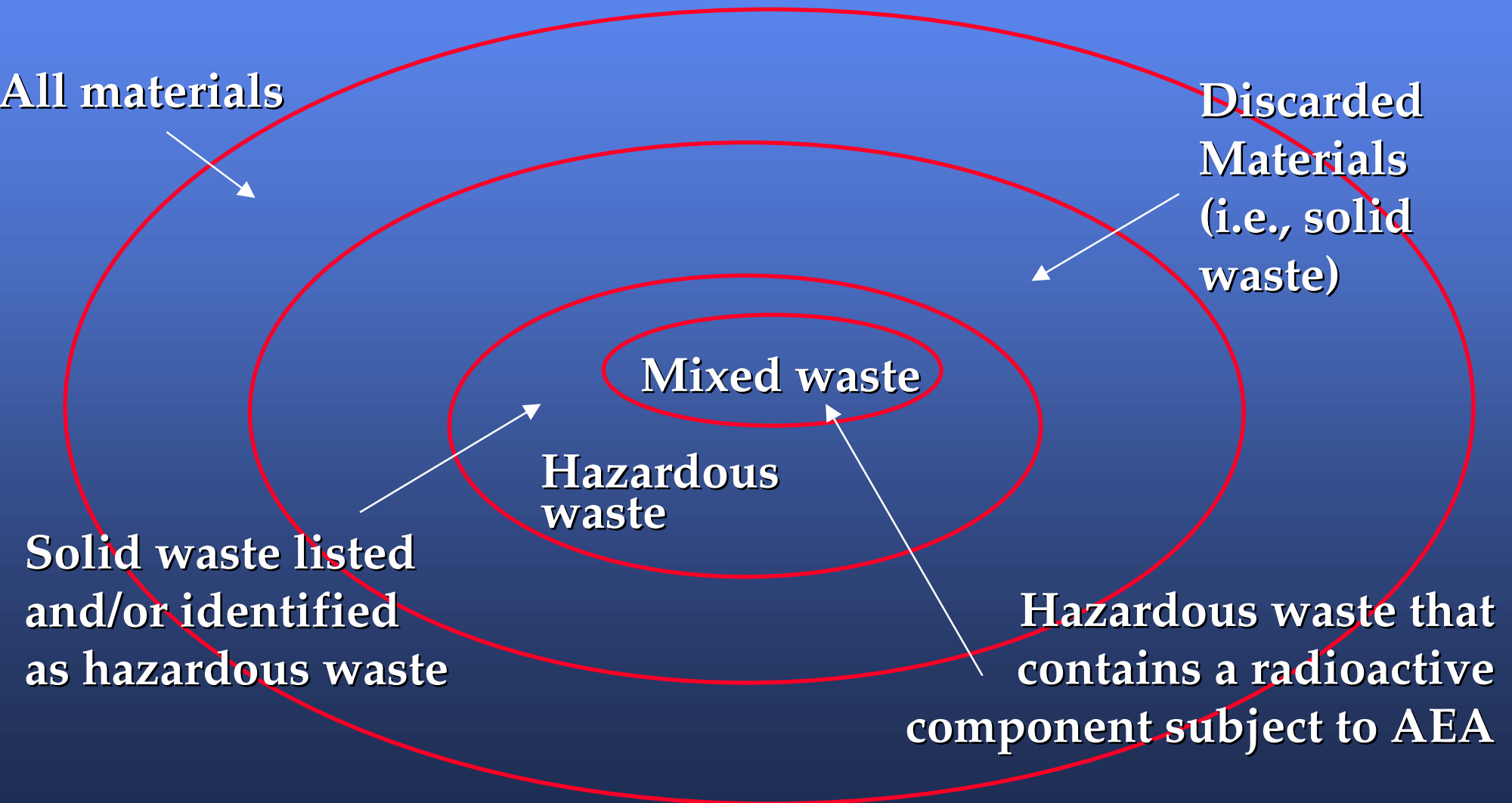
# Hazardous Waste Definition



# Hazardous?

- *Hazardous Material*
  - Regulated by DOT
  - Regulated by OSHA
- *Hazardous Constituent*
  - Listed in Appendix VIII 40 *CFR* 261
  - Not hazardous wastes but may be basis for listing a waste as hazardous
- *Hazardous Waste*
- *Hazardous Substance*

# Let' Pick Up Where We Left Off. The Definition of Hazardous Waste Begins With The Solid Waste Definition



# Overview of the Definition of Hazardous Waste

- STEP 1: Is the waste excluded?
- STEP 2: Is the waste listed?
  - Is it a mixture of solid waste and listed hazardous waste?
  - Is it derived from the treatment, storage, or disposal of a listed hazardous waste?
  - Does it contain a listed hazardous waste?
- STEP 3: Is the waste a characteristic hazard?

