HAZWOPER

Household Hazardous Waste

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Household Hazardous Waste Operations and Emergency Response
- Federal 29 CFR §1910.120
- California Code of Regulations §5192
  - (D) HHW Operations (TSDF) (§5192 (p) = 24 hours)
  - (E) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.
  - "Competent" means possessing the skills, knowledge, experience, and judgment to perform assigned tasks or activities satisfactorily as determined by the employer.

HAZWOPER Refresher

- Review/retraining on relevant initial training topics
- Update on regulatory and safety standards
- Additional subject areas as appropriate.
- Hands-on review
  - New or altered PPE
  - Decontamination equipment, or
  - Procedures.

HAZWOPER Topics

- Safety and health program
- Hazard communication program
- Medical surveillance program
- Decontamination program
- New technology program
- Material handling program
- Training program
- Emergency response program

Topics

<table>
<thead>
<tr>
<th>Injury and Illness Prevention</th>
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<tr>
<td>Training Standards</td>
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<td>Hazard Communication</td>
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<td>Ergonomics</td>
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<td>Personal protective equipment</td>
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<tr>
<td>Bloodborne pathogen</td>
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<td>Slips, trips and falls</td>
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<td>Heat Illness Prevention</td>
</tr>
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<td>Emergency action</td>
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<td>Lock-out/Tag-out</td>
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<td>Confined spaces</td>
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<table>
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<th>HAZWOPER Programs</th>
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<tr>
<td>Safety and health program</td>
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<tr>
<td>Hazard communication program</td>
</tr>
<tr>
<td>Medical surveillance program</td>
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<tr>
<td>Decontamination program</td>
</tr>
<tr>
<td>New technology program</td>
</tr>
<tr>
<td>Material handling program</td>
</tr>
<tr>
<td>Training program</td>
</tr>
<tr>
<td>Emergency response program</td>
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</table>

Emergency or Incidental Spill*

<table>
<thead>
<tr>
<th>Emergency</th>
</tr>
</thead>
<tbody>
<tr>
<td>High hazard</td>
</tr>
<tr>
<td>Need help</td>
</tr>
<tr>
<td>Spill to waterway</td>
</tr>
<tr>
<td>Life or injury threat</td>
</tr>
<tr>
<td>Requires immediate attention and/or evacuation</td>
</tr>
<tr>
<td>Reportable to agencies</td>
</tr>
<tr>
<td>OES, 911, Health/Fire</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Incidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low hazard</td>
</tr>
<tr>
<td>Limited quantity</td>
</tr>
<tr>
<td>Cleanup without assistance</td>
</tr>
<tr>
<td>Not reportable to agency but keep record (Log)</td>
</tr>
</tbody>
</table>

*OSHA guidance
HazMat Response Levels

- First Responder Awareness Level
- First Responder Operations Level
- Hazardous Materials Technician
- Hazardous Materials Specialist
- On Scene Incident Commander
- HAZWOPER

First Responder Awareness

- OSHA definition
- Likely to witness/discover a release
- Can initiate notifying authorities
- Take no further actions beyond notifying the authorities of the release

First Responder Awareness Level

Have sufficient training or sufficient experience to objectively demonstrate competency in the following areas related to hazardous substances in an incident or emergency:
A. Understand what hazardous substances are, and risks
B. Understand potential outcomes associated with an emergency
C. Ability to recognize the presence of hazardous substances
D. Ability to identify the hazardous substances, if possible.
E. Understand role of the first responder awareness individual in the employer's emergency response plan
F. Ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

Why Train?

- It’s your Life
- Protect yourself
- It’s the Law
  - Regulatory Standards
  - Permit Requirements

Training Frequency

- Initial
- Refresher/Annual
- Periodic
  - Change in process or new chemicals
  - In response to incidents
  - New requirements
  - Interest

Training Methods

- This Refresher
- Tailgate Safety
- On-the-job training
- On-line Courses
- Site Specific Requirements (Essential)
- Equivalent documentation or certification of work experience or training
Training Requirements

• HAZWOPER
  • Initial & annual refresher
• DOT hazardous materials transportation
  • Initial & 3 year refresher or for changes
• Respiratory protection (annual)
• Bloodborne pathogen (annual)
• Universal Waste (annual)
  • Includes temporary workers

Hazard Communication

• A hazard is a source of risk, danger, or peril capable of causing injury.
• What is it?
  • Communication of the hazards present
  • How to protect yourself.
• Why Do it?
  • It’s the Law
    • 29 CFR 1910.1200
    • CCR Title 8, section 5194

Hazard Communication

• Employer - Develop HazCom program
  • Provide effective information and training on hazardous chemicals in their work area at the time of initial employment.
  • Provide training when a new physical or health hazard is introduced.
  • Chemical specific information must always be available through labels and material safety data sheets.
• Employees - Know program details & follow them.
  • Be aware of the work practices, emergency procedures, PPE, and the specific chemicals they may be working with or around.

Toxicology and interaction

• Everything is toxic at a certain concentration and duration of exposure
• Interactions and bodily reactions are dependent upon;
  • Routes of entry
  • Distribution mechanism: blood, Lymph, Mucous
  • Biotransformation: Metabolism/Detoxification
  • Routes of elimination
    • Exhalation, Perspiration, Excretion
  • Bioaccumulation

Man Claims Skin Treatment Turned Face Permanent Blue

Fourteen years ago, Paul Karason developed a bad case of dermatitis, which results in swollen, reddened and itchy skin. He started self-medicating, using a treatment called colloidal silver, which is made by extracting silver from metal.
Toxicity – Degree of Severity

- Acute – short term - reversible
- Chronic – long term - irreversible
- Additive \(3 + 3 = 6\)
  - DDT and Chlordane
- Synergism \(3 + 3 = 8\)
  - Asbestos fibers and smoking
- Potentiation \(0 + 3 = 6\)
  - non-toxic increases toxicity of toxic
  - ethanol and carbon tetrachloride
- Antagonism \(3 + 3 = 4\)
  - two chemicals react-reduced toxicity
  - lead and phosphate

LD50 Toxicity

- Extremely toxic <1mg/kg
- Highly toxic 1-50 mg/kg
- Moderately toxic 50-500 mg/kg
- Slightly toxic 500-5000 mg/kg
- Practically nontoxic >5000 mg/kg

Comparative Acutely Lethal Doses

<table>
<thead>
<tr>
<th>LD50 (mg/kg)</th>
<th>Ounces/200 pound person</th>
<th>Toxic Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,000</td>
<td>48</td>
<td>PCBs</td>
</tr>
<tr>
<td>10,000</td>
<td>12</td>
<td>Alcohol (ethanol)</td>
</tr>
<tr>
<td>4,000</td>
<td>15</td>
<td>Table salt - sodium chloride</td>
</tr>
<tr>
<td>1,500</td>
<td>4.5</td>
<td>Nicotine</td>
</tr>
<tr>
<td>500</td>
<td>2.5</td>
<td>Nicotine</td>
</tr>
<tr>
<td>200</td>
<td>0.64</td>
<td>Carbonate</td>
</tr>
<tr>
<td>150</td>
<td>0.49</td>
<td>Phenobarbital - a sedative</td>
</tr>
<tr>
<td>142</td>
<td>0.45</td>
<td>Ethanol (anesthetic)</td>
</tr>
<tr>
<td>8</td>
<td>0.14</td>
<td>Nicotine</td>
</tr>
<tr>
<td>2</td>
<td>0.0804</td>
<td>Nicotine - a rat poison</td>
</tr>
<tr>
<td>1</td>
<td>0.032</td>
<td>Nicotine</td>
</tr>
<tr>
<td>0.5</td>
<td>0.010</td>
<td>Curare - an arrow poison</td>
</tr>
<tr>
<td>0.001</td>
<td>0.000032</td>
<td>2,3,7,8-TCDD (dioxin)</td>
</tr>
<tr>
<td>0.0001</td>
<td>0.00000032</td>
<td>Botulinum toxin (Food poison)</td>
</tr>
</tbody>
</table>

Dose / Response

One tequila Two tequila Three tequila

Absorption, Distribution, Excretion

Routes of Entry

There are 5 main routes of exposure:
- Inhalation
- Ingestion
- Absorption
- Injection
- Eye Contact

KEY ROUTES OF CHEMICAL ABSORPTION, DISTRIBUTION AND EXCRETION:
Signs of Exposure

The following symptoms could be an indication of chemical exposure:

- Loss of Smell
- Dizziness
- Choking or Coughing
- Headache
- Nausea
- Eye Irritation
- Change in Normal Behavior

Measuring Exposure

Comparative analogies are:

- ppm (parts per million)
  - 1 teaspoon in 1,000 gallons
  - 1 second in 12 days
- ppb (parts per billion)
  - 1 teaspoon in one million gallon
  - 1 second in 32 years

Examples:

- >5 ppm soluble lead in a waste is hazardous waste limit
- Benzene 1 ppm (permissible exposure limit = PEL)
- Methylene chloride 25 ppm (PEL)

