



College of
Southern Nevada

Investing in Our Future. Students First.

Laboratory Waste Management

Objectives

- Overview of the hazardous waste regulations
- What is a hazardous waste
- Common laboratory wastes
- What to do with laboratory wastes
- Common waste violations
- Chemical Emergencies

Regulatory Overview

- In 1976, congress enacted the **Resource Conservation and Recovery Act (RCRA)**.
- Comprehensive program requiring rigorous testing and management of toxic and hazardous wastes.
- Sets standards for generators, transporters, and treatment, storage and disposal facilities.

Regulatory Overview

RCRA identifies requirements for generators of hazardous waste:

- Generator registration (VSQG, SQG, LQG)
- Identification of hazardous wastes
- Containers and labeling information
- Storage
- Transportation (DOT)
- Disposal ***“Cradle to Grave”***

Laboratory Waste Spectrum

- **Hazardous Wastes**
 - Corrosives, toxics, flammables, aerosols, compressed gases
- **Biohazard Waste**
 - Red bag waste, sharps
- **Universal Wastes**
 - Lamps, batteries, mercury thermometers
- **Expired Chemicals**
 - U-Listed wastes
- **Non-Hazardous Wastes**
 - Paper, empty containers, broken glass

What is a Hazardous Waste?

- Hazardous wastes are regulated because they present special hazards to man or to the environment if they are improperly disposed of or discarded.
- EPA defines everything as a “*solid*” waste (including solids, liquids, gases, and semi-solids)
- Any “*discarded material*” which is:
 - *Abandoned*
 - *Recycled*
 - *Considered inherently waste-like; or*
 - *A Military munition*
- Determined at the point of generation.

Characteristic Hazardous Waste

Exhibit any one of four hazardous waste characteristics:

D001	Ignitable	Liquids with flash point less than 140° F, including oxidizers.
D002	Corrosive	Liquids or solids with a pH less than 2 or greater than 12.5.
D003	Reactive	Water reactive, normally unstable materials, cyanides & sulfides
D004	Toxic	TCLP Wastes, bioaccumulators, heavy metals, poisons, VOCs, etc.

Listed Hazardous Wastes

Specifically listed in the hazardous waste regulations (40 CFR 261):

- **F-listed** wastes from non-specific sources.
 - Example: solvents used to degrease equipment.
- **K-listed** wastes from specific sources.
 - Example: petroleum refining or pesticide manufacturing.
- **U-listed** wastes that are off-spec, expired, or discarded commercial chemicals.
- **P-listed** wastes that are acutely hazardous wastes.

Common Listed Laboratory Wastes

F-Listed	U-Listed	P-Listed
Acetone	Acetaldehyde	Arsenic Trioxide
Isobutanol	Acetone	Arsenic Acid
Methanol	Benzene	Potassium Cyanide
Methylene Chloride	Chloroform	Sodium Azide
Toluene	Formaldehyde	Sodium Cyanide
Xylene	Phenol	2,4-Dinitrophenol
Tetrachloroethylene	Toluene	Thiosemicarbazide

Hazardous Waste Generators

The RCRA defines a generator as:

Any person, by site, whose act or process produces hazardous waste identified or listed in 40 CFR 261.3.

Generators are classified by the volume of hazardous waste that they produce per month:

VSQG **Very Small Quantity Generator**
less than 100 Kg (220 lbs) per month.

SQG **Small Quantity Generator**
More than 100 Kg (220 lbs) to less than 1000 Kg (2,200 lbs) per month.

LQG **Large Quantity Generator**
More than 1000 Kg (2,200 lbs) or more than 1 qt. of acutely hazardous waste (P-Listed waste) per month.

Storage Limits

Generator Status	Storage Time	Storage Limit
LQG	90 Days	No Limit
SQG	180 days (or 270 days if waste must be shipped over 200 miles)	6000 Kg (13,200 lbs)
VSQG	No Limit	1000 Kg (2,200 lbs)

Hazardous Waste Containers

- Containers used to accumulate waste chemicals *must* be:
 - In good condition (*no holes, creases, cracks, rust*).
 - Compatible with the contents.
 - Kept closed unless adding or removing wastes.
 - Managed to prevent spills and minimize releases.
 - Segregated from incompatible wastes.

