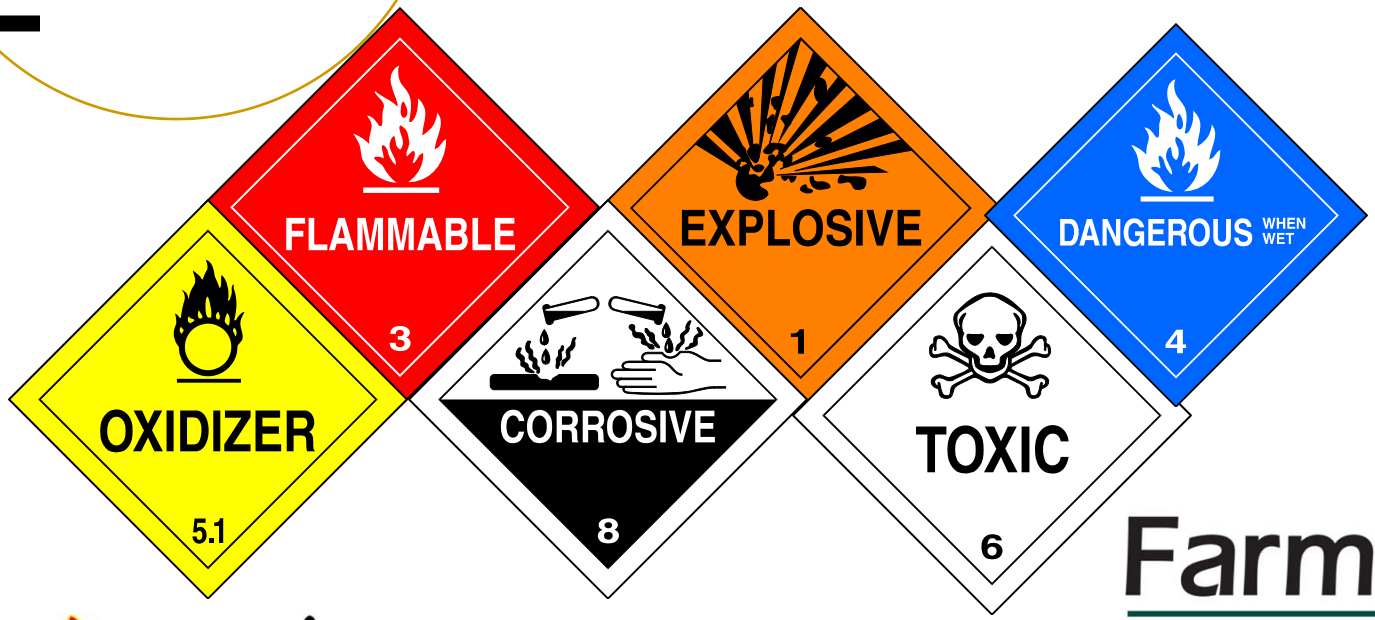
Hazardous Waste Management



Farmingdale State College
State University of New York

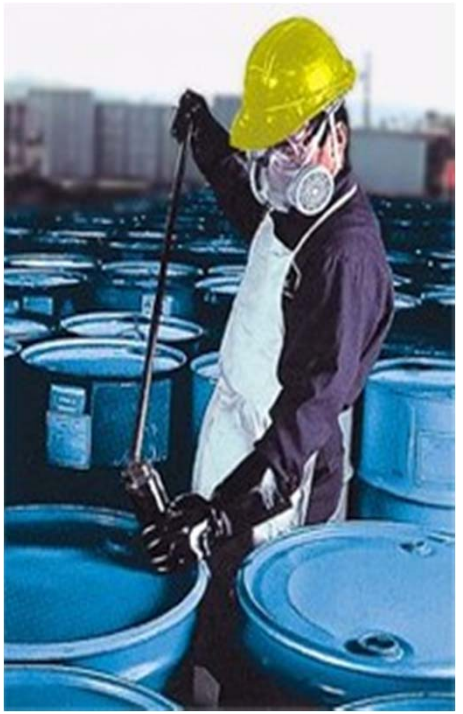
Waste Management Training

You must receive this training if you:

- Add hazardous waste into an accumulation container
- Determine if a material is hazardous waste
- Transport waste from an accumulation area to a storage area or designated waste collection area
- Inspect hazardous waste storage areas
- Perform treatment (solvent recovery or elementary neutralization)
- Respond to spills involving hazardous wastes

What are we going to talk about?

- Regulatory Overview
- Define Hazardous Waste and discuss how to properly manage it
- Special wastes and exemptions
- Learn hazardous waste management rules and what you need to do to ensure compliance
- Waste handling practices
- Learn the importance of personal protective equipment (PPE)
- Learn what actions to take in an emergency or spill involving hazardous waste
- Waste Minimization



Where did this all begin?

'Silent Spring' Is Now Noisy Summer

Pesticides Industry Up in Arms Over a New Book

Rachel Carson Stirs Conflict—Producers Are Crying 'Foul'

By JOHN M. LEE

The $300,000,000 pesticides industry has been highly irritated by a quiet woman author whose previous works on science have been praised for the beauty and precision of the writing.

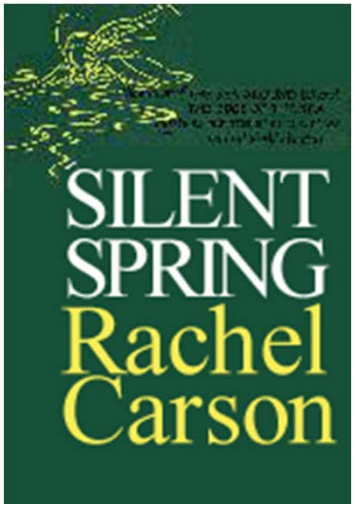
The author is Rachel Carson, whose "The Sea Around Us" and "The Edge of the Sea" were best sellers in 1951 and 1955. Miss Carson, trained as a marine biologist, wrote gracefully of sea and shore life.

In her latest work, however, Miss Carson is not so gentle,

fending the use of their products. Meetings have been held in Washington and New York. Statements are being drafted and counter-attacks plotted.

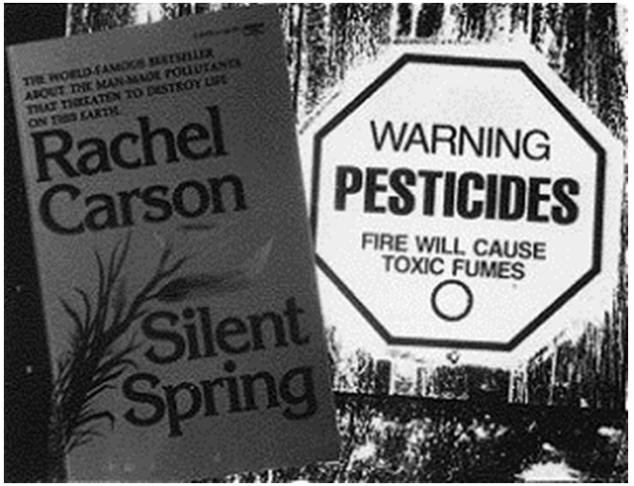
A drowsy midsummer has suddenly been enlivened by the greatest uproar in the pesticides industry since the cranberry scare of 1959.