Detectable Odors

<table>
<thead>
<tr>
<th>Acids</th>
<th>Identifying odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid, CH₃COOH</td>
<td>Sour vinegar</td>
</tr>
<tr>
<td>Hydrochloric Acid, HCl</td>
<td>Pungent, irritating</td>
</tr>
<tr>
<td>Nitric Acid, HNO₃</td>
<td>Acrid, sharp</td>
</tr>
<tr>
<td>Sulfuric Acid, H₂SO₄</td>
<td>Odorless</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solvents</th>
<th>Identifying odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone, (CH₃)₂CO</td>
<td>Fragrant, mint-like</td>
</tr>
<tr>
<td>Freon/oxygen</td>
<td>Sweet, chloroform-like</td>
</tr>
<tr>
<td>Isopropyl Alcohol, C₃H₈O</td>
<td>Fragrant, rubbing alcohol</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane, TCA</td>
<td>Sweet, chloroform-like</td>
</tr>
<tr>
<td>Xylene, C₈H₁₀</td>
<td>Aromatic</td>
</tr>
</tbody>
</table>

Gases

<table>
<thead>
<tr>
<th>Identifying odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphine, PH₃</td>
</tr>
<tr>
<td>Hydrogen Sulfide, H₂S</td>
</tr>
<tr>
<td>Silane, SiH₄</td>
</tr>
<tr>
<td>Ozone, O₃</td>
</tr>
</tbody>
</table>

Evaporation

- Temperature
- Surface area
- Evaporation rate

Mercury Vapor

Definitions Exposure

- PEL/TWA
  - Permissible Exposure Limits
  - Time Weighted Average calculation
  - OSHA (enforceable)
- TLV
  - Threshold Limit Values
  - ACGIH annual update

**e.g. Methylene chloride**

PEL=25 ppm  STEL=125 ppm  TLV=50 ppm

IDLH Definitions

(Immediately Dangerous to Life and Health)

- atmosphere that poses an immediate threat to life,
- would cause irreversible adverse health effects, or
- would impair an individual's ability to escape from a dangerous atmosphere

**e.g. Hydrogen Sulfide IDLH 100 ppm**
Flash Point

- Flash point
  - Minimum temperature at which the liquid’s vapor ignites
  - The lower the flash point, the greater the hazard

<table>
<thead>
<tr>
<th>DTSC/DOT</th>
<th>Flammable</th>
<th>Combustible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FP &lt; 73.4</td>
<td>BP ≤ 95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OSHA/NFPA</th>
<th>Flammable</th>
<th>Combustible</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP &lt; 73.4</td>
<td>BP &gt; 95</td>
<td></td>
</tr>
<tr>
<td>≥ 73.4 &amp; ≤ 140</td>
<td>Flammable 3</td>
<td>Combustible</td>
</tr>
<tr>
<td>&gt; 60 &amp; ≤ 199.4</td>
<td>Flammable 4</td>
<td></td>
</tr>
</tbody>
</table>

140°F

100°F

GHS

Classes of Some Flammable Liquids

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Flash Point (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS IA</td>
<td>Ethyl Ether</td>
</tr>
<tr>
<td></td>
<td>-49</td>
</tr>
<tr>
<td>CLASS IB</td>
<td>Gasoline</td>
</tr>
<tr>
<td></td>
<td>-45</td>
</tr>
<tr>
<td></td>
<td>Methyl Ethyl Ketone</td>
</tr>
<tr>
<td></td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Toluene</td>
</tr>
<tr>
<td></td>
<td>40</td>
</tr>
<tr>
<td>CLASS IC</td>
<td>Xylene</td>
</tr>
<tr>
<td></td>
<td>81-115</td>
</tr>
<tr>
<td></td>
<td>Turpentine</td>
</tr>
<tr>
<td></td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>Diesel</td>
</tr>
<tr>
<td></td>
<td>136</td>
</tr>
</tbody>
</table>

Explosive Range

What is GHS?
What is SDS?

What’s included in the GHS?

- Hazardous chemical substances
- Dilute solutions
- Mixtures
What’s not included?

- Pesticide residues in food
- Pharmaceuticals
- Food additives
- Cosmetics

What’s changed?

- Labels
  - On products
- Safety Data Sheets (SDS)
  - Replace MSDS
- Employee training

Implementation Schedule

<table>
<thead>
<tr>
<th>Effective Completion Date</th>
<th>Requirement (s)</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 1, 2013</td>
<td>Train employees on the new label elements and SDS format.</td>
<td>Employers</td>
</tr>
<tr>
<td>June 1, 2015</td>
<td>Comply with all modified provisions of the final rule, except.</td>
<td>Chemical manufacturers, importers, distributors and employers</td>
</tr>
<tr>
<td>December 1, 2015</td>
<td>Distributors may ship products labeled by manufacturers under the old system until December 1, 2015.</td>
<td></td>
</tr>
<tr>
<td>June 1, 2016</td>
<td>Select alternative workplace labeling and hazard communication program as necessary, and provide additional employee training for newly identified physical or health hazards.</td>
<td>Employers</td>
</tr>
<tr>
<td>Transition Period</td>
<td>Comply with either 29 CFR 1910.1200 (this final standard), or the current standard, or both.</td>
<td>All chemical manufacturers, importers, distributors and employers</td>
</tr>
</tbody>
</table>

GHS Required Label Elements

1. Harmonized signal word
   - Danger
   - Warning
2. Pictogram (e.g., skull and crossbones)
3. Hazard statement
   - (e.g., Fatal if Swallowed)
4. Precautionary statements
5. Manufacturer Info

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Pictograms and Hazards
Safety Data Sheets

1. Identification;
2. Hazard(s) identification;
3. Composition/information on ingredients;
4. First-aid measures;
5. Fire-fighting measures;
6. Accidental release measures;
7. Handling and storage;
8. Exposure controls/personal protection;
9. Physical and chemical properties;
10. Stability and reactivity;
11. Toxicological information;
12. Ecological information;
13. Disposal considerations;
14. Transport information; and
15. Regulatory information
16. Other information, including date of preparation or last revision

Acute Oral Toxicity

<table>
<thead>
<tr>
<th>Category</th>
<th>LD₅₀ (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5</td>
<td>≤5 ≤100</td>
</tr>
<tr>
<td>&gt;5 ≤ 100</td>
<td>&gt;100 &lt;100</td>
</tr>
<tr>
<td>50 ≤ 200</td>
<td>100 ≤ 1000</td>
</tr>
<tr>
<td>200 ≤ 5000</td>
<td></td>
</tr>
</tbody>
</table>

Non-Mandatory
16. Other information, including date of preparation or last revision

Pictograms not in GHS (Still needed in transport)

Class 6.2  Class 7  Class 9
Infectious substances  Radioactive material  Misc. dangerous substances/articles (e.g. lithium batteries, asbestos)

Sample Label

**OVEN CLEANER**

**DANGER**

HAZARD STATEMENTS:
Causes severe skin burns and eye damage.

PRECAUTIONARY STATEMENTS:
- Wear protective clothing, protective clothing, eye protection, face protection.
- Wash thoroughly after handling
- IF SWALLOWED: Rinse mouth. DO NOT induce vomiting.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
- IF ON SKIN: Remove/Remain and immediately all contaminated clothing. Rinse skin with water. Smoke.
- Dispose of contaminated container in accordance with local regulations. See SDS FOR MORE INFORMATION.
Safe Handling Fundamentals

- Read label before storing or using
- Practice good housekeeping
- Clean up spills immediately
- Only use approved or original container
- Keep the containers closed when not in use
- Store away from exits or passageways
- Use flammable liquids only with plenty of ventilation
- Keep flammable liquids away from ignition sources such as open flames, sparks, smoking, cutting, welding, etc.

Safety and Health Program

- Identify, evaluate, and control safety and health hazards for the purpose of employee protection
- Address as appropriate site analysis, engineering controls,
  - Maximum exposure limits,
  - Hazardous waste handling procedures

General Hazards

- Physical Hazards
- Chemical Hazards
- Biological Hazards
- Environmental Hazards

Hazard Types

- Physical hazards are associated with equipment operations, use of PPE, and work site conditions.
- Chemical hazard is a substance’s ability to pose harm based on its chemical properties.
- Biological hazards are induced by biological things, such as animal bites, poisonous plants, and pathological microorganisms.
- Environmental hazards are weather related typically heat and cold related

Physical Hazards – SAFETY MEASURES

ISSUE
- Be visible - Maintain eye contact with driver
- Stand to the side of moving vehicle
- Use equipment for lifting
- Avoid walking on garbage
- Have equipment operator spread load
- Use proper lifting technique, use knees
- Use carts
- Use tools like hooks to open bags
- Use personal protective equipment
  - glasses, gloves

Physical Hazards

- There are many different types of physical hazards. The most notorious are:
  - Vehicle Safety
  - Slips, trips, and falls
  - Back injuries = Lifting and carrying
  - Inclement weather = heat stress
  - Electrical Hazards
  - Hearing damage
Slips, trips, and falls

- Slips can be caused by wet surfaces, spills, or other weather hazards.
  - Taking shorter steps under wet conditions.
  - Clean spill immediately, even small ones.
  - Wear proper shoes, for your work area.
- Trips occur when your foot hits an object and you are moving with enough momentum to be thrown off balance.
  - Don’t carry loads above your line of sight.
  - Keep areas well lit.
  - Proper housekeeping. Clean, tidy, and properly stored.
- Falls
  - Don’t jump of loading docks or trucks.
  - Repair any broken steps.
  - Proper housekeeping.
  - Wear proper shoes and clothing for your job.