# Two Alternative Mechanisms for Bringing A Solid Waste into the Hazardous Waste System

- Identification of Characteristics of Hazardous Waste
  - Ignitability
  - Corrosivity
  - Reactivity
  - Toxicity
- Listings of Hazardous Waste
  - Wastes from non-specific sources
  - Wastes from specific sources
  - Discarded commercial chemical products

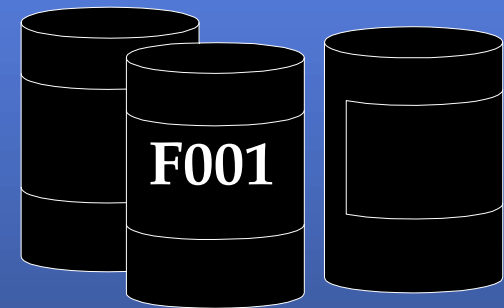
# Examining the SECOND Step: Does the waste meet a listing of hazardous waste?

- **Listed Hazardous Wastes**
  - **Wastes From Non-specific Sources**
  - **Wastes From Specific Sources**
  - **Discarded Commercial Chemicals**

(F-Listed)  
Waste from Non-specific Sources  
(40 *CFR* 261.31)

EPA Code

Waste

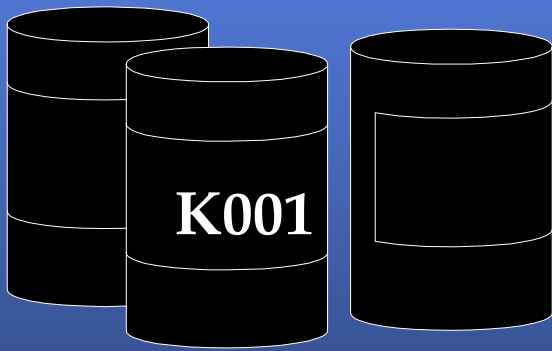


Spent halogenated solvents from degreasing: tetra- and trichloroethylene, methylene chloride, trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons

(K-Listed)  
Waste from Specific Sources  
(40 *CFR* 261.32)

EPA Code

Waste



Bottom sediment sludge  
from treatment of  
wastewaters from wood  
preserving that uses  
creosote and/or  
pentachlorophenol



(P- and U-listed)  
Listed Discarded Commercial Chemicals  
(40 *CFR* 261.33)

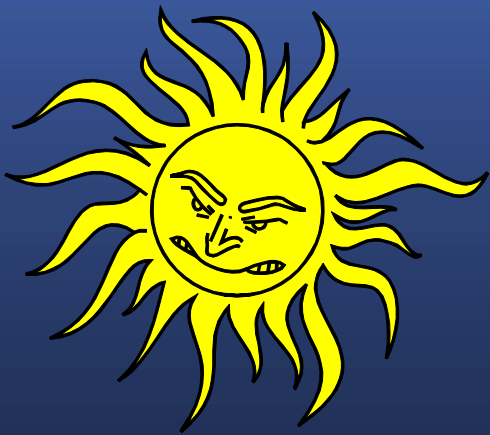
- Off-specification forms of these products
- Mixtures of these products and other materials that are applied to the land
- Mixtures of oil and these products when used as a fuel
- Containers holding these products, unless they are empty
- Spill residues of these products

# Types of Listed Discarded Commercial Chemicals:



- "P" List

- Acute hazardous waste
- Examples are beryllium, methyl isocyanate, and soluble cyanide salts



