Hazardous Material Control

Hazardous waste
Chemical Hygiene
Lab Safety std.
Biological Pathogens

Resource Conservation and Recovery Act (RCRA)

- Passed by Congress in 1976 to provide a cradle-to-grave management of hazardous waste
- Enforced by the following governmental agencies:
  - Federal - Environmental Protection Agency (EPA)
  - State - Department of Environmental Conservation (DEC)
  - Local - Department of Environmental Protection (DEP)

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Major Events that Led to the Development of RCRA

- **Love Canal, NY**
  - Hooker Chemical began dumping chemicals in 1941
  - School built on the old dump site in 1954
  - School and nearby houses became affected
  - Cancer rates increased and an emergency was declared
- **Times Beach, MO**
  - Dioxin contaminated oil used to control dust on town roads in 1972
  - Government spent 32 million to buy resident homes in 1982-83 after numerous people and animals became sick

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Hazardous Waste

- RCRA definition:
  - Causes or significantly contributes to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or poses a substantial present or potential future hazard to human health or the environment when improperly treated, stored, transported or disposed, or otherwise mismanaged.

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What is Hazardous Waste?

- Any waste that has the following characteristics:
  - Ignitable
  - Corrosive
  - Reactive
  - Toxic

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Finding Chemical Hazard Information

- Chemical labels: National Fire Prevention Association (NFPA) Fire Rating
- Material Safety Data Sheets (MSDS)
- Hazard Information on the Internet

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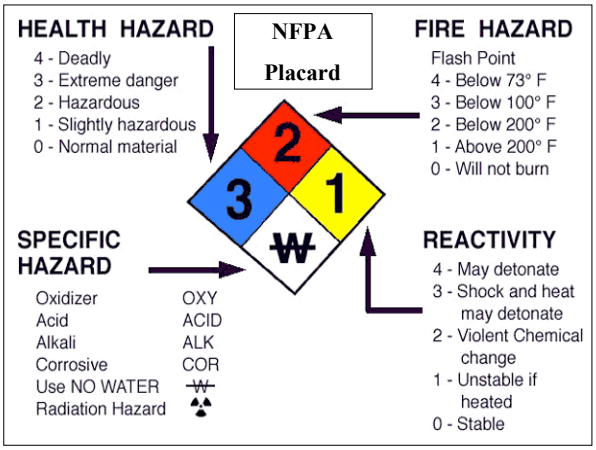

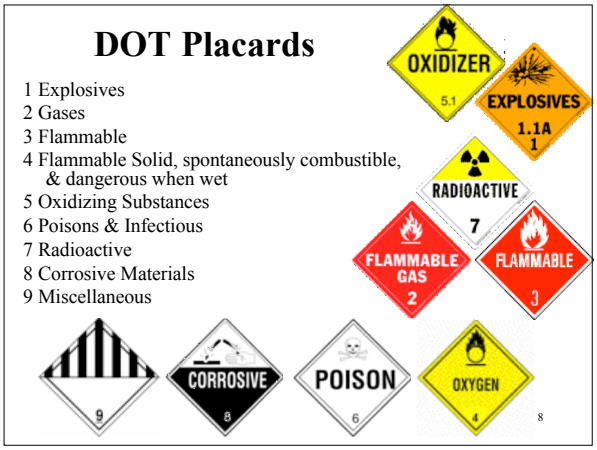

Material Safety Data Sheets

- Chemical Identification
- Ingredients (products containing hazardous chemicals)
- Physical Data
- Chemical Reactivity Data/chemical incompatibilities
- Health Hazard Data (occupational exposure limits, routes of entry, health effects)
- Spill/leak procedures
- Disposal procedures
- Miscellaneous info

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Hazardous Waste Generator

- **Large quantity generator:**
  - >2,200 lbs/month of hazardous waste
  - >2.2 lbs/month of acutely hazardous waste
- **Small quantity generator:**
  - Between 220 - 2,200 lbs/month of hazardous waste
  - ≤ 2.2 lbs/month of acutely hazardous waste
- **Conditionally exempt small quantity generator:**
  - Up to 220 lbs/month of hazardous waste
  - ≤ 2.2 lbs/month of acutely hazardous waste

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Hazard Control

- Chemical Hazard Information
- Engineering Controls
- Process/ Administrative
- Personal Protective Equipment

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Standard Operating Procedures-Control Measures

- Establish SOPs that includes safety and health measures:
  - Control measures-Minimize chemical exposures-Use general safety precautions-
    - Engineering Controls
      - Fumehoods-ventilation
    - Hygiene practices
      - Washing
      - Changing out PPE
      - Minimizing exposures of hazardous chemicals
    - Personal protective equipment (PPE)
      - Available, used and maintained

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Administrative Controls

- Purchasing Controls (Non-mandatory)
  - Monitor chemical use
  - Monitor chemical disposal
  - Monitor purchasing
- Inspections (Non-mandatory)
  - Periodic Housekeeping (safety)-quarterly inspections
  - Routine emergency equipment inspection
  - Look for outdated chemicals
- Review of Chemical Exposures-Usage
  - Continuing not one time
  - Ensure below recommended PEL's/TLVs

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Waste Minimization

- **Purchase only what is needed**
- Minimize and rotate inventories; redistribute excess chemicals
- Substitute hazardous substances with less hazardous materials
- Review and modify process to minimize amount of waste generated
- Recycle waste materials back into the same process or into a different process
- Separate hazardous waste from non-hazardous waste
- Reduce the amount of hazardous materials used in a procedure
- Do not purchase mercury-containing thermometers
- Share unused chemicals with other laboratories