Miss Carson's new book is entitled "Silent Spring." The title is derived from an idealized situation in which Miss Carson envisions an imaginary town where chemical pollution has silenced "the voices of spring."



"Silent Spring was a cry in the wilderness that changed History"

-Al Gore



Resource Conservation and Recovery Act (RCRA) - Passed by Congress in 1976

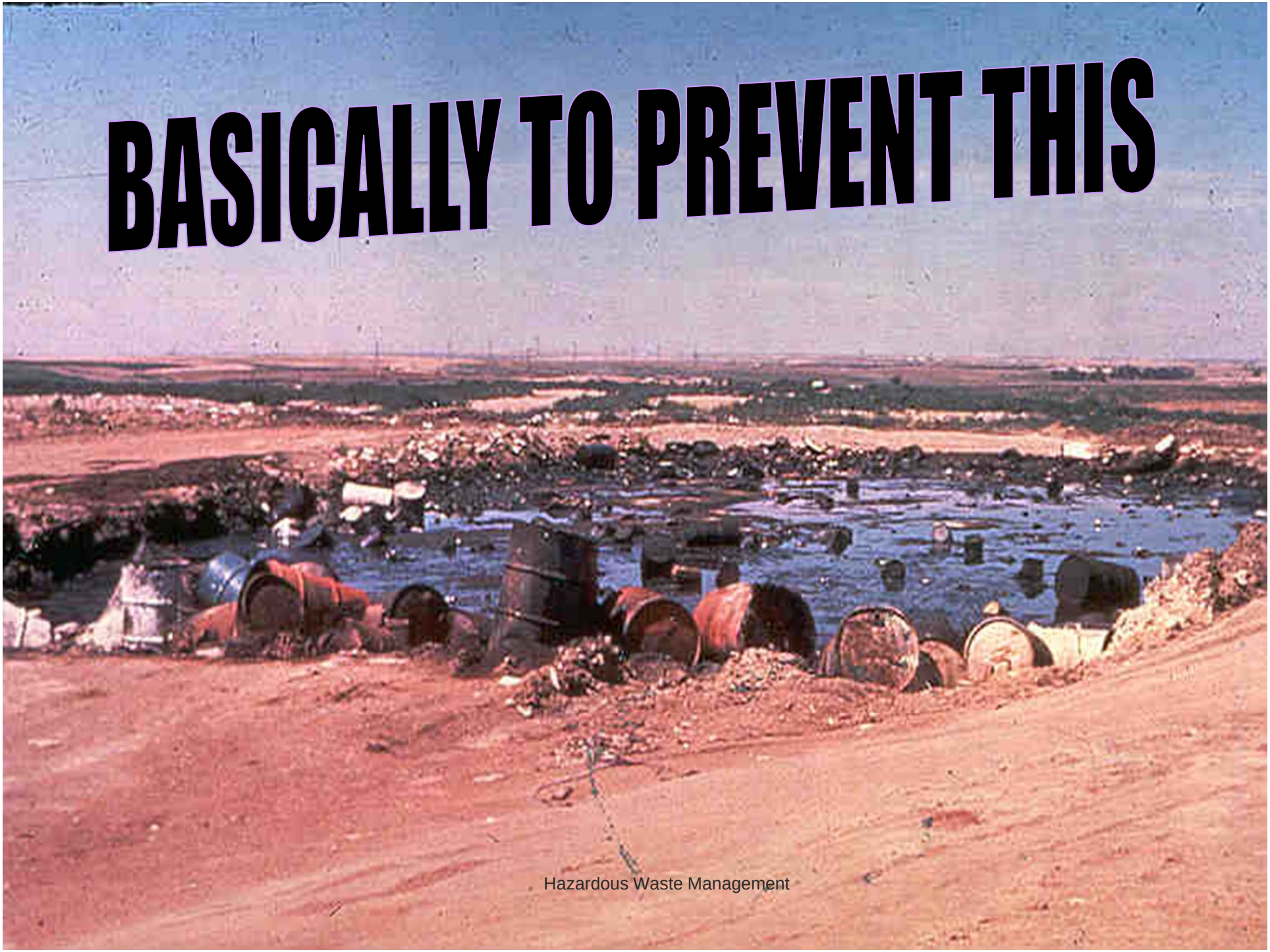
What is RCRA?

- RCRA's core regulations establish a "cradle-to-grave" hazardous waste regulatory program

What is RCRA? (cont.)

Core policies include:

- Identification of hazardous wastes
- Management requirements for generators, transporters, and treatment, storage and disposal facilities
- Land disposal restrictions
- Hazardous waste facility permitting


BASICALLY TO PREVENT THIS

Did you know that….

- *New York law provides civil and criminal penalties for violations of its environmental regulations.*
- *Environmental crimes can be punishable by up to $37,500 a day and/or imprisonment of up to a year.*

What is Hazardous Waste ?

- A solid, liquid, sludge or gaseous waste which is specifically *"listed"* as hazardous waste or displays a *"hazardous characteristic"* .

Hazardous Waste Identification

- All hazardous waste generators must determine if the wastes they generate are hazardous by:
  - Sampling and analyzing the waste using specified EPA test methods (or equivalent methods); or
  - Applying knowledge of the composition of the waste and the process used to generate it (i.e. “Generator Knowledge”).

“Listed” Hazardous Wastes

- Listed hazardous wastes are those wastes that have been specifically identified and listed in the regulations (EPA Title 40 CFR 261, Subpart D).
- The listings are based on the fact that the underlying constituents display at least one hazardous characteristic.
- To be classified as a listed waste, the waste must meet the listing exactly.

“Listed” Hazardous Wastes

There are **four types** of listed hazardous wastes.

- F – Spent solvent wastes
- P and U – Unused chemicals and products
- K – From specific industrial processes

New York Listed Wastes

- New York has identified waste containing concentrations equal to or greater than 50 parts per million (ppm) of polychlorinated biphenyls (PCBs) as New York listed hazardous waste.