- "U" List

- Toxic waste
- Examples are benzene, saccharin salts, and trichloroethylene

# Mixture Rule Wastes [40 CFR 261.3(a)]

- Mixtures of solid wastes with listed wastes

- Mixtures of solid wastes with characteristic wastes



# “Derived-From” Wastes [40 *CFR* 261.3(c)]

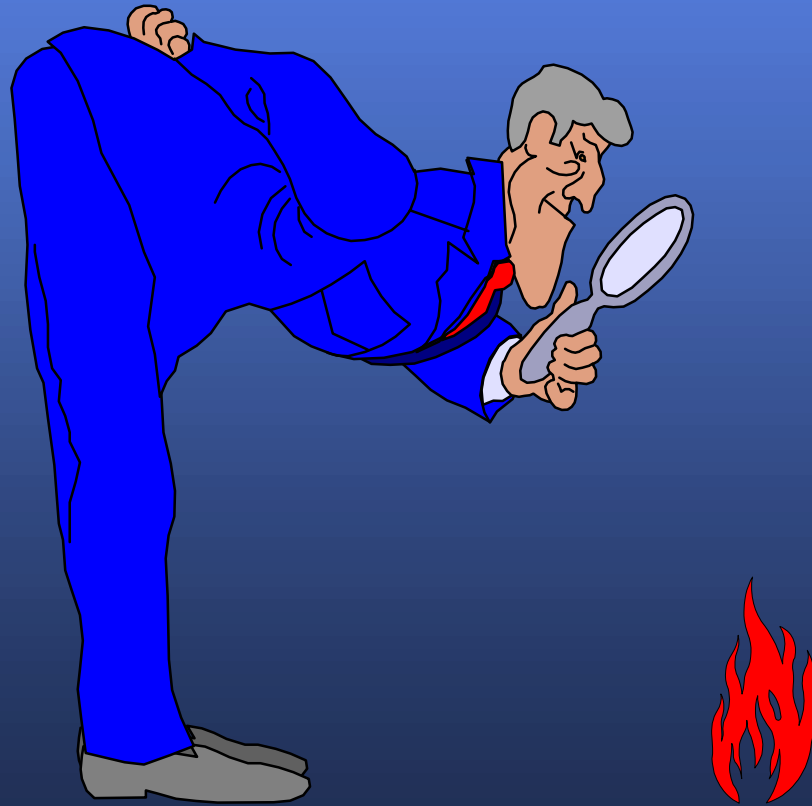
- Definition

Any solid waste generated from the treatment, storage, or disposal of a hazardous waste, including any sludge, spill residue, ash, emission control dust, or leachate (but not including precipitation run-off) is a “derived from” waste.

# “Contained-In” Principle

- Originally established to address contaminated media (e.g., soil)
- Exempts debris that the Regional Administrator, considering the extent of contamination, has determined is no longer contaminated with hazardous waste.

