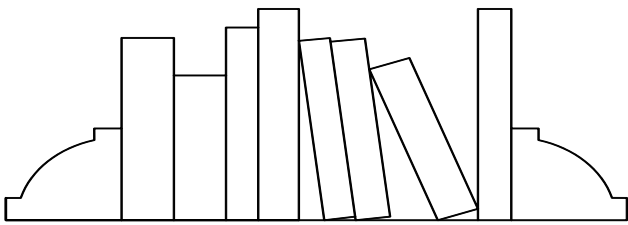


Waste

Lecture Outline:

19. HAZARDOUS WASTE
 - A. Hazardous Waste Defined
 - B. Regulatory History
 - C. Hazardous Waste in USA
 - D. Household Hazardous Waste
 - E. Superfund
 - F. Final Disposal



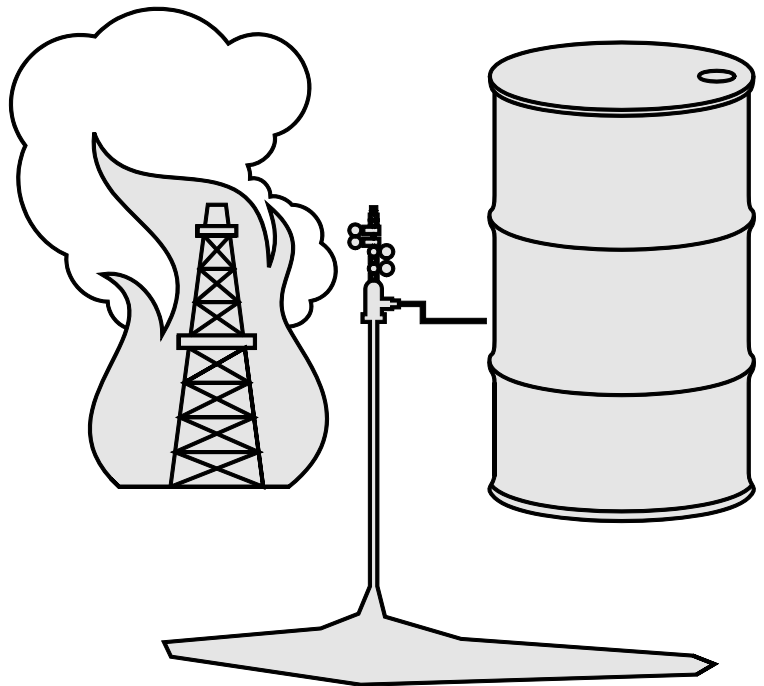
Learning Objectives:

When you are finished with this unit you should be able to:

1. Understand what makes a material hazardous.
2. Describe the regulatory history of hazardous waste in the USA.
3. Understand the Superfund program and the costs and benefits associated with it.
4. Analyze issues associated with final disposal of hazardous wastes.

Terms You Should Know:

- ❖ Carcinogenic
- ❖ Ignitable
- ❖ Oxidant
- ❖ Corrosive
- ❖ Toxic
- ❖ Radioactive
- ❖ Explosive
- ❖ RCRA
- ❖ Superfund
- ❖ E-waste
- ❖ Love Canal
- ❖ Times Beach



Reading Assignment:

Brennan and Withgott:
Chapter 22; pages 633-642.

19. HAZARDOUS WASTE

A. Hazardous Waste Defined

Hazardous Waste—by EPA definition,

- Ignitable – substances that

- Corrosive – substances that

- Reactive – substances that are chemically unstable and readily react with other compounds

- Toxic – substances that

1. E-Waste

- is a relatively new and growing problem

-

- over 40% of devices have been disposed of

- e-products contain:
 - ✓

 - ✓

 - ✓

B. Regulatory History

Major Laws:

- RCRA (1976)

- CERCLA (1980)

1. RCRA

Resource Conservation and Recovery Act

-
-
- system of record keeping for hazardous wastes
- hazardous wastes must be tracked from manufacture to final disposition
-

2. CERCLA

Comprehensive Environmental Response, Compensation, and Liability Act

- passed in 1980
- created "Superfund"
-
-
- now a hazardous waste must be stabilized and solidified before entering a landfill

C. Hazardous Waste in the USA

Many businesses generate hazardous wastes

Examples include:

-
-
-
- Exterminators

-
- Chemical manufacturers
-
- Oil refineries

Hazardous wastes generated by commercial or industrial activities may be classified as

OR

So a hazardous waste

1. Characteristic Waste

– defined as wastes that exhibit one of the following characteristics:

a. IGNITABILITY

✓

✓

✓

✓ waste oils, solvents are examples

b. CORROSIVE

✓

✓

✓

✓ battery acid is an example

c. REACTIVITY

✓

✓

✓ lithium-sulfur batteries and explosives are examples

d. TOXIC

2. Listed Waste

–

- are automatically considered hazardous waste solely on the process that generates them

Listed wastes include:

–

–

- wastes from certain cleaning and/or degreasing processes

Four categories:

–

–

–

–

3. Universal Wastes

- generally pose a lower threat than other hazardous wastes

–

– Examples:

✓ fluorescent light bulbs

✓

✓

✓

D. Household Hazardous Waste (HHW)

- Defined as waste that is generated from residential households

-

Categories:

-

-

- Pesticides

-

-

- Aerosols / propane cylinders

-

-

- Ammunition

-

1. Disposal of Household Hazardous Waste (HHW)

–

- modern landfills are designed to handle normal amounts of HHW
- regulated on a state-by-state basis

E. Superfund

- Name given to the environmental program established to address abandoned hazardous waste sites
-
-
- Allows EPA to clean up toxic waste sites

1. How Superfund works

- The Superfund process is complex
 - ✓
 - ✓
 - ✓
- In 30 years over 10,000 sites have been evaluated

2. Superfund sites in Pacific Northwest

- Alaska
- Idaho
- Oregon
- Washington

3. Bunker Hill site in Idaho

-
- listed on NPL in 1983
- contamination from 100+ years of mining

–

F. Final Disposal

Hazardous wastes undergo different treatments in order to stabilize and dispose of them

1. Recycling

- some materials can be recycled into new products

✓

- ✓ electronic circuit boards

✓

2. Portland cement

- cement based solidification and stabilization

–

3. Neutralization

- pH adjustment

–

4. Incineration / Destruction

- incineration at high temperature

–

- reduce volume

5. Hazardous Waste Landfill

- special, long-term storage facility

6. Pyrolysis

- ultra high temperature electrical arc

–