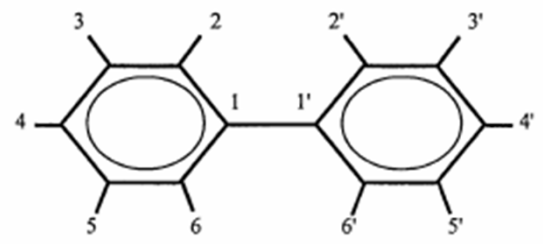


Figure 1

Characteristic Hazardous Wastes

"Characteristic" Hazardous Waste displays at least one (or more) of the following four characteristics:

- *Ignitable (D001)*
- *Corrosive (D002)*
- *Reactive (D003)*
- *Toxic (D004-D043)*

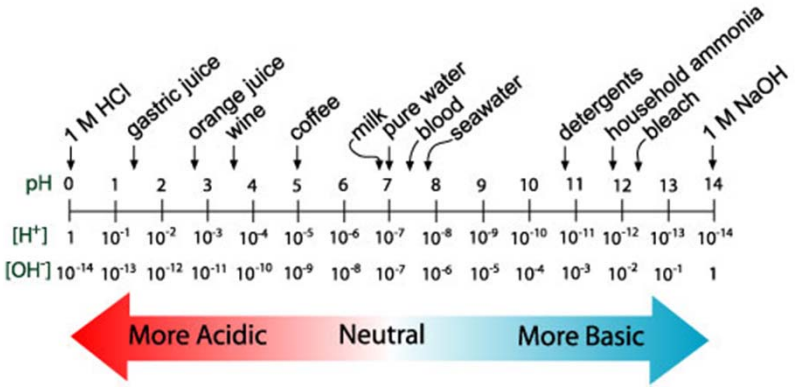
Ignitable Hazardous Waste

- Liquids and aqueous solutions with flash points less than 140°F
- Solids capable of spontaneous combustion under normal temperature and pressure
- Ignitable compressed gases
- Oxidizers

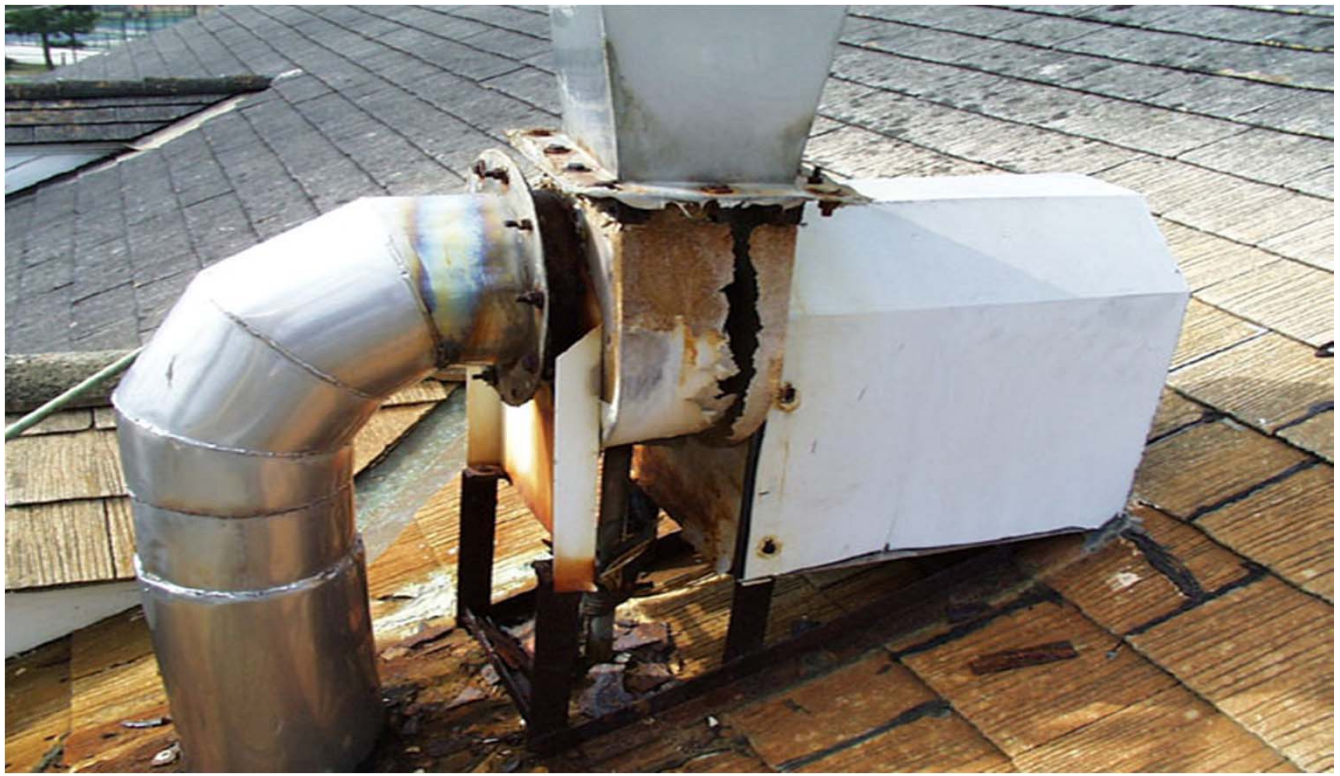
Corrosive Hazardous Waste

- Aqueous solutions with pH less than or equal to 2.0 or greater than or equal to 12.5.

  Examples: acids; bases; hydroxides; waste boiler treatment chemicals.



Perchloric Acid Fume Hood Exhaust



Reactive Hazardous Waste

- Reacts violently with water.
- Generates toxic gases or fumes.
- Explosives.
- Certain compressed gases (including partially full aerosol cans).

Examples: cyanides; explosives; dry picric acid; expired ethyl ethers; sulfide containing wastes, “yl” chlorides and fluorides.

Aerosol Cans….Reactive?

Aerosol cans may be considered Hazardous Waste if one or more of the following conditions exist:

- The can is still pressurized
- The propellant is chlorinated
- The propellant is isobutane, ether or some other flammable gas
- The material contains lead, pesticides or another hazardous constituent

Peroxide Formers….Reactive?

Toxic Hazardous Waste

- Waste displays the toxicity characteristic if it exceeds certain concentration levels using specified test methods (TCLP)
- The **T**oxic **C**haracteristic **L**eaching **P**rocedure (TCLP) simulates the conditions in a landfill and then analyzes the concentrations of specifically listed chemicals and heavy metals that could potentially leach into the groundwater.

*Waste Codes D004 through D043

Toxic Hazardous Waste

- Examples of the most common toxic materials, their regulatory limits, and their corresponding waste codes are listed on the following two slides.