Lifting and Carrying

- Most people will suffer some type of back injury in their life. Simple techniques can assure these do not happen.
  - Get a firm footing.
  - Bend your knees.
  - Keep your feet shoulder width apart and point your toes out.
  - Bend at your knees.
  - Tighten your stomach muscles.
  - Stomach muscles help support your spine.
  - Lift with your legs.
  - Keep the load close.
  - The closer it is to the spine the less stress on your back.
  - Keep your back upright.
  - Shoulders should be back and your back should always remain straight.
  - Maintain line of vision and proper housekeeping.

Electrical Hazards

- Electrical hazards can be present from exposed wires, misusing equipment / broken equipment, and construction practices.
  - Bond and ground equipment
  - Don’t use damaged power cords or tools.
  - Use proper lockout / tagout procedures.
  - Check for underground electrical lines before digging.

Hearing damage

- Once 85dBA is reached in your work place you must initiate a hearing conservation program.
  - Continuous noise levels at 90dBA or spikes of 100dBA can cause hearing damage (increase blood pressure, headaches, fatigue, and permanent loss).
  - Safety precautions include;
    - Reduce source of loud noise
    - Use hearing protection
    - Reduce time of exposure
    - Increase distance from source of noise
    - Have an annual audiogram done to monitor changes

Eating, Drinking, & Smoking

- Eating and Drinking areas – 29 CFR 1910.120 (g)(2)
  - No employee shall be allowed to consume food or beverage in a toilet room nor in any area exposed to toxic material.
  - Smoking at HHW’s
    - Don’t do it!

Chemical Hazard SAFETY MEASURES

- Avoid exposure
  - Use protective clothing
    - Safety glasses
    - Hand protection
  - NEVER intentionally smell a container or material. If you can smell it you are inhaling it into your body
  - Beware of unsafe containers
Sources of Ignition

Must take adequate precautions to prevent ignition of flammable vapors. Some sources of ignition include:

- Open flames
- Smoking
- Static electricity
- Cutting and welding
- Hot surfaces
- Electrical and mechanical sparks
- Lightning

Static Electricity

- Generated when a fluid flows through a pipe or from an opening into a tank
- Main hazards are fire and explosion from sparks containing enough energy to ignite flammable vapors
- Bonding or grounding of flammable liquid containers is necessary to prevent static electricity from causing a spark

Bonding

- Physically connect two conductive objects together with a bond wire to eliminate a difference in static charge potential between them
- Must provide a bond wire between containers during flammable liquid filling operations, unless a metallic path between them is otherwise present

Grounding

- Eliminates a difference in static charge potential between conductive objects and ground
- It will not eliminate a difference in potential between these objects and earth unless one of the objects is connected to earth with a ground wire

Biological Hazards

Medical Waste  Insects
Bloodborne Pathogens Mammals
Sharps  Reptiles

Bloodborne Pathogen Standard

Who is covered by the standard?

- All employees who could be “reasonably anticipated” as the result of performing their job duties to face contact with blood and other potentially infectious materials
  - Physicians, nurses, paramedics and emergency personnel
  - Dentists and other dental workers
  - Law enforcement & firefighters personnel
  - Anyone providing first-response medical care
- Title 8, Section 5193
- Solid Waste? Load checkers?
Bloodborne Pathogen

- Exposure Control Plan address prevention
- Universal Precautions - Treat all human blood and certain body fluids as if they are infectious
- Hepatitis B Vaccination available
- Training requirements
- Sharps Injury Log

How does exposure occur?

- Most common: needlesticks
- Cuts from other contaminated sharps (scalpels, broken glass, etc.)
- Contact of mucous membranes (for example, the eye, nose, mouth) or broken (cut or abraded) skin with contaminated blood

HIV/AIDS

- Human immunodeficiency virus infection (HIV)
- Acquired immunodeficiency syndrome (AIDS)
- AIDS Transmission
  - Sexual Contact
  - Blood Contact
    - Needles
    - Fluid
- The HIV virus is very fragile and will not survive very long outside of the human body.

HBV Or Hepatitis

- Inflammation of the liver - most common bloodborne disease
- Is transmitted primarily through "blood to blood" contact
- Symptoms range from flu-like to none at all
- No symptoms - person is infectious and can spread the disease. Can survive in dried blood for up to seven days
- Hepatitis infects about 300,000 people in USA annually
- Can lead to serious conditions such as cirrhosis & liver cancer

Hepatitis A, B, and C

- Hepatitis A
  - Acute hepatitis & almost always gets better on its own
  - Easily spread from person to person, in food and water, and can infect many people at once
- Hepatitis B
  - Can be both acute and chronic
  - Spread by blood or other body fluids, various ways.
- Hepatitis C
  - Almost always chronic
  - Spreads only by blood.

Hepatitis A, B, and C

- Hepatitis A and B can be prevented by vaccination, but not Hepatitis C.
- There are now many good medications available to treat chronic Hepatitis B and C.
If Needles are Found

- Inform other employees
- Use tools like tongs to collect needles
- Always use gloves
- Place needles in sharps container at location

If Stuck by a Needle

- Encourage the wound to bleed,
  - Do not suck the wound
- Rinse thoroughly under running water. If water is not available, use cleansing wipes
- Cover the wound
- Collect needle if possible and take to clinic
- Formally record the incident including details of the action taken
- Seek medical advice and treatment immediately

Biological Hazards

Insects & Mammals

- Spread pathogens
  - Ticks
  - Spiders
  - Bees & Wasps
    - Biting and stinging insects
  - Mosquitoes
  - Mammals
    - Dogs, cats, rodents
  - Reptiles
    - Snakes

Biological Hazards - SAFETY MEASURES

- Use proper personal protection
  - Eye protection, Hand protection, Clothing
- Use tools to avoid handling materials
- Wash hands and any other body parts that contacted suspected medical wastes, chemicals, and waste
- Inform supervisors of potential exposure

Environmental Hazards

- Heat Stress
- Cold Weather

Heat Illness – Cal/OSHA Reg

- Identifying, evaluating, and controlling exposures
- Types, signs and symptoms
  - Mass Sweating = Heat Stress
  - No Sweating = Heat Stroke
  - Nauseous and dizziness.
  - 104 °F are life-threatening. At 106 °F, brain death begins.
- Title 8, §3395
When Temperature Exceeds 85°F

- Access to 1 quart fresh water/person/hour
- Shade required, available for all employees
- Located as close as practical to the area where employees are working, but no further than a 2.5 min walk away.
- Accommodate at least 25% of the employees on the shift at any one time.
- Encouraged to take a cool-down rest in the shade for a period of no less than five minutes at a time.

Employee Training

- Environmental and personal risk factors for heat illness
- Employer's procedures
- Importance of frequent consumption of water
- Importance of acclimatization
- Different types of heat illness and the common signs and symptoms
- Immediate reporting
- Emergency procedures

Supervisor training

Supervisors should receive training on the following topics prior to supervising employees performing work that should reasonably be anticipated to result in exposure to the risk of heat illness:

- The information required to be provided to employees.
- Procedures the supervisor is to follow to implement the applicable provisions.
- Procedures the supervisor is to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.
- How to monitor weather reports and how to respond to hot weather advisories.

Inclement Weather: Cold

- Acute
  - the body temperature drops very swiftly, often in a matter of minutes, such as when a victim falls through an ice-covered lake.
- Subacute
  - occurs on a scale of hours, most commonly by remaining in a cold environment for an extended period of time.
  - Shivering, tremors
  - Low blood pressure
  - Confusion
  - weakness

Personal Protective Equipment

- How dehydrated are you?
  - Highly dehydrated! Go drink a large bottle of water immediately!!
  - You are still seriously dehydrated. Drink a bottle of water now and make sure you feel much better.
  - Moderately dehydrated. You lose water on a regular basis throughout the day. Drink more water.
  - You’re almost there. Get some water in your system to flush out all those toxins from your workout. Stay hydrated and healthy!
  - Great job! How don’t let yourself get dehydrated. Drink at least 8-12 large glasses of water throughout the day.
  - Caffeinated drinks dehydrate. Seek your consumption. Sport drinks can provide supplementary electrolytes, but WATER is the best!
Personal protective equipment

- In use as required
- Appropriate for activity
- Operations plan compliance
- Respiratory
- New development in PPE
  - “New Technology Program”

Why PPE is Used

Aerosol paint can exploded while cleaning bale

PPE Limitations

- Provides temporary protection only
- Does not eliminate hazards
- No single combination of PPE and clothing provides protection against all hazards
- Watch for breakthrough, leaks

Typical PPE

- Head Protection
- Eye protection
- Hand protection
- Foot protection
- Clothing
- Respiratory

PPE - SUMMARY

- Assess hazards
- Seek engineering controls
- If not sufficient, then select PPE
- PPE is not fail safe. Good work practices essential
- Wearing PPE can present own hazards
- Inspect PPE and maintain in good order
- Use buddy system
- Staff must be training in all aspects of PPE

PPE – EMPLOYER RESPONSIBILITIES

- Assessment of workplace hazards
  - Health hazards
  - Physical hazards
- Providing PPE
- Recordkeeping
- Maintenance of PPE
- Training employees
PPE – EMPLOYEE RESPONSIBILITIES

- Assess potential hazards prior to starting the job.
- Attend training sessions
- Follow ALL warnings & precautions
- Listen & follow directions from supervisor
- Report any & all safety hazards or conditions to supervisor

Chemical Protective Clothing

- Degradation- Visible, gross damage to the material such as blistering, cracking, swelling or dissolving.
- Penetration- Chemicals leaking through seams, stitching or zippers.
- Permeation- Chemicals soaking into and through the material.
- Breakthrough time- The time it takes before enough permeation occurs so that the chemical can be measured. Tested in Laboratory.