**Examining the THIRD Step:  
Does the waste exhibit any  
characteristic of hazardous waste?**

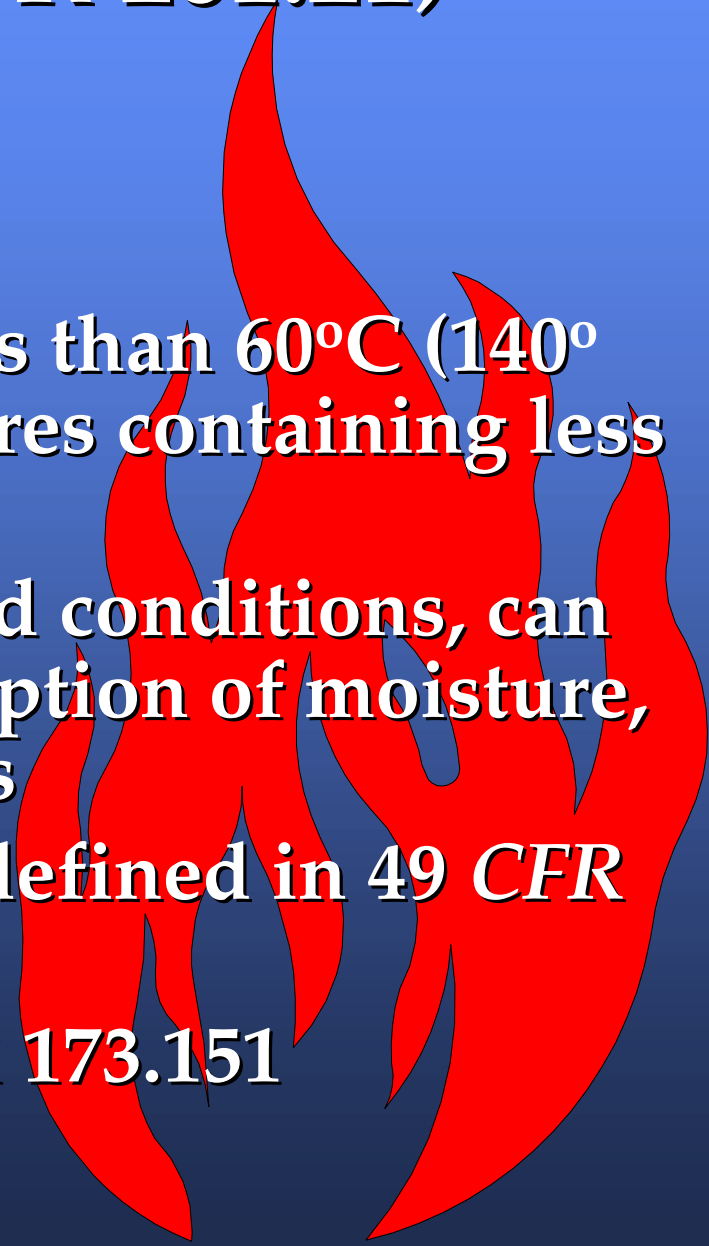


# Hazardous Waste Characteristics

- **Characteristics of Hazardous Waste**
  - Ignitability
  - Corrosivity
  - Reactivity
  - Toxicity

# Ignitable Hazard (40 *CFR* 261.21)

- D001
- A liquid with a flash point of less than 60°C (140° F), except aqueous alcohol mixtures containing less than 24% alcohol.
- A non-liquid that, under standard conditions, can cause fire through friction, absorption of moisture, or spontaneous chemical changes
- An ignitable compressed gas as defined in 49 *CFR* 173.300 (DOT)
- An oxidizer as defined in 49 *CFR* 173.151





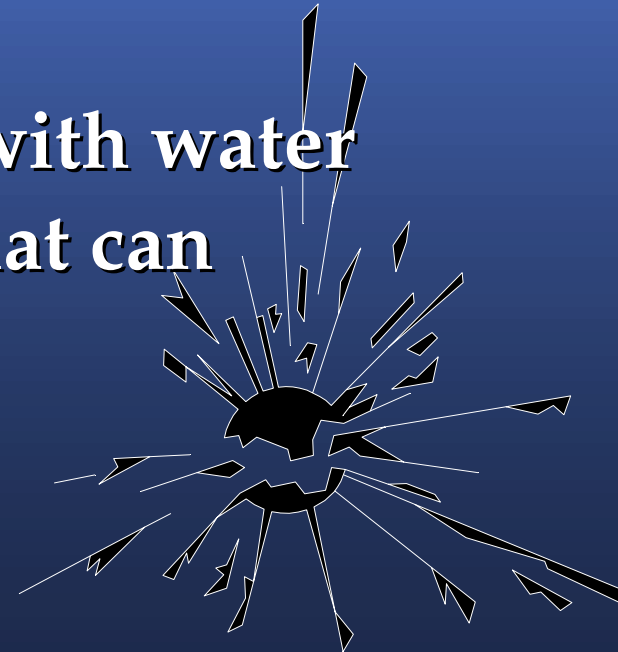
# Corrosive Characteristic (40 CFR 261.22)



- D002
- Aqueous solution with a pH less than or equal to 2 or greater than or equal to 12.5
- A liquid that corrodes steel at a rate greater than 6.35 mm per year at 55 degrees C (130 degrees F)