*NOTE: The 8 compounds that appear in **boldface** are referred to as the "RCRA 8 metals."*

Toxic Hazardous Waste

Arsenic	**5.0 ppm**	**D004**
Barium	**100 ppm**	**D005**
Benzene	0.5 ppm	D018
Cadmium	**1.0 ppm**	**D006**
Chloroform	6.0 ppm	D022
Chromium	**5.0 ppm**	**D007**
Lead	**5.0 ppm**	**D008**
Mercury	**0.2 ppm**	**D009**

Toxic Hazardous Waste

Methyl Ethyl Ketone (MEK)	200 ppm	D035
Selenium	**1.0 ppm**	**D010**
Silver	**5.0 ppm**	**D011**
Tetrachloroethylene	0.7 ppm	D039
Trichloroethylene	0.5 ppm	D040
Vinyl Chloride	0.2 ppm	D043

Used Oil

- Used oil must be managed in accordance with the Used Oil rules rather than hazardous waste rules unless it:
  - Displays a hazardous characteristic (e.g., toxicity);
  - Is mixed with a listed hazardous waste;
  - Contains 50 ppm or greater PCBs; or
  - Contains more than 1,000 ppm total halogens.

Used oil meeting any of these criteria is hazardous waste.

Mixture Rule

- Any mixture of a listed waste with a non-hazardous waste becomes a listed hazardous waste (may also display a hazardous characteristic).

  Example:

  - If a small amount of used solvent such as methylene chloride (F002), toluene (F005), or acetone (F003) is mixed into a 55-gallon drum of a non-hazardous waste stream, such as phosphate buffer solution or waste oil, then the entire drum becomes F-listed hazardous waste and must be managed as such.

Special Hazardous Wastes

Universal Wastes

- A category of “less” regulated wastes
- Universal Waste must be collected and disposed of separately from other waste
- Must be disposed of within 1 year of accumulation start date

Examples are:

- Lead-acid, nickel/cadmium, lithium and mercury batteries (not alkaline)
- Mercury thermostats
- Fluorescent bulbs (contain mercury)
- High Intensity Discharge (HID) lamps

Sample label

Universal Waste
Used Lamps
Farmingdale State College
EH&S (631) 420-2105
Start Date: _____/_____/_____

Hazardous Waste Generator Status

- New York hazardous waste generators are subject to a range of different rules depending on their generator status.
- Generator status is based on hazardous waste generation rates and/or maximum volume of hazardous waste stored on-site at any one time.
- In New York there are 3 generator categories:
  - Large Quantity Generator (LQG)
  - Small Quantity Generator (SQG)
  - Conditionally Exempt SQG (CESQG)

Small Quantity Generators

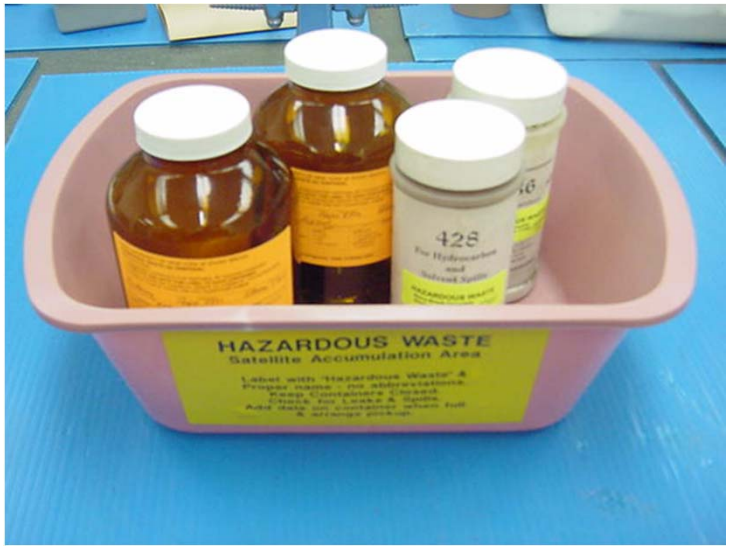
- New York facilities are classified as SQGs if they:
  - Generate more than 220 lbs of hazardous waste in a calendar month, but no more than 2,200 lbs;
  - Generate no more than 2.2 lbs of acute hazardous waste (P-waste) site-wide in a calendar month;
  - Store no more than 2.2 lbs of P-waste on site at any one time; or
  - Store no more than 13,200 lbs of hazardous waste on site at any one time.

Satellite Accumulation Area (SAA) Management Rules

- SQGs can accumulate up to 55-gallons of hazardous waste or one quart of acute hazardous waste "at or near the point of generation" in "Satellite Accumulation Areas (SAA's)" without regard to the 180-Day Storage Area requirements provided the requirements described on the next few slides are met.
- Note that NYSDEC interprets "at or near" to mean in the same room. If a SAA is accessed through a door that can be closed (even if it is never closed), then it is not "at or near" the point of generation.

SAA Container Management Rules

- SAA containers must be:
  - In good condition.
  - Compatible with the waste.
  - “Closed,” except when waste is being added (this includes HPLC waste collection containers).
  - Managed to prevent leakage.
  - Labeled with the words “Hazardous Waste,” and with other words identifying the contents.



SAA Container Management Rules

- Containers must be:
  - Moved to a 180-day storage area within 72 hours (3 days) of the 55-gallon or one quart limits being exceeded, or when the container is full.
  - Dated as soon as the 55-gallon or 1 quart (P-waste) limit is reached, or as soon as the container is moved to the 180-day storage areas, whichever occurs first.

Filling out the hazardous waste label correctly…

HAZARDOUS WASTE

CONTENTS (No abbreviations or formulas):

_____

_____

Storage Start Date:
(For EH&S Use Only)

_____/_____/_____

Questions?
Call EH&S at x2105

Farmingdale State College
State University of New York

Chemical name must be written in English. Do NOT use chemical formulas or abbreviations

HAZARDOUS WASTE

Storage Start Date (for EH&S Only):

_____/_____/_____

Unknowns

- Unknowns are chemicals in containers where the labels have been lost or the name of the chemical on the label is illegible/missing.

Unknowns

- Unknowns must be managed as hazardous waste until a proper hazardous waste determination can be made.
- Unknowns are not permitted in our 180-day/main hazardous waste storage facility.

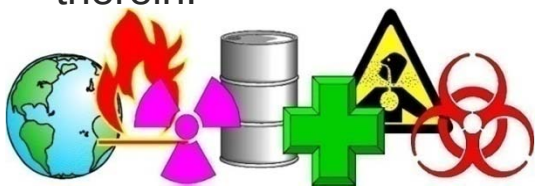
Waste Handling Prohibitions

Hazardous wastes must *NOT* be:

- dumped down the drain
- discharged to a sanitary sewer
- discarded with regular garbage
- allowed to evaporate to the atmosphere

How do I make a pickup request?