Glove Selection Chart

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Natural Rubber</th>
<th>Neoprene</th>
<th>Butyl</th>
<th>PVC</th>
<th>Nitrile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Butane</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>PCB's</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hydrochloric acid 97%</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Acetone</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hydrogen Peroxide</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

PPE – HEAD PROTECTION

Common causes of head injury include:
- Falling or flying objects
- Falling or walking into hard objects

Injury prevention methods include:
- Wearing a hardhat
- Warning signs such as “low head room”

PPE – EYE & FACE PROTECTION

Common causes of eye & face injury include:
- Flying objects & particles
- Grinding, sanding, chiseling
- Toxic gases, vapors & chemical splashes
- Testing of chemicals, opening containers
- Being struck by a swinging object
- Overhead crane hoist, chains, cables

Safety Glasses With Removable Side Shields: Impact Only

Safety Glasses With Nonvented Side Shields: Impact Only

Vizionex®: Impact Only

Impact Safety Goggles: Impact Only
PPE – EYE & FACE PROTECTION

**Injury prevention methods include:**
- Eye protection
- Use of machine guards
- Barriers
- Good lighting
- Signs & warnings

Safety Glasses

- Rated for impact
  - ANSI Z87 or Z94 (Canadian)

Exploding Container

[Image: http://www.dryiceinfo.com/Pictures/dry%20ice%20bomb%20injury.jpg]

Emergency Eyewash Station Requirements

“Emergency eyewash facilities and deluge showers shall be in accessible locations that require no more than 10 seconds for the injured person to reach”

29 CFR 1910.151(c)
Title 8, §5162
ANSI Z358.1

Shower/Eyewash Temperature

- OSHA (Enforceable)
  - 60 to 95 degrees (appendix reference)
  - OSHA generally defers to most recent standard
  - 29 CFR 191.151(c)
- ANSI (New recommendation)
  - Tepid water—moderately warm or lukewarm
  - Considered to be 78 degrees F to 92 degrees F
  - ANSI Z358.1-1998

Spills on skin or eyes

- The best immediate treatment for chemical spills on skin or eyes is to:
  - Flush the area with water for at least 15 minutes
  - If spill is to the eye, seek medical attention immediately
- The standard for plumbed eyewash is:
  - 0.4 gallons per minute
- Bottled eyewash have limited emergency uses
PPE – HAND PROTECTION

Approximately 20% of all disabling accidents on the job involve the hands.

• Types of injuries include:
  • Traumatic Injury
  • Contact Injury
  • Repetitive Motion Injury
  • Gloves
    • Right one for the job

PPE – FEET PROTECTION

TYPES OF HAZARDS

• Impact Injuries
• Injuries from spills & splashes
• Compression Injuries
• Electrical Shock
• Extreme weather conditions

PPE – HEARING PROTECTION

A hearing protection device should be worn whenever a person is exposed to noise that is 85 decibels or greater for an 8 hour period of time.

TYPES OF HEARING PROTECTION DEVICES

• Foam Earplugs
• PVC Earplugs
• Earmuffs

Respiratory Protection

There are 2 basic types of respirators

• Air Purifying Respirators (APRs). With these you breath in the air around you and cartridges filter the air before you breath it.
• Atmosphere Supplying Respirators. These provide a separate clean air supply from a cylinder on your back (SCBA) or through an airline from a cylinder or compressor (SAR). In O2 deficient atmosphere you must have an atmosphere supplying respirator.

Respirator/Dust Mask

• Voluntary Use
  • Read & follow instructions
  • Use proper mask for hazard
  • Only use yours

  • T8, §5144, App D
Respiratory Protection

**Equipment Inspection**

After Each Use Check For

- Proper Cartridges & Air Bottle Level
- Face Piece Integrity
- Couplings, Regulator, Fittings, Gaskets
- Harness Integrity
- Alarm Operation

**Medical Surveillance**

- Certification by a Physician or Licensed Health Care Professional
- Pulmonary function test and/or equivalent physical evaluation
- Ability to wear a “tight-fitting” mask
- Medical history

**Fit Test**

- Positive Pressure Fit Check
- Negative Pressure Fit Check
- Qualitative or Quantitative Fit Test

**Positive Pressure Fit Check**

- Close off the exhalation valve and exhale gently into the facepiece.
- Satisfactory fit if
  - Slight positive pressure built up inside the facepiece
  - No evidence of outward leakage of air at the seal.

**Negative Pressure Fit Check**

- Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s).
- Inhale gently so that the facepiece collapses slightly
- Hold the breath for ten seconds
- If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.
Qualitative Fit Test

- One minute each exercise
  1. Normal breathing
  2. Deep breathing
  3. Turning head side to side
  4. Moving head up and down
  5. Talking - Rainbow Passage
  6. Bending over
  7. Normal breathing

Service Life

- Defined as how long it provides employee with adequate protection from harmful chemicals in the air
- Depends on:
  - Environmental conditions (e.g., high humidity)
  - Breathing rate
  - Cartridge capacity
  - Concentration contaminant in air
  - Breathing rate
  - Hours used per day
- Some cartridges have end-of-service-life indicator

Change schedule

- Manufacturer's recommendation
- Conduct experimental tests
- Math model
- “Rule of Thumb” (AIHA)
  - Chemical boiling point >70°C & concentration <200 ppm = service life = 8 hours normal rate
  - Service life inversely proportional to work rate
  - Reducing concentration by factor of 10 increases service life by factor of 5
  - Humidity > 85% reduces service life by 50%

Factors affecting cartridge usage

- Exposure time
- Contaminants
- Concentration
- Exertion level/Work Rate
- Frequency of use (e.g., continuously, intermittently) throughout the shift
- Temperature
  - Reduce 1-10% per 10 degree Celsius
- Humidity
  - Higher humidity reduces service life
- The presence of potentially interfering chemicals.

Cartridge Types

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Color Coding on Cartridge/Canister Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid gases</td>
<td>White</td>
</tr>
<tr>
<td>Acid gases &amp; organic vapors</td>
<td>White</td>
</tr>
<tr>
<td>Acid gases and ammonia gas</td>
<td>Yellow with 1/2 inch white stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Acid gases, organic vapors, and ammonia gases</td>
<td>Yellow</td>
</tr>
<tr>
<td>Ammonia gas</td>
<td>Green</td>
</tr>
<tr>
<td>Key particulates, NOx, HCN, H2S</td>
<td>Teal</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>Cyan</td>
</tr>
<tr>
<td>Chlorine gas</td>
<td>White with 1/2 inch yellow stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Hydrogen chloride gas</td>
<td>Yellow with 1/2 inch white stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Hydrogen sulfide gas and phosphorus vapor</td>
<td>Yellow with 1/2 inch white stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Non-combustible and/or inert gases</td>
<td>White</td>
</tr>
<tr>
<td>Organic vapors</td>
<td>Black</td>
</tr>
<tr>
<td>Radioactive materials, except tritium &amp; noble gases</td>
<td>Purple</td>
</tr>
<tr>
<td>Pesticides</td>
<td>Organic vapor canister plus a particulate filter R95, R99, R100</td>
</tr>
<tr>
<td>Radioactive materials, except tritium &amp; noble gases</td>
<td>Purple (magenta)</td>
</tr>
</tbody>
</table>

End of Life Service Indicator (ESLIs)

- NIOSH has approved ESLIs for only four cartridges or canisters:
  - Mercury vapor;
  - Carbon monoxide;
  - Ethylene oxide; and
  - Hydrogen sulfide.