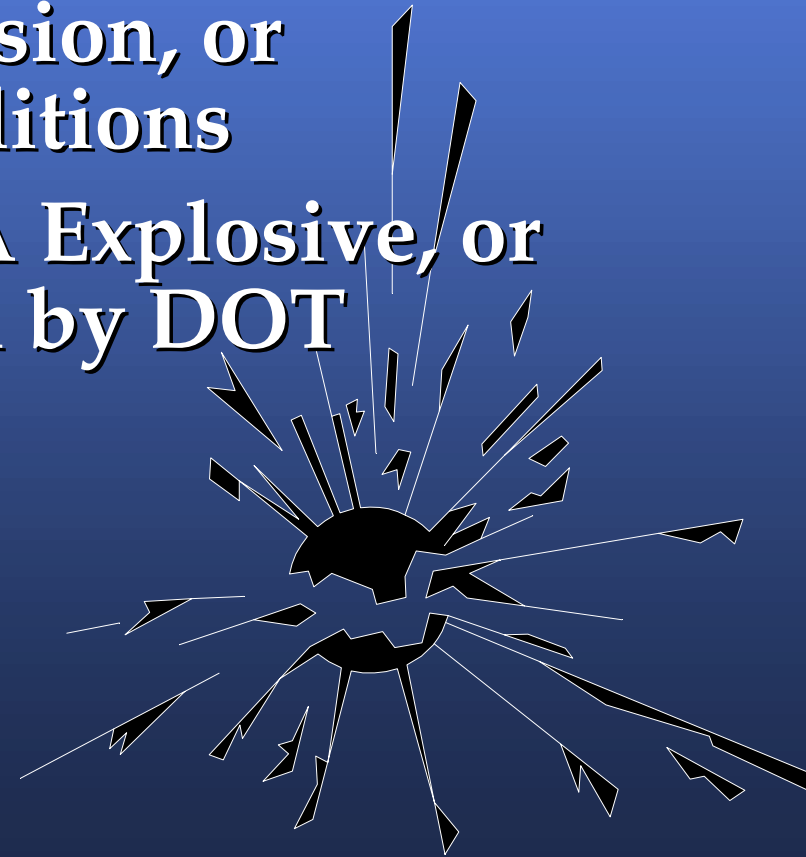
# Reactive Characteristic (40 *CFR* 261.23)

- D003
- Normally unstable and readily undergoes violent change
- Reacts violently with water
- Forms potentially explosive mixtures with water
- Generates toxic gases when mixed with water
- Cyanide or sulfide-bearing waste that can produce toxic gases

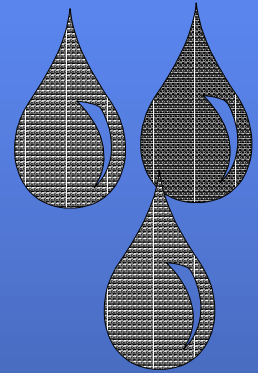


# Reactive Characteristic (Continued)

- Capable of detonation if exposed to heat or a strong initiating source
- Capable of detonation, explosion, or reaction under standard conditions
- Forbidden Explosive, Class A Explosive, or Class B Explosive, as defined by DOT



# Toxicity Characteristic (40 *CFR* 261.24)



- Based on a leachability test (TCLP)
- Waste is deemed hazardous if it exceeds threshold concentrations for specified constituents
- Test method 1311 published in EPA Publication SW-846; incorporated by reference [App. II to Part 261]

# Toxicity Characteristic (continued)

- 40 constituents identified under toxicity characteristic
  - 8 metals
  - 7 pesticides/herbicides
  - 25 other organic compounds