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OSHA - Hazard Communication

29 CFR 1910.1200.

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Introduction

- About 32 million workers work with and are potentially exposed to one or more chemical hazards
- There are approximately 650,000 existing chemical products, and hundreds of new ones being introduced annually
- Chemical exposure may cause or contribute to many serious health effects such as heart ailments, central nervous system damage, kidney and lung damage, sterility, cancer, burns, and rashes
- Some chemicals may also be safety hazards and have the potential to cause fires and explosions and other serious accidents

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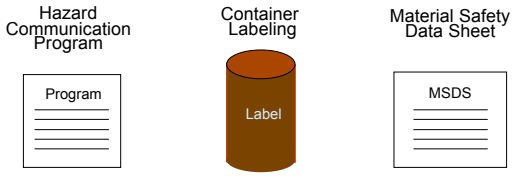
Purpose of OSHA's Hazard Communication Standard

To ensure that employers and employees know about work hazards and how to protect themselves so that the incidence of illnesses and injuries due to hazardous chemicals is reduced.



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Who is covered?

OSHA's Hazard Communication (HazCom) standard applies to general industry, shipyard, marine terminals, longshoring, and construction employment and covers chemical manufacturers, importers, employers, and employees exposed to chemical hazards.

Standards: 29 CFR - 1910.1200

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Employer Responsibilities

- Identify and list hazardous chemicals in their workplaces
- Obtain Material Safety Data Sheets (MSDSs) and labels for each hazardous chemical, if not provided by the manufacturer, importer, or distributor
- Implement a written HazCom program, including labels, MSDSs, and employee training
- Communicate hazard information to employees through labels, MSDSs, and formal training programs

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Exemptions

- Pesticide Labeling
- EPA regulated wastes labeled appropriately
- Foods, cosmetics
- Alcoholic beverages
- Consumer products

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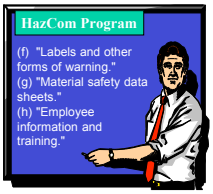
The Standard Requires

- Chemical Inventory
- Written Program
- Obtaining Material Safety Data Sheets
- Container Labeling
- Employee Training



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Written HazCom Program
Requirements

- Describes container labeling, MSDSs, and employee training for each workplace
- List of the hazardous chemicals
- Make information regarding hazards and protective measures available to other employers onsite

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OSHA 29CFR1920.1450:
OSHA Laboratory Standard

- **OSHA Laboratory Standard** of 1990 to address research laboratory work hazards (students, PostDocs, professors too!)
- Outgrowth of HazCom Std.
- Performance based standard
- "For laboratory uses of OSHA regulated substances, the employer shall assure that laboratory employees' exposures to such substances do not exceed the permissible exposure limits (PEL's) specified in 29 CFR 1910, subpart Z"

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The OSHA Laboratory Standard

- Employee Exposure Determination
  - Initial Monitoring
    - If above action level or PEL
  - Periodic Monitoring
    - If initial monitoring warrants
  - Employee Notification of Monitoring
    - Within 15 days
    - In writing

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The OSHA Laboratory Standard

- Employee Information (right to know)
  - Must be apprised of chemical hazards
  - Prior to work
  - New procedures/hazards
  - Include the Standard, CHP Location, and the PEL's of the substances
    - If no PEL, then signs and symptoms of exposure and location of reference material and MSDS's

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The OSHA Laboratory Standard

- Employee Training
  - Methods and observations that may be used to detect hazards
  - Physical and health hazards
  - Measures used to protect themselves
    - SOP's
    - Emergency Procedures
    - PPE
  - Implementation of the CHP

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The OSHA Laboratory Standard

- Medical Consultation and Examinations
  - Medical Attention and Follow-Up Exams will be provided when
    - Signs and symptoms
    - Monitoring reveals routine exposure above action level or PEL
    - Accident/Spill/Leak
  - Exams by a Licensed Physician without cost or loss of pay at a reasonable time and place

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The OSHA Laboratory Standard

- Hazard Identification
  - Labels shall not be removed or defaced
  - MSDS's shall be maintained and accessible
  - For Chemicals Developed in the Laboratory
    - The employer shall determine the hazard
    - Provide appropriate training
  - Follow Hazard Communication Standard (1910.1200) with respect to MSDS's and Labeling
- Use of Respirators
  - In accordance with the Respiratory Standard (1910.134)
- Recordkeeping
  - In accordance with 1910.20: 30 Years

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The OSHA Laboratory Standard

The Chemical Hygiene Plan

- A Written Plan Capable of
  - Protecting employees from health hazards
  - Keeping exposures below PEL or action limit
  - Readily available to employees
  - Shall include
    - SOP's
    - Control Measures using
      - Engineerinig Controls
      - Administrative Controls
      - PPE

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The OSHA Laboratory Standard

The Chemical Hygiene Plan Shall include:

- **Establishment of a Designated Use Area**
- **Use of Containment Devices such fume hoods and glove boxes**
- **Procedures for the safe removal of waste**
- **Decontamination Procedures**
- **Fume Hood Performance measures**
- **Information and training to workers**
- **Prior Approvals for certain operations**
- **Provisions for medical consultations**
- **Designation of Personal that Implement CHP**
- **Chemical Hygiene Officer**
- **Chemical Hygiene Committee**

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CHP Responsibilities

- Designation of Responsible person for CHP
  - All levels of management responsible-CEO ultimate responsibility
  - Chemical Hygiene Officer appointed-works with all levels of management
  - Establish Safety or Hygiene Committee (recommended)
  - Employee is also held responsible
  - Written CHP needs to be reviewed yearly and must be made available to all employees

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OSHA Laboratory Standard Respirator Use

- *Respirator use is not recommended!*
- Considered the *last* line of defense against exposure
- Modify work practices or experimental procedures instead

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