- A REQUEST FOR PICKUP OF CHEMICAL WASTE FORM should be filled out prior to when the chemical waste is to be picked up from your lab or work area. ***Please Note:*** This is not required and serves as an internal inventory tracking mechanism only.
- The form has two copies – the front/white copy to be included with the chemicals for pickup, and the back/yellow copy is for your own records. INSTRUCTIONS on how to complete the form can be found on the REVERSE of each form/page.
- When your container(s) is FULL, or you need your waste picked up for any reason, please submit a work order through the Physical Plant work order system. Once in the work order system, select "Moving & Trucking" from the category drop down feature, and then choose "Waste/Hazardous Materials" from the subcategory drop down menu.
- **IMPORTANT!** You MUST COPY the EH&S Officer on ALL work order requests involving hazardous waste! Scroll down to the bottom of the work order you're creating and enter jeff.carter@farmingdale.edu in the "E-mail Id(s) To Notify" field.
- If you've completed a REQUEST FOR PICKUP OF CHEMICAL WASTE FORM, you may scan and attach it to your work order as well using the "Attach File" feature included therein.



Request for Pickup of Chemical Waste

REQUEST FOR PICKUP OF CHEMICAL WASTE For chemicals and mixtures

Physical Plant Use Only
Date Received: _____
Location : _____
Pickup Request#: _____
Total Containers: _____

Date: _____ Location of Waste (Room & Building): _____ Department : _____

Request Submitted by (print): _____ Signature: _____ Phone: _____ Supervisor: _____

By my signature, I certify that the information contained on this form is true and correct to the best of my knowledge. _____ signature Campus mail address: _____ room, building _____

	Chemical Name – (No formulas or abbreviations)	Number of identical containers	Capacity of container	Amount in container	Units (circle one)	Excess Material? (leftover unused chemical)	If excess, is the original container seal intact?	Color of chemical	Phase (liquid, solid, gas, sludge)
					Kg L	Y N	Y N		
					Kg L	Y N	Y N		
					Kg L	Y N	Y N		
					Kg L	Y N	Y N		
					Kg L	Y N	Y N		
					Kg L	Y N	Y N		
					Kg L	Y N	Y N		
					Kg L	Y N	Y N		

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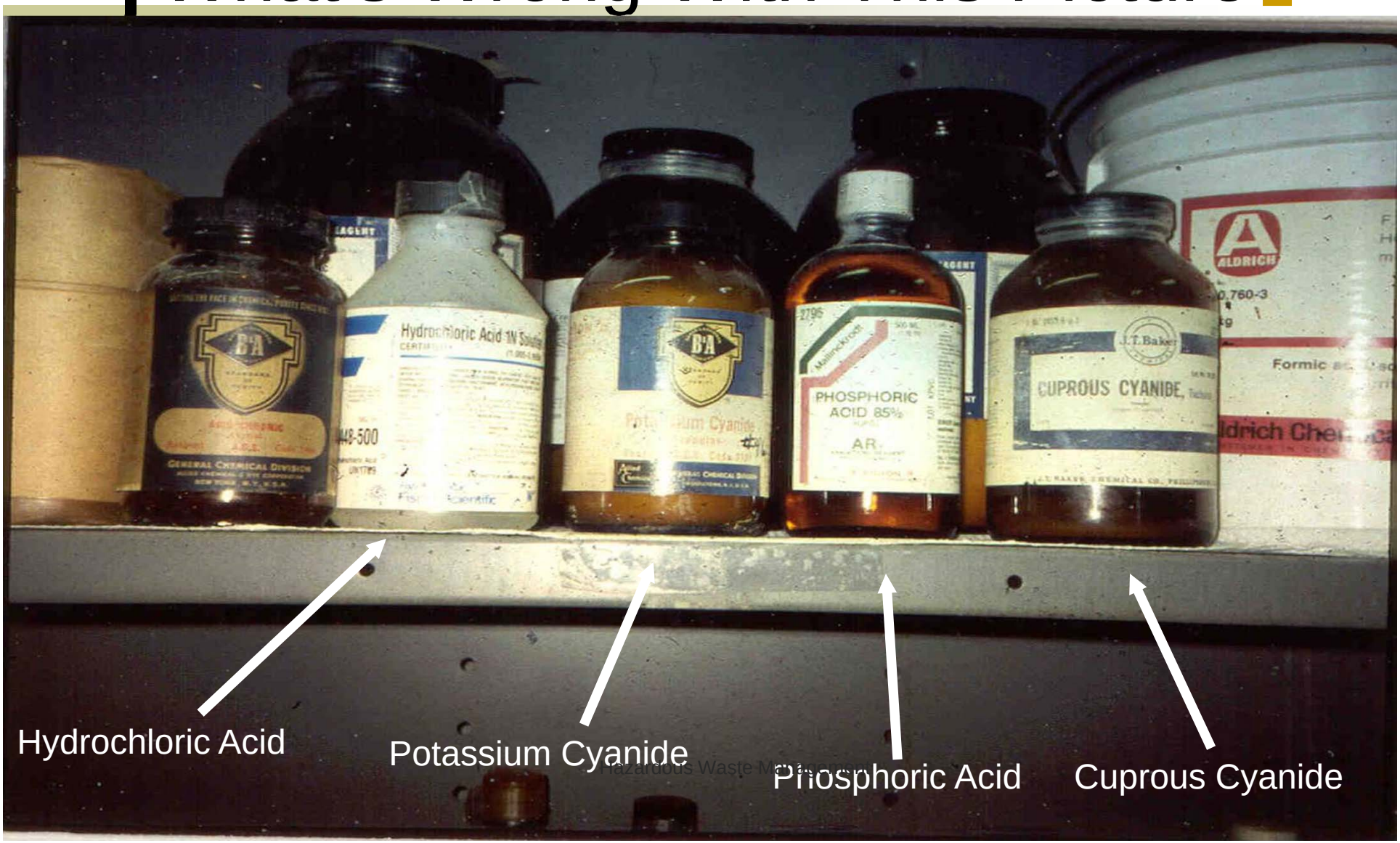