EXAMPLE

Figure 3: The yellow background changes to blue at the service life mark.
Warning signs

- Detect chemical breakthrough
- Odor
- Eye irritation
- Respiratory irritation
- Restricted breathing
- Excess sweating

*Not allowed as sole indicator*

Waste Classification

Common Hazardous Wastes

- Flammable
  - Propane
  - Gasoline
  - Solvents
- Corrosive
  - Car batteries (acid)
  - Muriatic acid
  - Alkaline batteries
  - Drain cleaner
- Poison/Toxic
  - Pesticide
  - Weed killer
- Reactive
  - Ammunition
  - Flares
  - Hydrogen Cyanide

Neutral – Compatible Storage

- Examples
  - Flammable
    - Gasoline
    - Solvents
    - Pesticides
  - Poison
    - Pesticides
    - Oil
  - Non flammable
    - Latex paint

HW - Flammable/Ignitability

1. it is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60 °C (140 °F),
2. solid capable of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard;
3. it is an ignitable compressed gas
4. it is an oxidizer

CCR, Title 22 §66261.21

Neutral/Flammable - Poisons

- Ant and Roach Killer
- Anti-Freeze
- Acetic Compounds
- Automotive Cleaners
- Bacterial Pipe Cleaners
- Bordeaux Mix
- Boric Acid
- Bug Remover
- Chlorine
- Chrome-Silver Polishes
- Chromium
- Copper Sulfate
- DDT
- Diazinon
- Dimethylamine Salts
- Disinfectants *
- Dog Repellent
- Ethylene Glycol
- Fertilizers
- Flox Spray Powder
- Fungicides *
- Gopher Killer
- Insect Sprays
- Lead Compounds
- Lead Powder
- Lindane
- Malathion
- Mercury
- Methyl Chloride
- Mole Killer
- Meth Crystals
- Pentachlorophenol
- Pesticides
- Pharmaceuticals
- Plant Food
- Paving Paint
- Pyrethrine
- Rat Poison
- Rose Dust
- Sheep Dip
- Smell Shag Killer
- Strychnine
- Tar Remover
- Weed and Grass Killer
- Windshield Wiper Fluid*

* Check Ingredients for proper classification
Oxidizer

- Initiates or promotes combustion in other materials
- Cause fire by itself or releases oxygen or other gases
  - *e.g. Hydrogen Peroxide bubbles on skin

---

Oxidizers

- All pH ranges
- Bases/Alkaline
  - Bleach
  - Pool chlorine
- Neutral
  - Hydrogen peroxide
  - Methyl ethyl ketone peroxide
- Acid
  - Nitric, concentrated
  - Sulfuric, concentrated

---

Inorganic oxidizers donate oxygen

- Chlorates and chlorites
- Nitrates and nitrites
- Chromates
- Inorganic “per-” compounds
  - Peroxides
  - Permanganates
  - Persulfates
  - Periodates

---

Organic Peroxides

- Forms explosive peroxides
- Usually small volume
- Examples:
  - Methyl ethyl ketone peroxide
  - Benzoyl peroxide
  - Diethyl ether (ether)
  - Ether (diethyl ether)
  - Tetrahydrofuran

---

Common Signal Words for Oxidizers

<table>
<thead>
<tr>
<th>Oxidizer Key Word Prefix or Suffix</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ate</td>
<td>Ammonium nitrate</td>
</tr>
<tr>
<td>-ite</td>
<td>Potassium permanganate</td>
</tr>
<tr>
<td>-peroxide</td>
<td>Calcium hypochlorite</td>
</tr>
<tr>
<td>-peroxy</td>
<td>Methyl ethyl ketone peroxide</td>
</tr>
</tbody>
</table>

Many exceptions

---

Chlorates are powerful oxidizers

St. Alnus Schein Dept.

134
HW - Toxic

- Acute Oral Toxicity Criterion - LD₅₀ < 2,500 mg/kg body weight
- Acute Dermal Toxicity - LD₅₀ < 4,300 mg/kg body weight
- Acute Inhalation Toxicity - LD₅₀ < 10,000 ppm gas/vapor
- Acute Fish Toxicity - 96 hour LC₅₀ < 500 mg/l of water
- Carcinogens
- Specific Compounds greater than limit

**WARNING**
This Product May Contain A Chemical Known To The State Of California To Cause Cancer, Or Birth Defects Or Other Reproductive Harm.

CCR, Title 22 § 66261.24

---

HW - Corrosive

1. Liquid with a pH less than or equal to 2 or greater than or equal to 12.5
2. It is a liquid and corrodes steel
3. Solid that, when mixed with an equivalent weight of water, produces a solution having a pH less than or equal to 2 or greater than or equal to 12.5
4. Solid, when mixed with an equivalent weight of water, produces a liquid that corrodes steel

CCR, Title 22 § 66261.22

---

pH - Measures corrosivity

- Acid to base
- Scale from 0 to 14

**HYDROGEN IONS**

**P H SCALE**

<table>
<thead>
<tr>
<th>pH</th>
<th>Acid</th>
<th>Neutral</th>
<th>Basic/CAustic</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Acid</td>
<td>Neutral</td>
<td>Basic/CAustic</td>
</tr>
<tr>
<td>1</td>
<td>Acid</td>
<td>Neutral</td>
<td>Basic/CAustic</td>
</tr>
<tr>
<td>2</td>
<td>Acid</td>
<td>Neutral</td>
<td>Basic/CAustic</td>
</tr>
<tr>
<td>3</td>
<td>Acid</td>
<td>Neutral</td>
<td>Basic/CAustic</td>
</tr>
<tr>
<td>4</td>
<td>Acid</td>
<td>Neutral</td>
<td>Basic/CAustic</td>
</tr>
<tr>
<td>5</td>
<td>Neutral</td>
<td>Flammable/Poison</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Neutral</td>
<td>Flammable/Poison</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Neutral</td>
<td>Flammable/Poison</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Neutral</td>
<td>Flammable/Poison</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Neutral</td>
<td>Flammable/Poison</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Base/CAustic</td>
<td>Corrosive</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Base/CAustic</td>
<td>Corrosive</td>
<td></td>
</tr>
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<td>12</td>
<td>Base/CAustic</td>
<td>Corrosive</td>
<td></td>
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<tr>
<td>13</td>
<td>Base/CAustic</td>
<td>Corrosive</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Base/CAustic</td>
<td>Corrosive</td>
<td></td>
</tr>
</tbody>
</table>

**pH TEST FOR CORROSION**

- **Acid to base**
- **Scale from 0 to 14**

**ACIDS**

- Examples
  - Hydrochloric
  - Muriatic
  - Battery Acid
  - Sulfuric
- Corrosive to skin and materials
- Typical immediate pain

**BASE/ALKALINE/CAUSTIC**

- Examples
  - Drain cleaner (non-industrial)
  - Lye
  - Metal polish
  - Bleach
  - Typical slippery feel – **DO NOT TEST!**
  - Long exposure results in deep tissue burn

---
### Acids
- Car batteries
- Muriatic acid
- Hydrochloric acid
- Flux
- Metal cleaner
- Rust removers
- Boric Acid
- Car Battery Acid
- Copper Cleaners
- Etching Solutions
- Ferric Chloride
- Drain cleaners can be either acid or base

*Check Ingredients for proper classification*

### Base/Alkaline/Caustic
- Alkaline batteries
- Bleach
- Sodium hydroxide (Lye)
- Drain cleaners can be either acid or base
- Ammonia and Ammonia Based Cleaners
- Battery Terminal Cleaner

*Check Ingredients for proper classification*

---

### HW - Reactive
1. It is normally unstable and readily undergoes violent change without detonating;
2. It reacts violently with water;
3. It forms potentially explosive mixtures with water;
4. When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
5. It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
6. It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement;
7. It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure;
8. It is a forbidden explosive, Class A explosive, or Class B explosive

*Check Ingredients for proper classification*

---

### Universal Waste
- "Universal waste" means a hazardous waste identified as a listed universal waste and is exempt from hazardous waste management requirements and, therefore, are not fully regulated as hazardous waste. (Health & Safety Code § 25123.8, CCR Title 22, §66261.9)

- Universal Waste Electronic Devices (UWED)
  - E-waste
  - CRTs
  - Batteries, dry cell
  - Fluorescent Lights
  - Mercury devices
  - Aerosol cans (non-empty)

---

### Explosive HHW Examples

---

### “Empty” means:
- Emptied household hazardous material and pesticide container, of five gallon or less in capacity
  - (Not including used oil filters and PCB containers)
- No hazardous material can be poured or drained … when the container or inner liner is held in any orientation (e.g., tilted, inverted, etc.)
- No hazardous material remains in or on the container that can feasibly be removed by physical methods (A thin uniform layer or dried material or powder is considered acceptable)
- A compressed gas cylinder is exempt from regulation … when the pressure in the container approaches atmospheric pressure.
- Aerosol containers are exempt from regulation … if the aerosol container was emptied of the contents and propellant to the maximum extent practical under normal use

*Check Ingredients for proper classification*
Universal Waste Concepts

- Typically sent for recycling
- Allowed some exemptions from:
  - EPA Identification Number
  - Hazardous Waste Manifest (Use Bill of Lading)
  - Hazardous Waste Transporter
  - TSDF
    - (HW Treatment, Storage, and Disposal Facility)
  - Storage time
  - Limitations on export – notifications and consent

Management Standards

- Store in compatible container
- Properly labeled
- Maximum one calendar year storage
- Personal protection as needed
- Training required

Label For Universal Wastes

- Date required for first item in container

![Universal Waste Label](image)

Treatment

- Dismantling and/or physical processes such as shredding, grinding, sawing, cutting, compacting etc.
- Separation based upon physical properties and/or
- Screening to separate components based upon size

Emergency release

- Immediately contain all releases and residue
- Package as universal waste
- Mercury spills require special procedures

Universal Waste Electronic Devices (UWED)

- UWED label
- Electronic devices with mercury
**UWED - E-waste**

- DTSC tested these as hazardous
  - printers,
  - CPUs,
  - VCRs,
  - cell phones,
  - telephones,
  - radios, and
  - microwave ovens
- Now includes DVD Players, LCD (flat) screens & CRT Devices
- Label
  - "Universal Waste Electronic Device(s)"

**Electronics/CRT Differences**

<table>
<thead>
<tr>
<th>Electronic Devices</th>
<th>CRT</th>
<th>CRT Glass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal Waste--Electronic Device(s)</td>
<td>Universal Waste--CRT(s)</td>
<td>Universal Waste--CRT Glass</td>
</tr>
</tbody>
</table>

**Label**

- Label - NEW
  - Container
  - Area
    - Boundary marked
    - Labeled
    - No other materials
- Also consider posting a Proposition 65 warning
- Storage container or area must note the start date of accumulation

**Hazard Potential**

- Weight
  - Lift with knees
  - Dropping
- Implosion
  - Broken glass
- Shock Potential from Capacitor
- Lead
  - Leach and absorbed by body
  - Other metals – being investigated
  - Plastic – flame retardants

**Lead Health Effects**

- Lead can damage the central and peripheral nervous systems, blood system and kidneys in humans.
- Effects endocrine system observed
- Serious negative effects on children’s brain development
- Lead accumulates in the environment
- High acute & chronic toxic effects on plants, animals and microorganisms.