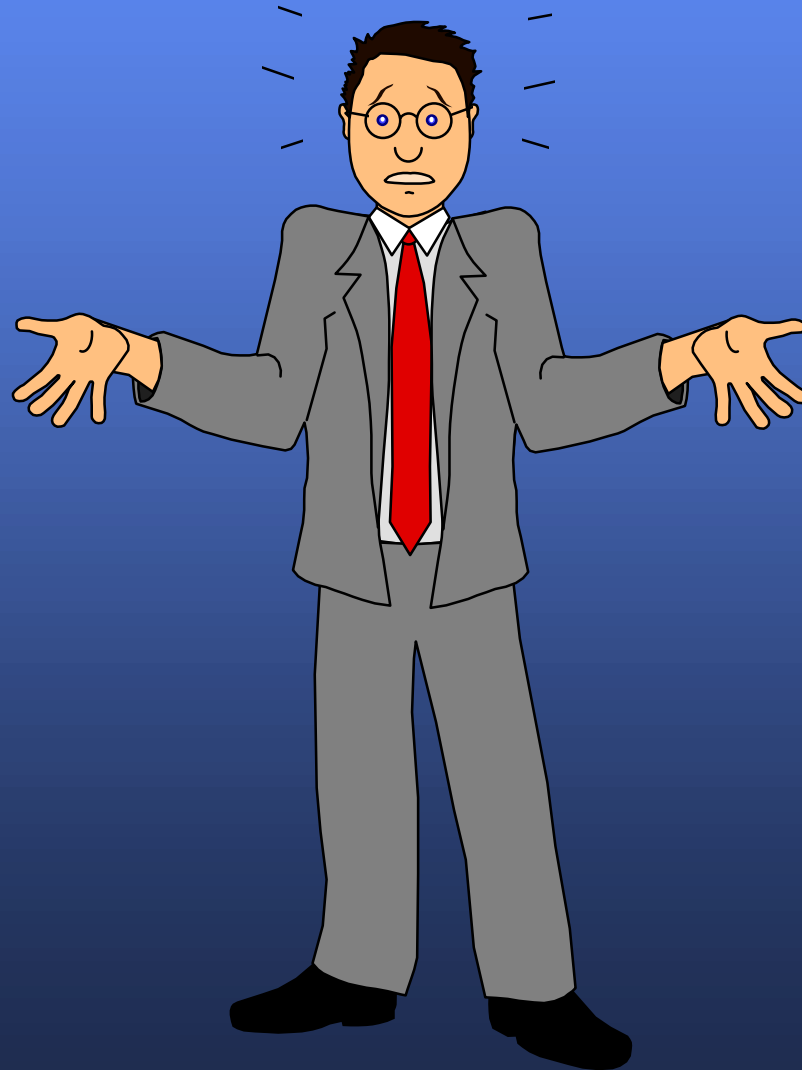
**Are we done yet?**



# Let's Revisit the FIRST Step for Defining Wastes as Hazardous:

- *Is the waste excluded?*
- Is the waste listed?
- Is the waste a characteristic hazard?

What should we consider  
during this Step?





# Exclusions, Exemptions, and Special Conditions

- Conditionally exempt small quantity generators
- Materials that are NOT regulated
- Recyclable materials
- Universal wastes
- Residues in “empty” containers
- Delisting

# What are some of the materials that are NOT subject to hazardous waste regulations?

- Waste remaining in the unit in which it was generated
- Specific solid wastes not considered hazardous
- PCBs
- Sample/treatability exclusion
- “Mixture rule” exemptions
- “Derived-from” exemptions

# Specific Solid Wastes NOT Considered Hazardous Waste

- Household waste
- Waste returned to the soil or used as fertilizer
- Mining overburden
- Waste from combustion of fossil fuels
- Wastes from exploration, development, or production of crude oil, natural gas, or geothermal energy
- Waste with trivalent chromium
- Waste from the extraction, beneficiation, and processing of ores and minerals

# Specific Solid Wastes NOT Considered Hazardous Waste (Continued)

- Cement kiln dust
- Discarded arsenical-treated wood or wood products
- Petroleum-contaminated media/debris subject to UST corrective action
- Reinjecting groundwater
- Used chlorofluorocarbon refrigerant from totally enclosed heat transfer equipment
- Non-terne plated , hot drained, used oil filters
- Used oil re-refining distillation bottoms used as a feedstock

# Sample/Treatability Exclusion

- The sample/treatability exclusions apply to waste that will be analyzed or treated and include:
  - Solid waste, water, soil, or air collected for testing to determine its characteristics or composition
  - Samples collected for treatability studies
  - Samples undergoing treatability studies

# Mixture Rule Exemptions (40 *CFR* 261.3(a)(2)(iv))

- Wastewater discharges regulated under the CWA are not subject to Subtitle C provided:
  - Spent solvent concentrations do not exceed 1 ppm or 25 ppm depending on the type of listed solvent
  - Heat exchanger bundle cleaning sludge from petroleum refining industry (K050)
  - De minimis losses of commercial chemical products or chemical intermediates
  - Wastewaters from laboratory operations containing toxic wastes

# Derived-from Rule Exemption (40 *CFR* 261.3(c)(2)(ii))

- Materials that are reclaimed from solid wastes and used beneficially
- Waste pickle liquor sludge
- Wastes from burning certain recyclable materials that are exempted from regulation
- Certain nonwastewater residues resulting from high temperature metals recovery (HTMR)
- Wastes that do not exhibit a hazardous waste characteristic

# Requirements for Hazardous Wastes That Are Recycled (i.e., Recyclable Materials)

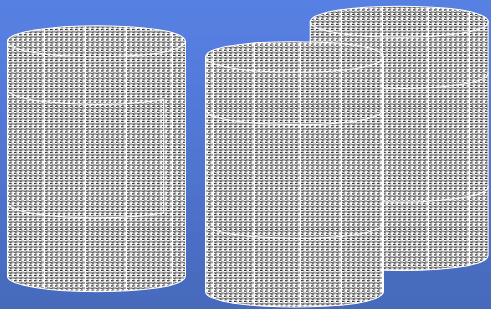
- Recyclable materials subject to 40 *CFR* Part 266
  - Materials used in a manner constituting disposal
  - Hazardous waste burned for energy recovery
  - Used oil burned for energy recovery (*OR 40 CFR 279*)
  - Materials from which precious metals are reclaimed
  - Spent lead-acid batteries being reclaimed
- Recyclable materials exempt from regulation
  - Industrial ethyl alcohol being reclaimed
  - Used batteries returned to a battery manufacturer for regeneration
  - Scrap metal
  - Materials (fuels, reclaimed oil, or hazardous waste fuel) associated with petroleum refining production, or transportation
  - Used oil that is recycled and is also hazardous solely because it exhibits a hazardous characteristic (*OR 40 CFR 279*)