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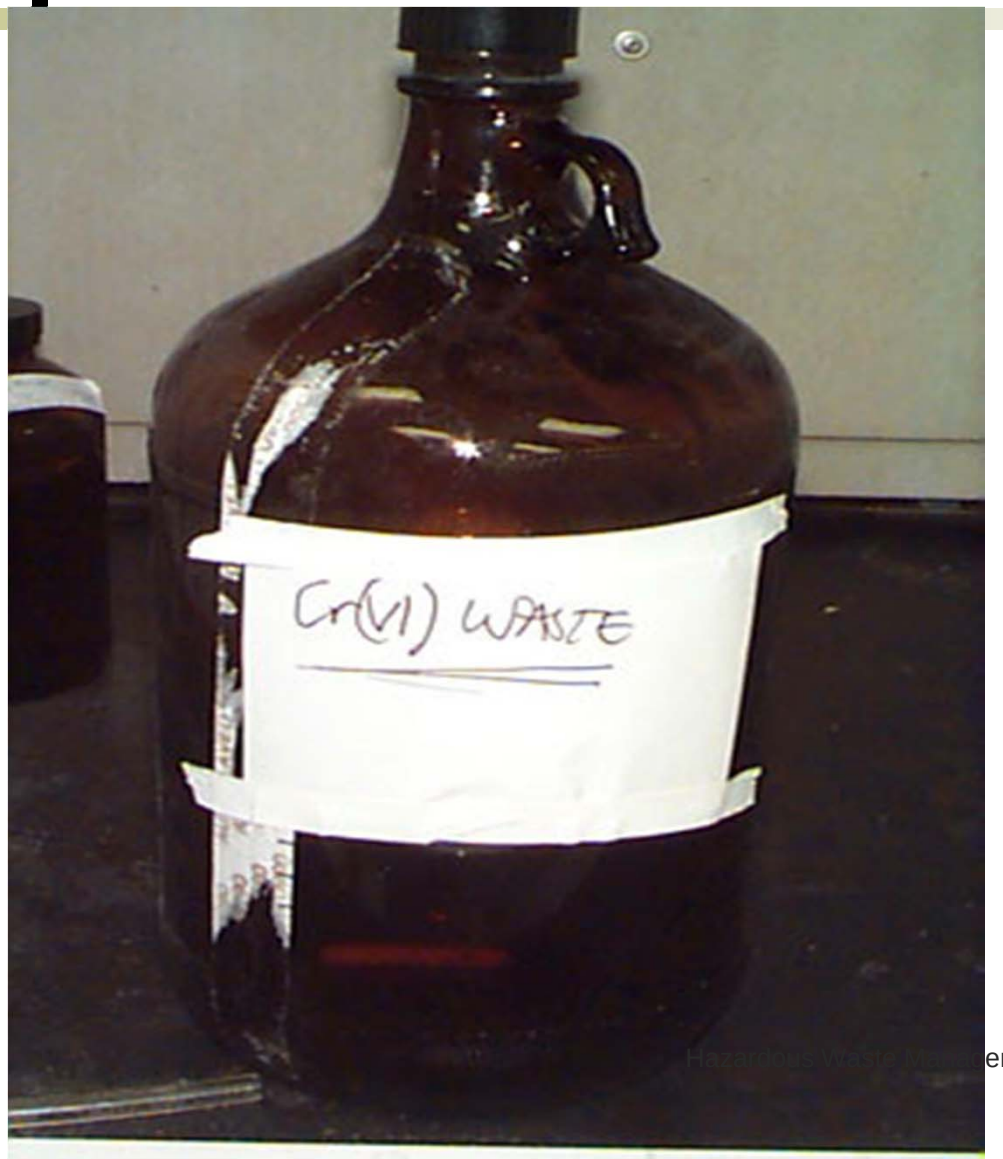
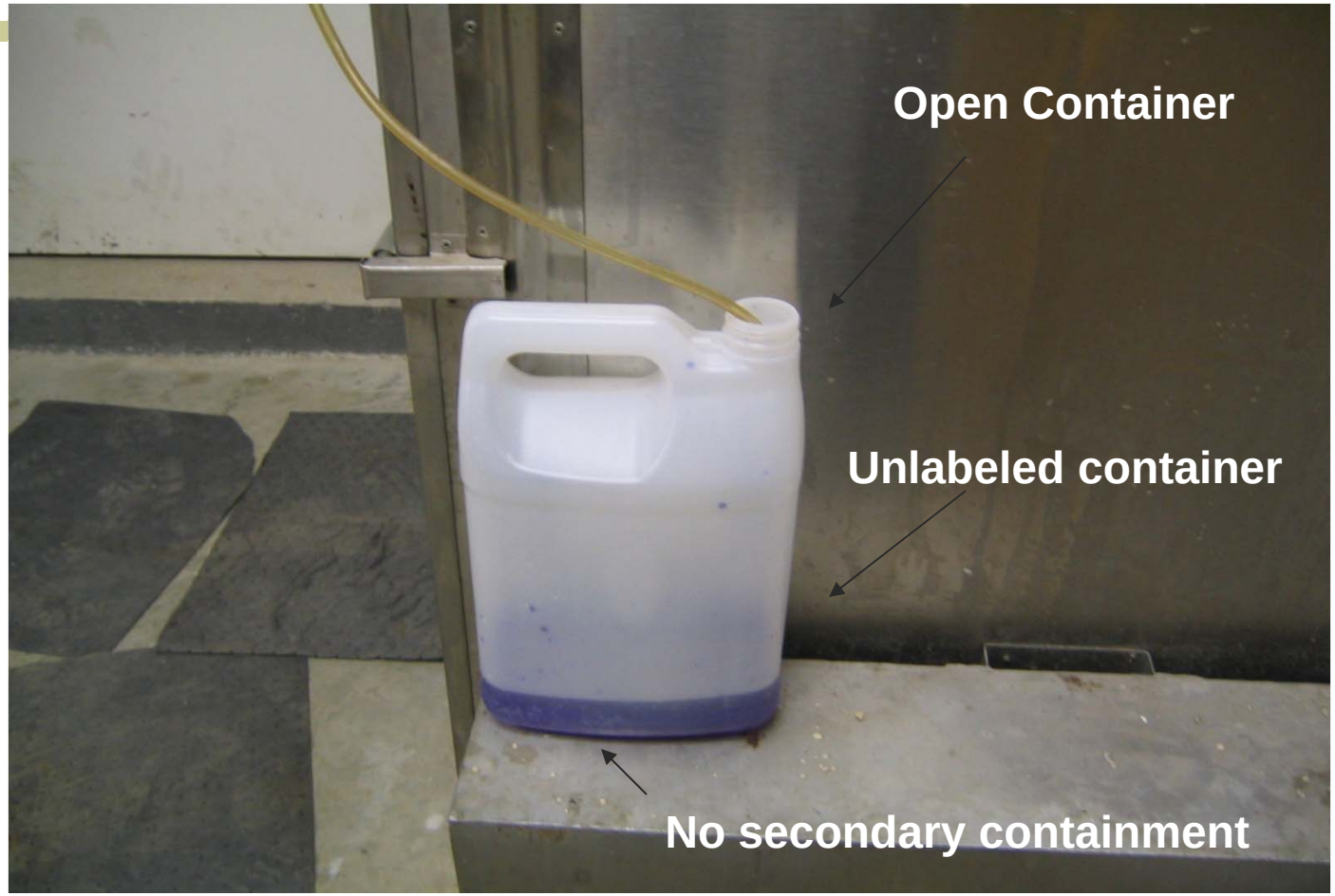