**Handling Precautions**

- Proper lifting – estimate by slight tilt
- Use cart to transport CRTs over distance
- Tie up cord to prevent trip hazard
- Personal Protective Equipment
  - Work gloves,
  - Glasses
  - Dust mask (if handling broken glass)
Storage

- Storage containers or packages must be structurally sound, adequate to prevent breakage, and compatible with the contents of the container (including shrink-wrap on pallets)
- Maximum one year accumulation

Packaging

- Bulk – Gaylord, trailer pallet with Shrink wrap

Disassembly

- Allowed to remove CRTs from CRT devices if prevent breakage and work over containment.
- Employees must be trained
- Discharge stored charge or get SHOCKED

Broken Glass Handling

- Immediately contain all releases of CRT material, broken CRTs or any CRTs that shows evidence of breakage, leakage, or damage that could cause the release of lead or other hazardous constituents to the environment
- Residues can be managed as universal waste
- Containers shall be structurally sound, and compatible with the contents of the container
- Use personal protection

Recycling & Disposal Options

- Must use a
  - CRT material handler (prior agreement),
  - a destination facility, or
  - a foreign destination (Must notify DTSC and CUPA)
- Can ship with Bill of Lading
- Receipts must be kept for at least 3 years
- Special Rules for export including Asian Markets

Household Batteries
Household Batteries Definitions

- AA, AAA, C cells, D cells and button batteries (e.g. hearing aid batteries).
- Automotive type batteries are not universal waste.

Battery Types & Chemistries

General purpose disposable household batteries include:
- Zinc carbon
- Zinc chloride
- Alkaline manganese

Primary button cells:
- Mercuic oxide
- Zinc air
- Silver oxide
- Lithium

Dry-cell rechargeable:
- Nickel cadmium (NiCd)
- Nickel metal hydride (NiMH)
- Lithium ion (Li-Ion) batteries

Lithium

- DANGEROUS !!
- Known fire hazard from storage
- Still enough power for spark
- Tape both ends, bag, or separate

Danger from Batteries

Hazards

- Corrosive/Base
  - Alkaline/Caustic Potassium hydroxide
  - Chemical burns/Skin irritation
  - Wash hands soap and water
- Toxic
  - Heavy metals
  - Lithium
  - Cadmium
- Keep away from lead acid batteries

Rechargeable Batteries

Protect contacts as needed

- Maybe lead-acid
- *Maybe just lead

Call-to-Recycle
http://www.rbrc.org/call2recycle/index.html
**Hazards**

- Mercury is a toxic metal
- Liquid at room temperature
- Evaporates quickly
- Can cause harm to people and animals including nerve damage and birth defects.
- If mercury is released into the environment
  - Can contaminate the air
  - Enter streams, rivers, and the ocean, where it can contaminate fish that people eat.
- **FOLLOW MERCURY SPILL RESPONSE**

**Fluorescent Tubes, Bulbs and Other Mercury-Containing Lamps**

- **Types**
  - Fluorescent light tubes and bulbs,
  - high intensity discharge (HID),
  - metal halide,
  - Sodium bulbs, and
  - neon bulbs
- **ALL tubes are hazardous**

**Lamp Crushers**

- Great Idea!
- Almost?
- There are NO approved fluorescent lamp crushers for California

**Mercury Spill Response**

- **Cleaning Up a Small Number of Lamps**
  - Sweep up debris with a small broom or a whisk broom. Sweep gently to avoid suspending phosphor powders in the air.
  - **DO NOT VACUUM** broken lamp debris. The exhaust from the vacuum will disperse mercury into the air. If you must vacuum the debris, only vacuum after sweeping up as much debris as possible and wiping up the powder with a wet paper towel.
  - Place the debris in an airtight container (a sealable bag, glass jar, or pail with a tight fitting lid).
  - Seal the container and label it, Universal Waste – Lamp(s), or Waste Lamp(s), or Used Lamp(s). In addition, it is recommended that you write on the label “accidentally broken.”
  - Try to disperse the mercury vapor by opening windows or doors.

**PCB Sources**

- Products made before 1977 that may contain PCBs include:
  - old fluorescent lighting fixtures
  - electrical devices containing PCB capacitors,
  - old microscope and hydraulic oils
- The amount in the ballast is VERY small
- Less than a thimble full but very concentrated
- Manufactured between 7/1/78 & 7/1/98 = **No PCBs**
- **Not Universal Waste**
Mercury Containing Equipment

Mercury Devices

- Thermostats & Thermometers
- Gauges
- Novelties
  - greeting cards that play music when opened;
  - athletic shoes (made before 1997) with flashing lights in soles;
  - and mercury maze games
- Mercury switches can be found in
  - chest freezers,
  - pre-1972 washing machines,
  - sump pumps,
  - electric space heaters,
  - clothes irons,
  - silent light switches,
  - automobile hood and trunk lights,
  - ABS brakes.
- Pilot Light Sensors
- Old mirrors

Mercury Containing Equipment Label

- Used for all of these:
  - Thermostat(s)
  - Mercury Switch(es)
  - Gauge(s)
  - Drained Mercury
  - Novelty(ies)

Recyclable Hazardous Waste

- Hazardous with exemptions for recycling
  - Latex paint
  - Used oil
  - Used oil filters
  - Lead acid batteries
  - Antifreeze

Label - Used Oil

- Accumulation Only
  - Not Shipment label
- “Used Oil – Hazardous Waste”
- Name and address of generator
- Initial date of accumulation
- WASTE PETROLEUM OIL, 3, NA1270, PGIII

What can go in the used oil tank?

ACCEPTABLE
- Motor oil
- Hydraulic fluid
- Transmission fluid
- Differential oils
- Gear oil

MAYBE LIST
- Power Steering
- Synthetic oil
- Refrigeration oil

WARNING

NOT ACCEPTABLE
- Brake fluid
- Cooking oil
- Transformer oil
- Gasoline
- Kerosene
- Solvents
- Chlorinated solvents
- Antifreeze
- Water
Lead Acid Batteries

- Lead-acid storage battery that are cracked, caps are missing, or otherwise damaged shall be stored and transported in a nonreactive, structurally secure, closed container capable of preventing the release of acid and lead. (Title 22, Section 66266.81)
- Keep away from alkaline batteries
- Transport 10 or fewer
- No Bill of Lading

Battery Storage

AB 1353 (Matthews)
Treated Wood Ban

- Treated wood is wood treated with a chemical preservative to protect against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to the decay of the wood and the chemical preservative is registered under FIFRA.
- Arsenic, Chromium, Copper, Pentachlorophenol
- Cresote (Not Definitive TWW)

Treated Wood Samples

“Staple” Marks

TWW Storage Requirements

- Protect from run-on and run-off for 90 days
- Maximum one year storage allowed
**TWW Label**

- Required during accumulation, storage, and transport (except for households self-transporting to approved facility)

**EXAMPLE**

**TREATED WOOD WASTE**
- Do not burn or scavenge.

**TWW Handler Name and Address:**

**Accumulation Date:**

**Treated Wood Waste Records**

- DTSC Notification 30 days after generate 10,000 pounds per calendar year
- Shipping record
  - Name/Address – generator, disposal
  - Weight
  - Shipment date
- Twice a year reports – 7/30 & 1/30

**Asbestos**

- Used in homes until late 1970s
- 1977 banned in wallboard patching compounds and gas fireplaces, voluntary ban in hair dryers
- 1989, EPA banned all new uses of asbestos
- 2000 EPA guidelines for use vermiculite

**Asbestos Ban Timeline**

**Identifying Asbestos**

- **Friable** - crumbled with hand pressure
  - Title 8, §5208, Appendix G
- **Nonfriable** – e.g. transite pipe
- <1% Asbestos is not Hazardous
  - Title 22, §66261.24 (a)(2)
  - PEL 0.1 fiber per cubic centimeter (<HW)
- Impossible to identify positively without lab analysis
  - Typically about $35/sample

**Asbestos**

- Call DEQ before renovating or demolishing. Don’t put yourself or others at risk of exposure.
### Asbestos-Containing Materials


(source: EPA)

### Asbestos-Containing Materials (Continued)


### Certified Lead-Based Paint Renovation Contractor

- Required effective April 2010
- Construction contractors performing renovations on pre-1978 buildings or child occupied facilities

- What are they going to do with the wastes?

### Renovation

- Modifying any existing surface that results in the destruction of painted surfaces does not include minor repair and maintenance.
  - 6 square feet or less of interior painted surface
  - 20 square ft or less of exterior painted surface
- Any window installation, regardless of size, is not minor repair and maintenance.