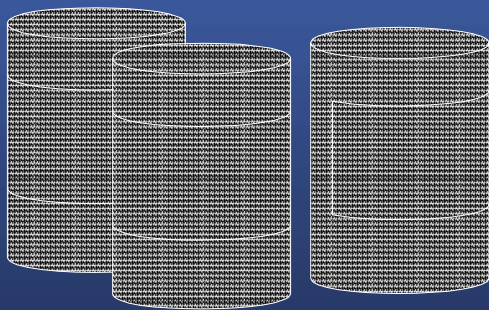
# Universal Wastes: EPA's Streamlined Conditions

- Batteries
- Pesticides
- Mercury-containing thermostats

# Are Containers that Held Hazardous Waste Also Hazardous?



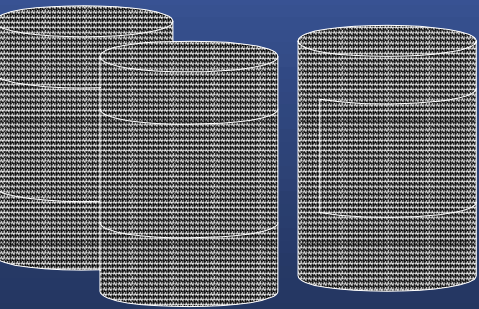
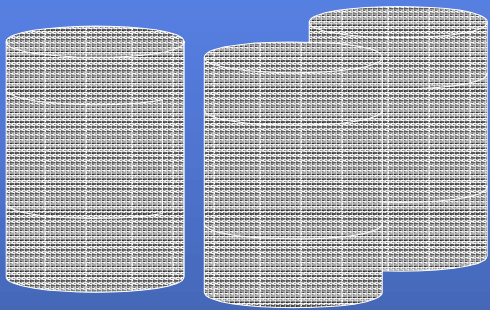
- Empty containers are not hazardous (40 *CFR* 261.7)
- Containers are empty (except those that held acute hazardous waste) if:



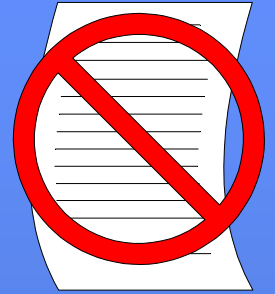
- emptied by conventional methods AND
- no more than 2.5 cm of residue,
- 3% by weight if less than or equal to 110 gal in size, or
- 0.3% weight (total capacity) if greater than 110 gal.

# Are Containers Hazardous (Continued)

- Containers that held acute hazardous waste are empty if:
  - they have been triple rinsed with an appropriate solvent
  - they have been cleaned by an alternative method demonstrated in the scientific literature
  - the container liner that prevented contact between the product and the container has been removed



# What is delisting?



- Delisting is a regulatory process (40 *CFR* 260.22) that applies to listed wastes
- It requires petitioning the appropriate EPA Regional Office or authorized State
- Petitioners must demonstrate that:
  - the waste produced by a particular facility does not meet the criteria for its waste category
  - no other constituents are present that might cause the waste to exhibit a characteristic and, therefore, require that the waste be regulated as hazardous waste

# Changing Definition of Hazardous Waste

- Additional listings
- Additional criteria
- New or revised exclusions
- Hazardous Waste Identification Rule (HWIR)

# Definition of Hazardous Waste in Summary

- The definition of hazardous waste begins with the solid waste definition.
- EPA has established a hierarchy for performing the hazardous waste determination which includes:
  - Determining if the waste is excluded;
  - Determining whether the waste meets a listing
  - Determining whether the waste exhibits a characteristic
- Listed waste include the F-, K-, P- and U-listed waste
- D-series hazardous wastes are those exhibiting any of four characteristics (i.e., ignitability, corrosivity, reactivity, or toxicity).
- Mixed waste is the smallest subset of the universe of materials.