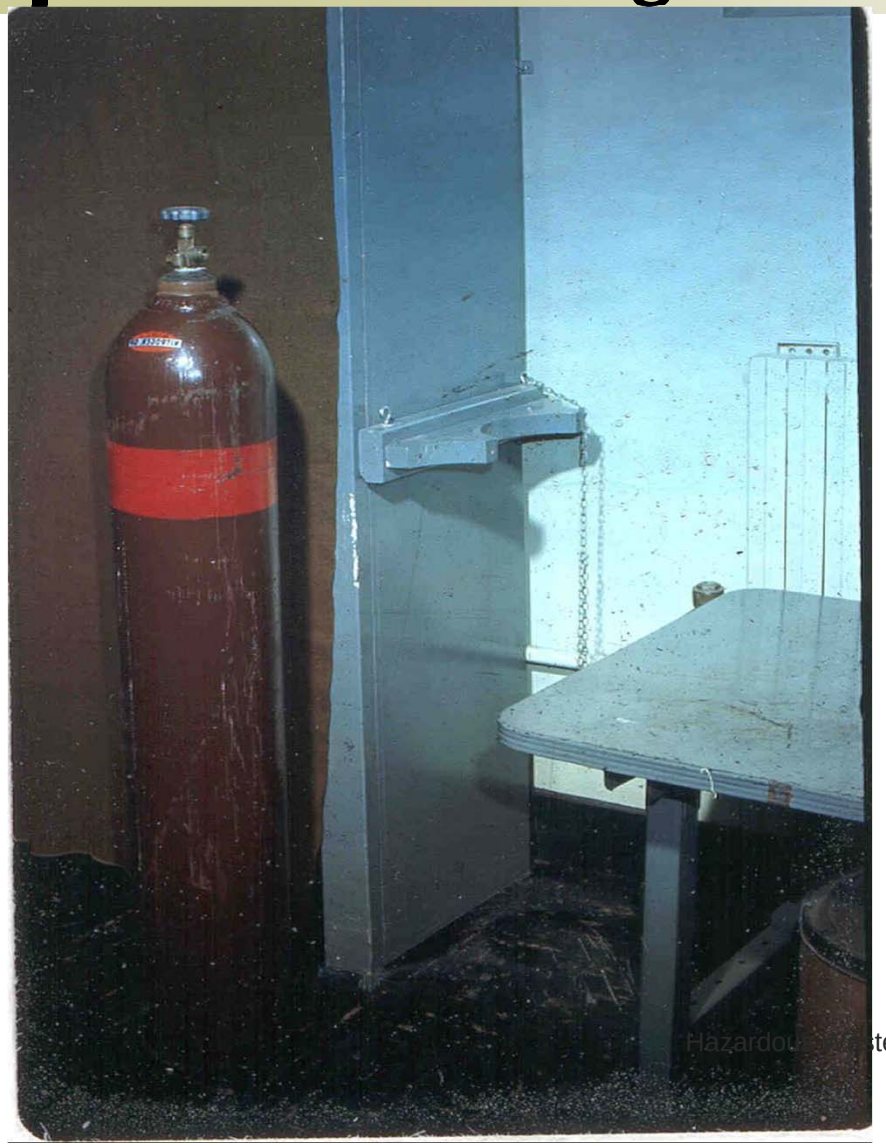
What's Wrong With This Picture

Improper labeling and storage of a HPLC waste chemical



Correct labeling and storage of a HPLC waste chemical

What's Wrong With This Picture



Waste Handling Practices

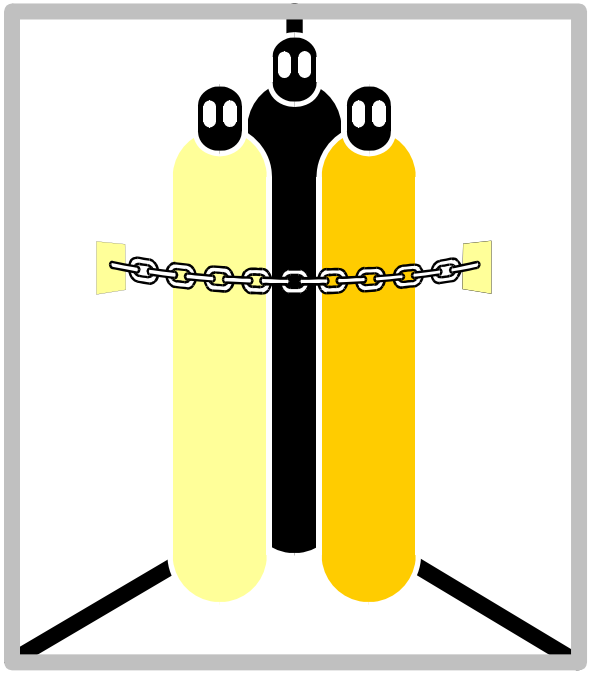
During Chemical Transport:

- Have spill clean-up material readily available.
- Remove, but carry, appropriate PPE.
- Use freight elevator or limit access to elevators.
- Avoid crowded and public areas, if possible.

Waste Handling Practices

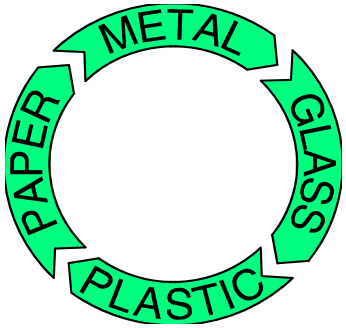
Disposal of waste gases:

- Contact suppliers for pickup of cylinders.
- Do not dispose of gases by bleeding to atmosphere.
- Do not leave/store unsecured.



Disposal of Empty Containers

- Empty = less than 1” of product or less than 3% of capacity of container, whichever is smaller.
- Empty containers should be triple rinsed before disposal.
- Deface label and mark “triple rinsed.”
- Recycle glass, bottles and cans where possible.



Disposal of Empty Containers (cont.)