### Medical Waste

- Regulated
- Non-regulated

**September 1, 2008**
Home sharps ban - solid waste, recyclable materials, or greenwaste

### Home-generated Sharps Waste

- Not considered medical waste
- Includes: hypodermic needles, pen needles, intravenous needles, lancets, and other devices that are used to penetrate the skin for the delivery of medications
- Household includes:
  - Household, multifamily residence, farms, or ranches
Liquid Wastes

- Prohibition greater 50% liquid
- Paint filter test

Radioactives

- Natural and manmade sources
- Some smoke alarms, mantles, medicine
- Photo = Fiesta ware plate, radioactive rocks, heliarc welding rods, and KCl salt substitute
- Decommissioned wastes
- SWRCB Landfill Study - Tritium

Drug lab chemicals

One Pot lab Evidence

Identification Signs

Clues?

Purpose

- Provide guidance on proper basic segregation of hazardous wastes to minimize the potential for incompatible materials to be stored together.
- Provide for safety
- Avoid incompatibility (See Demo)
- > 30 hazard class for shipment but only 3 basic classes used for safe storage
Disclaimer

• General rules
• Use extreme caution
• Watch for unusual
  • Smells (DO NOT SNiff)
  • Sounds (hissing, popping)
  • Crystals growing
• Some exceptions to all the rules
• DO NOT HANDLE IF THERE ARE ANY DOUBTS REGARDING SAFETY

General Rules

• Do not mix chemicals
• Keep incompatible materials away from each other
• Segregate unknowns in a plastic tub away from all other materials
• When examining a container, be extremely careful
• Watch for danger signs

Segregate Incompatibles

• Danger signs include:
  • Rotting containers
  • Bulging containers
  • Missing or poor fitting lids
  • Old military containers
  • Reactions in the container
  • Crystals in or round the container
  • May indicate the presence of an unstable or explosive chemical

Kaboom Confusion

Windex (base) with Vinegar (acid)
Is mixture Acid or Base?
**Compatible Separation**

<table>
<thead>
<tr>
<th>Acids</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muriatic</td>
<td>Paints,</td>
</tr>
<tr>
<td>Hydrochloric</td>
<td>Solvents,</td>
</tr>
<tr>
<td>Car batteries</td>
<td>Pesticides</td>
</tr>
<tr>
<td>Sulfuric</td>
<td>Roofing tar</td>
</tr>
<tr>
<td>Metal cleaner</td>
<td>Furniture polish</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bases/Alkaline/Caustic</th>
<th>Oxidizer/Peroxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaline batteries</td>
<td>Ammonium Nitrate</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Hydrogen Peroxide</td>
</tr>
<tr>
<td>Hydroxide</td>
<td>MEK peroxide</td>
</tr>
<tr>
<td>Metal polish</td>
<td></td>
</tr>
</tbody>
</table>

**Others**
- Ammunition, explosives, asbestos, propane

**DOT Label**

- The various Department of Transportation (DOT) Labels for hazardous materials shipments look like this:

**GHS Pictograms**

- Each label has four means of determining the hazard classification:
  - Picture
  - Color of label
  - Name
  - Hazard class number

**NFPA Hazard Rating - Fire Diamond**

- Numerical Rating 0 to 4 (most hazardous)
- Special Hazards: OXY, WR, COR
Hazardous Materials Information System (HMIS)

<table>
<thead>
<tr>
<th>Product Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH</td>
<td></td>
</tr>
<tr>
<td>FLAMMABILITY</td>
<td></td>
</tr>
<tr>
<td>REACTIVITY</td>
<td></td>
</tr>
<tr>
<td>PROTECTIVE EQUIPMENT</td>
<td></td>
</tr>
</tbody>
</table>

**Hazard Index**

- 0 = Minimal Hazard
- 1 = Slight
- 2 = Moderate
- 3 = Serious
- 4 = Severe

**Personal Protection Index**

- A thru K, Standard Equipment
- L thru Z, Custom Equipment

---

Lab Chemical Label

- The term “POISON” is overly used on common hazardous materials and can not be relied upon for classification or safe handling purposes
- Also, the storage and disposal instructions usually do not provide sufficient information for proper storage and the disposal instructions on older products indicate disposal of used portion in the trash even though disposal is illegal in California

---

**WARNING**

- Use caution when handling containers
- Some containers have been weathered or corroded to the point that the container is unstable and handling it can result in spillage or puncture
- Always use proper protective equipment
- Also realize that some labels do not correctly identify the contents. Watch for inconsistencies:
  - Brown liquid in a lemon-lime soda bottle
    - Could be oil or a pesticide
  - Grey powder in a baking soda container
    - It was determined to be an arsenic compound

---

**Common signal words and classification**

<table>
<thead>
<tr>
<th>Signal Words</th>
<th>Hazard Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable</td>
<td>Flammable</td>
</tr>
<tr>
<td>Inflammable</td>
<td>Flammable</td>
</tr>
<tr>
<td>Poison</td>
<td>Overused – Check ingredients</td>
</tr>
<tr>
<td>Corrosive</td>
<td>Corrosive, acid or base</td>
</tr>
<tr>
<td>Keep away from flame</td>
<td>Flammable, likely corrosive, maybe poison</td>
</tr>
<tr>
<td>Avoid skin contact</td>
<td>Likely corrosive, maybe poison</td>
</tr>
<tr>
<td>Keep away from skin</td>
<td>Likely corrosive, maybe poison</td>
</tr>
</tbody>
</table>

---

http://jced.jocogov.org/hazardous_materials/Household/hhw_labelreading.htm
Unknowns

- If unable to determine classification, store by itself in a plastic tub

CESQG

- "Conditionally exempt small quantity generator" or "CESQG" means a business concern which meets the criteria specified in Section 261.5 of Title 40 of the Code of Federal Regulations
- Includes government agencies and non-profits
- HHW Facility authorized by DTSC to accept HW from CESQGs
  - Limited to accepting, per calendar month, no more than
    - 100 kilograms (220 pounds) of HW, or
    - 1 kilogram of extremely or an acutely hazardous waste HW
- Not your job to verify status – only limit acceptance
- 40 CFR 261.5 & Health and Safety Code 25218.3. (b)

HHW Program Type

CESQG

- Permanent
- Temporary Events
CESQG Responsibilities

- EPA ID Number
- CESQG contacts HHW Facility prior to each delivery to confirm waste acceptable
- Vehicle owned and operated by the CESQG
- transported in "closed containers and packed in a manner that prevents the containers from tipping, spilling, or breaking during transport"
- Different wastes shall not be mixed within a container before or during transport

CESQG – HHW Facility Role

- Provide
  - Oral, written, or electronic instructions to the CESQG prior to each delivery
  - Proper packing for the safe transportation
  - Track name, address, and EPA ID Number
  - Track type and quantity of wastes
  - Track fee, if any
  - Refuse amounts over the limit

Permanent facilities

- A permanent or semipermanent structure at a fixed location that meets both of the following conditions:
  - (1) The facility is operated at the same location on a continuous, regular schedule
  - (2) The hazardous waste stored at the facility is removed within one year after collection.

Temporary facilities

- A household hazardous waste collection facility that meets both of the following conditions:
  - (1) The facility is operated not more than once for a period of not more than two days in any one month at the same location
  - (2) Upon termination of operations, all equipment, materials, and waste are removed from the site within 144 hours

Operations Plan

Permanent vs. Temporary

Permanent
- Continuous base, free of cracks and sufficiently impervious
  - (Plastic not required)
- Not required to have a separate area for wastes to be transported off-site

Temporary
- All waste handling areas (with exception of traffic areas) must be covered with continuous plastic sheeting of at least 6 mil thickness
- Punctured or torn plastic must be repaired immediately

Managing Wastes

Operations, Compliance and Permitting
Lowe's $18 Million Hazardous Waste Settlement

- Alameda, San Joaquin, Sacramento and Solano counties District Attorneys filed civil action
- More than 118 Lowe's stores throughout California over a 6-1/2 year period disposed of hazardous waste in landfills including:
  - Pesticides, aerosols, paint and colorants, solvents, adhesives, batteries, mercury-containing fluorescent bulbs, electronic waste and other toxic, ignitable and corrosive materials.
  - Batteries and lamps from recycling kiosks

Facility Signage

- Visible from all approaches
- Legible from a distance of at least 25 feet.
- Language on the signs will be in English and in any other language predominant in the area surrounding the facility

Storage Issues

- Avoid incompatible storage
  - Acid, base, flammable/neutral, oxidizer, other
- Permitting
  - Hazardous materials
  - Universal waste
- Storage time limit
- Reuse/material exchange
- Integrate with HHW programs

Signage

- Visible from all approaches
- Legible from a distance of at least 25 feet.
- Language on the signs will be in English and in any other language predominant in the area surrounding the facility

Storage Time

- Most Hazardous Wastes (including CRTs but not other universal waste)
  - Typically - 90 days
  - IF CESQG, date starts once exceed 100 kg (220 pounds)
- Universal Wastes = 1 year
  - Electronics, CRTs, Dry Cell Batteries,
  - Aerosol Cans, Fluorescent Lamps
- Recyclable Hazardous Waste
  - Lead Acid Batteries
    - <1 ton = 1 year
    - > 1 ton = <180 days
Written Inspection Log

- Name of the inspector
- Date of the inspection
- Condition of all waste containers
- Description of any problem noted during the inspection and action taken to fix it

Facility Inspections

HW – Area, Containers/Drums

- Containers must have tight-fitting lids that are kept closed except when wastes are being added or removed.
  - Funnel must be removed or be equipped with a valve or cover to prevent leakage if drum turned over.
  - DOT Certified for Hazardous Wastes
  - Inspected weekly

Aboveground Storage Tanks

- Inspect daily
  - No apparent structural defects, or deterioration
  - No severe rusting
  - No leaking
  - Correct label
  - Certification

  - Inspection under CUPA Authority

Inspection – How Many Issues?

