

HAZARDOUS WASTES

RCRA of 1976:

- **Defines hazardous waste**
- Promotes recovery and conservation
- Mandates government control of ultimate disposal from point of generation to point of disposal (**cradle-to-grave** concept)
- Requires manifest identification and permitting system
- **Amended to require double liners and leachate collection system**
- **Applies to generators producing at least 220 lb. in a calendar month**

CERCLA of 1980, amended in 1986:

- Defines hazardous substances as used in the Clean Air Act and Clean Water Act
- Regulates leachate and other releases from abandoned and inactive sites operating prior to November 1980
- Businesses that produce 220–2,000 lb of hazardous wastes in a calendar month are also regulated
- Comes into play when hazardous waste sites are identified and classified
- Established priorities list of sites targeted for remediation (bad first)
- Gov't can require owner/operator to clean up site
- Established "**Superfund**" via tax on chemical production
- If responsible party cannot be found, gov't can perform clean up with state contribution of 10% of cleanup cost

Superfund Amendments and Reauthorization Act (SARA) of 1986:

- First mandatory gov't program requiring chemical emergency planning at the state and local level
- Extension of CERCLA that established remediation standards and increased funding to implement the program
- **Title III of SARA:**
 - Emergency Planning and Community Right to Know Act (**EPCRA**) established
 - Provides public with knowledge about chemical hazards in their area

Toxic Substances Control Act of 1976:

- Regulates production, use, and disposal of chemical substances that may present an unreasonable risk of injury to health or environment

Clean Air Act (EPA):

- Regulates emission of hazardous air pollutants

Clean Water Act (EPA):

- Regulates discharge of hazardous pollutants into the nation's waters

Marine Protection, Research, and Sanctuaries Act (EPA):

- Regulates waste disposal at sea

Occupational Safety and Health Act (OSHA):

- Regulates hazards in the work place, including worker exposure to hazardous substances
- Requires toxic waste operators to have 40 hours of training and protective equipment (**HAZWOPER**)

Hazardous Materials Transportation Act (DOT):

- Regulates transportation of hazardous materials

Hazardous waste defined:

Solid waste or combination of solid wastes that because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

- Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed

Includes the following substances:

- **Chemical**
- **Biological**
- **Flammable**
- **Explosive**
- **Radioactive**

Characteristics:

- **Ignitability**
- **Corrosivity**
- **Reactivity/explosiveness**
- **Toxicity** (identified via toxicity characteristics leaching procedure, **TCLP**)

Hazardous waste recycling information required:

- Company ID code
- Category
- Primary usable constituents
- Contaminants
- Physical state
- Quantity
- Packaging
- Geographic location

Transportation:

- **CHEMTREC** offers info and advice on what to do and on characteristics of chemicals in an emergency...available 24 hours a day, 365 days a year
- In case of fire or other emergency at a facility having hazardous materials, info can be obtained via the National Oceanic and Atmospheric Administration (**NOAA**)
- Information availability is required by the Superfund Amendments and Reauthorizin Act (**SARA**)

Long-term storage:

- **Double liners with leachate collection systems required**
- **Groundwater monitoring system required**
- **Can be assumed that all liners, cutoff walls, or other containments will eventually leak**

Manifest system:

- Links generator, transporters, storage facilities, treatment plants, disposal sites, and the EPA/state
- If incident occurs, hazards/risks can be recognized and responsible parties identified

Shipping (all on hazardous waste manifest):

- Proper shipping name
 - Chemical name
 - Chemical group/family
 - End use
 - Hazard class
- UN/NA Number
- Hazard class (DOT)
 - Explosives
 - Gases
 - Flammable and combustible liquids
 - Flammable solids
 - Oxidizers
 - Poisonous, toxic, and infectious liquids/solids
 - Radioactive
 - Corrosive
 - Miscellaneous
- Packing group
 - I = Great danger
 - II = Medium
 - III = Minor
- Markings labels and placards
 - Orientation arrows
 - Hazardous waste label (and enter required waste and DOT markings on label)

- Hazard label (DOT) and place primary hazard DOT label next to waste label
- Additional information (handling)

Treatment technologies:

- Physical
 - Chemical
 - Biological
 - Thermal
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- g/ppm = density of vapor for HAZWOPER
 - Hazardous materials drained from crank case = heavy metals, oil
 - Process modification = zero tolerance for hazardous waste
 - **Corrosion-resistant container = best for storing hazardous waste**
 - Radioactive waste management = DOE (Dept. of Energy)
 - **Storage of hazardous waste without permit = 90 days max**