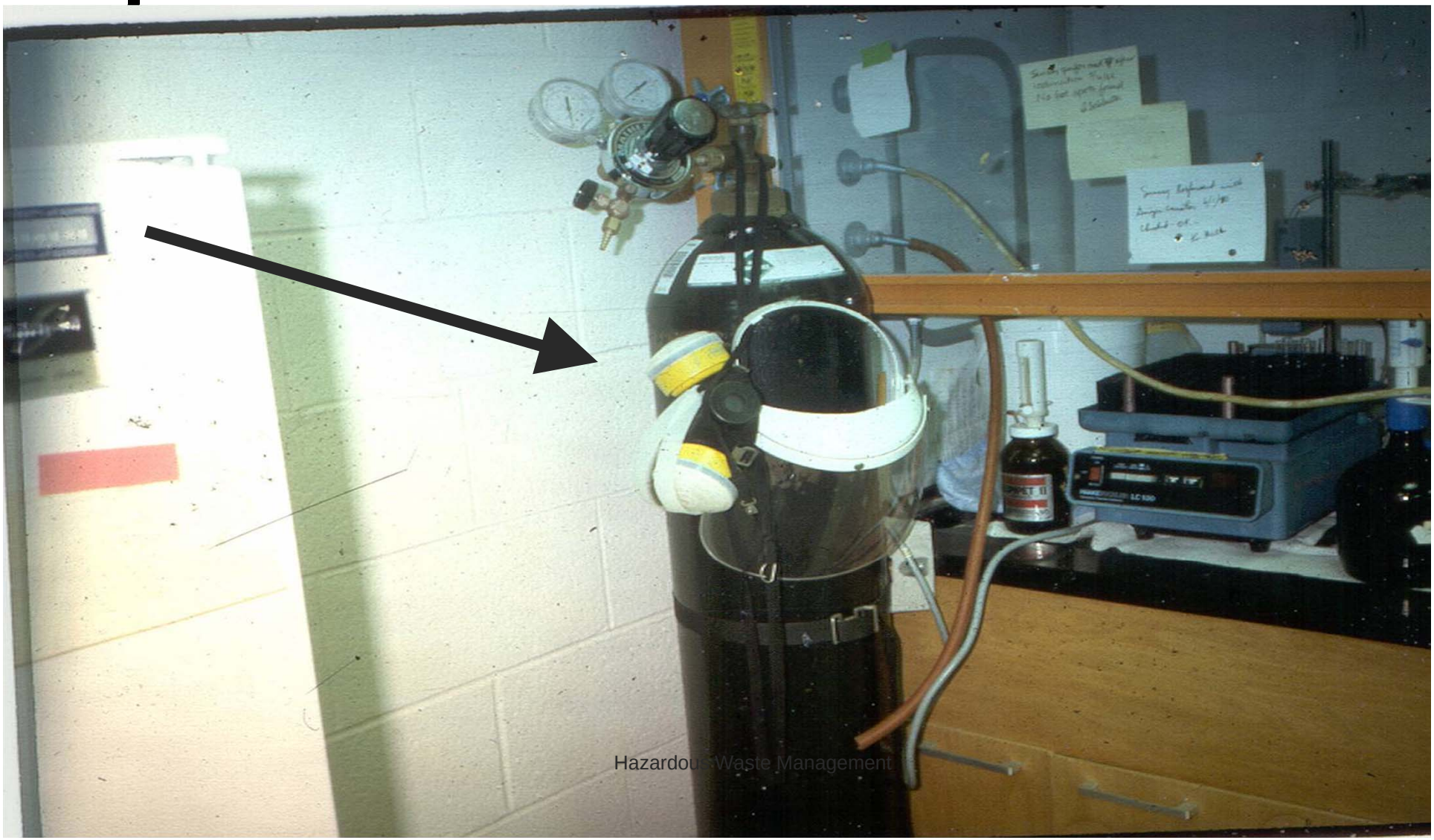
- For all “empty” containers that previously held/stored a P-listed (acutely toxic) chemical, **do not rinse**, but rather dispose of the entire container as hazardous waste).

Disposal of Empty Containers (cont.)

- Under no circumstances may a container labeled with the international radioactive symbol, a biological symbol or with the words “Hazardous Waste” be disposed of in the regular trash.


WHERE'S YOUR PPE???

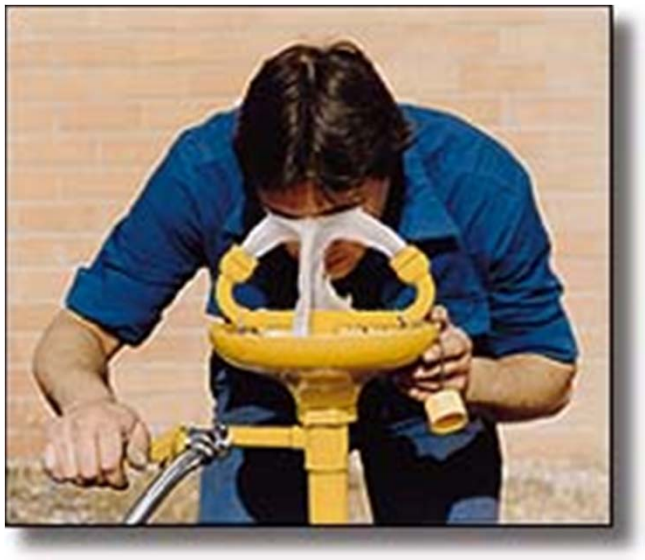
OH! There it is…..



Emergency Procedures…

Chemical splashes to the eyes…

- Immediately flush eyes with copious amounts of water for **15 minutes**
- Assist victim if it can be done safely
- Always seek medical attention afterwards



Emergency Procedures…

Chemical splashes to the body…

- Immediately remove contaminated clothing and flush area with copious amounts of water for **15 minutes**
- Assist victim if it can be done safely
- Always seek medical attention afterwards

Emergency Procedures

- All chemical spills, leaks, fires or other uncontrolled releases must be **immediately reported** by notifying University Police @ 911 or x2111, or (631) 420-2111 from cell phones.
- If there is a fire, immediately pull the fire alarm, begin evacuation, and contact University Police from a safe location.

Chemical Spills

It is important that spills of hazardous waste and materials are cleaned appropriately by trained personnel. Before attempting to clean a spill, take the following information into account.

When assessing the spill, consider:

- the size of the spill
- the toxicity of the material
- physical hazards of the material
- availability of clean-up materials
- knowledge and training of the person doing the clean-up

Chemical Spills

You may clean up an "incidental" or minor spill if:

- you have the supplies to absorb and bag the spilled material;
- you are familiar with the properties of the spilled materials;
- you have the proper personal protective equipment (PPE);
- spilled acids or bases are dilute;
- solvents are in a well ventilated area;
- Does NOT involve radioactive materials;
- ***You can do the cleanup safely.***

Types of Waste Minimization

- Source Reduction (Reduce)
  - Substitute non-hazardous or less toxic chemicals for hazardous ones.
  - Use smaller quantities in your process by reducing the overall size of the process or apparatus.
  - Do not order more than you need for scheduled work.

Types of Waste Minimization

- **Reuse:** Do not dispose of chemicals that can be reused.
- **Recycling:** Consider purchasing a solvent recycler if you generate waste solvent that could be redistilled and recycled

Types of Waste Minimization

- **Reclamation**

  If your waste contains precious materials, your waste stream may be a valuable byproduct (i.e. silver recovery systems). Consider installation of a reclamation program.


REDUCE
RETHINK
REUSE
RECYCLE

CONGRATULATIONS!

You have successfully completed Hazardous Waste Management Training.