Temporary Storage Sample Configuration

- Hazardous Waste Emptied Daily
Lockers

- Containment of 10% of container volume
- Base intact
- Spilled material removed in timely manner
- Engineer certification suitably designed

Engineer Certification – Lockers

- Certify containment system
  - A base under the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed;
  - The base shall be sloped or the containment system shall be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids;
  - The containment system shall have sufficient capacity to contain precipitation from at least a 24-hour, 25-year storm plus 10% of the aggregate volume of all containers or the volume of the largest container, whichever is greater. Containers that do not contain free liquids need not be considered in this determination;

Operations

- Pre-acceptance
- Waste acceptance and segregation
- Waste analysis (HazCat)
- Daily closing procedures
- CESQG waste

Container Storage

- Aisle space not specified
- Labels must be visible
- Able to inspect container for leakage
  - Typically 24 to 48 inches
- Separation wall
  - 18 inches top
  - 18 inches front
Labeling

- Label everything
- Hazardous waste
- Universal waste
- Recyclables
- Wording
  - “Hazardous”
  - Hazards
  - Physical state
  - Accumulation date

Special Permits – get a copy

Package Certification

- United Nations marking

<table>
<thead>
<tr>
<th>Container type</th>
<th>Material</th>
<th>Grouping</th>
<th>Packing Group</th>
<th>Weight limit</th>
<th>Physical State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = drum</td>
<td>A = steel</td>
<td>1 = closed</td>
<td>X = 1, II, III</td>
<td>L = Liquid</td>
<td></td>
</tr>
<tr>
<td>4 = box</td>
<td>B = aluminum</td>
<td>2 = open</td>
<td>Y = II, III</td>
<td>S = Solid</td>
<td></td>
</tr>
<tr>
<td>6 = composite</td>
<td>G = fiberboard</td>
<td>3 = open</td>
<td>Z = III</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Drum Closure

- Close drum using torque wrench
- Rings bolt and bungs
- Performance test to prevent leakage
- Drum supplier provides instructions
- Train workers on use
- Use calibrated torque wrench
- Get updates instructions annually
- Reject containers that do not properly close
- 49 CFR §178.2 (c)

Pool Chemicals for Reuse
Facility Daily Closure

- All wastes segregated into appropriate storage area by hazard class.
- All containers will be labeled with any known information.
- All container will be securely closed.
- Unknowns will be segregated into tubs or other suitable area.
- Any drums or other transport containers will be securely closed.
- All tools and equipment will be properly cleaned and stored.
- All trash is picked up and facility swept.
- All customer surveys, waste identification forms, and all other records will be filed at facility or returned to main office.
- All Facility doors will be closed and locked.

Storage Time

- Most Hazardous Wastes
  - 90 days
  - 180 days for generator <2200 lbs (~300 gallons)/month
  - 270 days if TSDF greater than 200 miles away
- Universal Wastes = 1 year
- Electronics, CRTs, Dry Cell Batteries, Aerosol Cans, Fluorescent Lamps
- Recyclable Hazardous Waste
  - Lead Acid Batteries
    - <1 ton = 1 year
    - >1 ton = <180 days

Transportation

- Shipping records
  - Uniform Hazardous Waste Manifest
  - Bill of lading
  - Pre-shipment
  - Track status

Govt Transport Between Sites

- Government employees in government vehicles are exempt from DOT federal hazardous materials transportation
- California still applies
  - Manifest, bill of lading, or shipping paper
  - >1,001 pounds needs placard
  - Driver license hazmat endorsement “H” or “X”

This is why HHW goes in the trunk

Decontamination
Decontamination Procedures

- Developed and implemented prior to employees or equipment entering
- Minimize contact with hazardous substances or equipment that contacted
- Decontaminate employees and equipment

Decontamination Procedures

- **Daily and emergency contact**
- Personal decontamination
  - Remove and discard or clean
- Equipment decontamination
- Medical emergencies
- Disposal of contaminated equipment

Emergency Response

Discuss basic emergency procedures applicable to load checking
Present types of emergency situations
Discuss basic response measures

Emergency Response Plan

- Exempt from HAZWOPER ER if evacuate
- Subject to 8 CCR 3220
  - Assign responsibilities
  - Training
  - Emergency escape
  - Head count
  - Reporting procedures
  - Contact personnel
  - Alarm system

Worker Health and Safety

- Hazardous situations potentially exist at solid waste facilities
  - Fires
  - Spills
  - Injuries
- Responses to emergency situations requires specialized training
- Load checking personnel should be trained to clean up small low-hazard spills
  - e.g. paint can size spills of paint or oil

Emergency or Incidental Spill

- **Emergency**
  - High hazard
  - Need help
  - Spill to waterway
  - Life or injury threat
  - Requires immediate attention and/or evacuation
  - Reportable to agencies
    - OES, 911, Health/Fire
- **Incidental**
  - Low hazard
  - Limited quantity
  - Cleanup without assistance
  - Not reportable to agency but keep record (Log)
Emergency Preparedness

- Local Emergency Agency Relations
- Spill Equipment (Cart)
- Hot Load Area
- Training

Facility Evacuation Procedures

- Evacuation area, UPWIND
  - Head count
  - All personnel remain until released
- Assess Situation
- Isolate
- Notification
- NEVER GET IN OVER YOUR HEAD!

Assess Emergency Situation

- Are you prepared?
  - Supplies ready
  - Emergency responders familiar with site
  - Hazardous waste contractor arrangements
- If suspect hazardous waste
  - May trigger Incident Command System
  - First Responder Awareness Training
    - Witness, notify, no further action
  - Response limited in emergency situation
  - Gather information for response unit

Notification

- Notify emergency agencies as necessary
- Once they arrive, they are in charge
- Provide only assistance that you are trained for and are comfortable in providing
- Document the incident in your log of special occurrences and any other reporting form needed

Hazardous Materials

- Local Emergency Response Agency
  - 9-1-1 or Local Fire Department
- CUPA, Certified Unified Program Agency
- Office of Emergency Services
  - (800) 852-7550 or (916) 845-8911
- California Highway Patrol
  - spills on highways
Hazardous Waste Exposure

- Remove contaminated clothing
- Rinse off – 15 minutes
- Medical attention?
- Report

Mercury Spill Response - DTSC

- **Cleaning Up a Small Number of Lamps**
  - Sweep up debris with a small broom or a whisk broom. Sweep gently to avoid suspending phosphor powders in the air.
  - **DO NOT VACUUM** broken lamp debris. The exhaust from the vacuum will disperse mercury into the air. If you must vacuum the debris, only vacuum after sweeping up as much debris as possible and wiping up the powder with a wet paper towel.
  - Place the debris in an airtight container (a sealable bag, glass jar, or pail with a tight fitting lid).
  - Seal the container and label it, Universal Waste – Lamp(s). In addition, it is recommended that you write on the label "accidentally broken".
  - Try to disperse the mercury vapor by opening windows or doors.

Serious Injury or Harmful Exposure

- **Cal/OSHA**
  - Report serious injury or illness, or death, of an employee
  - Immediately (not more than 8 hours after event)

Emergency Response Guide (ERG)

- **Sections**
  - Yellow = ID number
  - Blue = Name
  - Green
    - Toxic Inhalation Hazard
    - Warfare agent
    - Dangerous Water Reactive
  - White = Other
  - Orange = Emergency Guide

Post Emergency Review

- Record incident
- Conduct de-briefing of staff
- Review incident and response
  - What worked
  - What needs improvement
  - How to better prepare
- Follow-up with emergency agencies
- Incorporate any changes
- Schedule drill

Recordkeeping
Permits/Approval

- EPA Identification Number
- Hazardous Material Business Plan
- Universal Waste Handler
- Household Hazardous Waste Notification
- CUPA/DTSC Inspections

Recordkeeping

- Permits & Approvals
- Training
- Shipment
- Inspections
- Engineering certifications
- Material Safety Data Sheets

Documentation, General

- Permits/approvals
  - Solid waste facility permit
  - Waste discharge requirements
  - Tire program identification number
  - EPA ID Number
  - Universal waste handler

- Copies of all documents should be available
- Remote location allowed under certain circumstances

Hazardous Waste Treatment, Storage, and Disposal Sites

Your Facility

- Your waste goes here

Record Retention

- Regulatory
  - Load checking – no time limit, liability concern
  - Incidents – 3 years
  - Manifests – 3 years
  - Universal waste – 3 years
  - HazMat Bill of Lading – 2 years

- Reality
  - Forever

The End