Hazardous Waste Labeling

- At a minimum, containers containing a hazardous waste must be identified with:
 - The words “HAZARDOUS WASTE” or “NON-HAZARDOUS WASTE” on one side.
 - the indication of the hazard (e.g., Corrosive, Flammable, Toxic, etc.).
 - the name of the material or contents (Example: “Organic Solvent Waste” or “Inorganic Waste”).
 - Date when the container is full.
 - Location where the hazardous waste container originated.

Hazardous Waste Labels

HAZARDOUS WASTE

ACCUMULATION START DATE _____

CONTENTS _____

HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

HAZARDOUS WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL.

IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY.

GENERATOR INFORMATION:

NAME _____

ADDRESS _____ PHONE _____

CITY _____ STATE _____ ZIP _____

MANIFEST TRACKING NO. _____ ACCUMULATION START DATE _____

EPA ID NO. _____ EPA WASTE NO. _____

D.O.T. PROPER SHIPPING NAME AND UN OR NA NO. WITH PREFIX

HANDLE WITH CARE!

LABELMASTER® (800) 521-5258 www.labelmaster.com

HAZARDOUS WASTE

ACCUMULATION START DATE: _____

CONTENTS: _____ %

CONTACT: _____ ROOM #: _____

WASTE CODES: _____

HAZARDS

(Check all that apply)

FLAMMABLE

CORROSIVE

TOXIC

REACTIVE

OXIDIZER

OTHER: _____

IN CASE OF EMERGENCY – CONTACT COLLEGE POLICE AT 702-651-7911

Indication of Hazard Labels

Can use any of the following methods:

Ignitable (D001)

EPA Waste Characteristic



OSHA Pictogram



DOT Hazard Class Label



NFPA 704 Rating

Hazardous Waste Labels



Satellite Accumulation

- Located at or near the point of generation in a fume hood, bench or workstation.
- Up to 55 gallons of hazardous waste or 1 quart of acutely hazardous waste.
- When full, moved to secondary containment until it is picked up by EHS.

Central Storage Areas

- Choose a central storage area to store wastes ready for disposal.
- Keep containers in secondary containment.
- Inspect central storage area weekly.
- Keep storage areas clean and free from trash and empty containers.

Non-Hazardous Waste

- Non-hazardous wastes do not meet the definition of a hazardous waste but must be managed and disposed of properly.
- They should be collected in an appropriate disposable container
- Clearly labeled as “Non-Hazardous Waste”, its contents, and picked up by EHS for proper disposal.

Common Non-Hazardous Wastes

Amino Acids	Ammonium Chloride
Boric Acid	Bromothymol Blue
Calcium Carbonate	Copper Sulfate
Ethidium Bromide	EDTA
Ferric Chloride	Glutamic Acid
Magnesium Sulfate	Potassium Iodide
Sodium Iodide	Urea

Non-Hazardous Waste Labeling

- At a minimum, containers containing a non-hazardous waste must be identified with:
 - The words “NON-HAZARDOUS WASTE” on one side.
 - the name of the material or contents (Example: “Copper Sulfate Solution” or “Methyl Blue Solution”).
 - Date when the container is full.
 - Location where the hazardous waste container originated.

Non-Hazardous Waste Labels



Solid Wastes

- Materials that are not considered hazardous waste can be disposed as solid waste:
 - Paper Products and Packaging
 - Used Personal Protective Equipment (PPE)
 - Broken Glass and Pipettes
- Paper products or PPE that are not saturated with hazardous materials and/or biohazard waste can be recycled or disposed as a solid waste.
- Broken glass and pipettes must be placed in rigid broken glass disposal containers.

Waste Container Selection



HDPE Narrow-Mouth Bottles



HDPE Wide-Mouth Bottles



Amber HDPE Bottles



HDPE Hedpaks



Polyethylene Jugs



5-Gallon Pails



Closed Head 5-Gallon Poly Pail
(DOT UN 1H1/Y1.8/150)

Empty Containers

- Empty chemical containers can be disposed of in the trash if less than 1 inch of residue or 3% by weight of total capacity remains.
- Containers that previously contained P-listed chemicals must be rinsed, and the rinse must be collected and then disposed as a hazardous waste.
- Remove lids, labels and puncture container to prevent reuse.

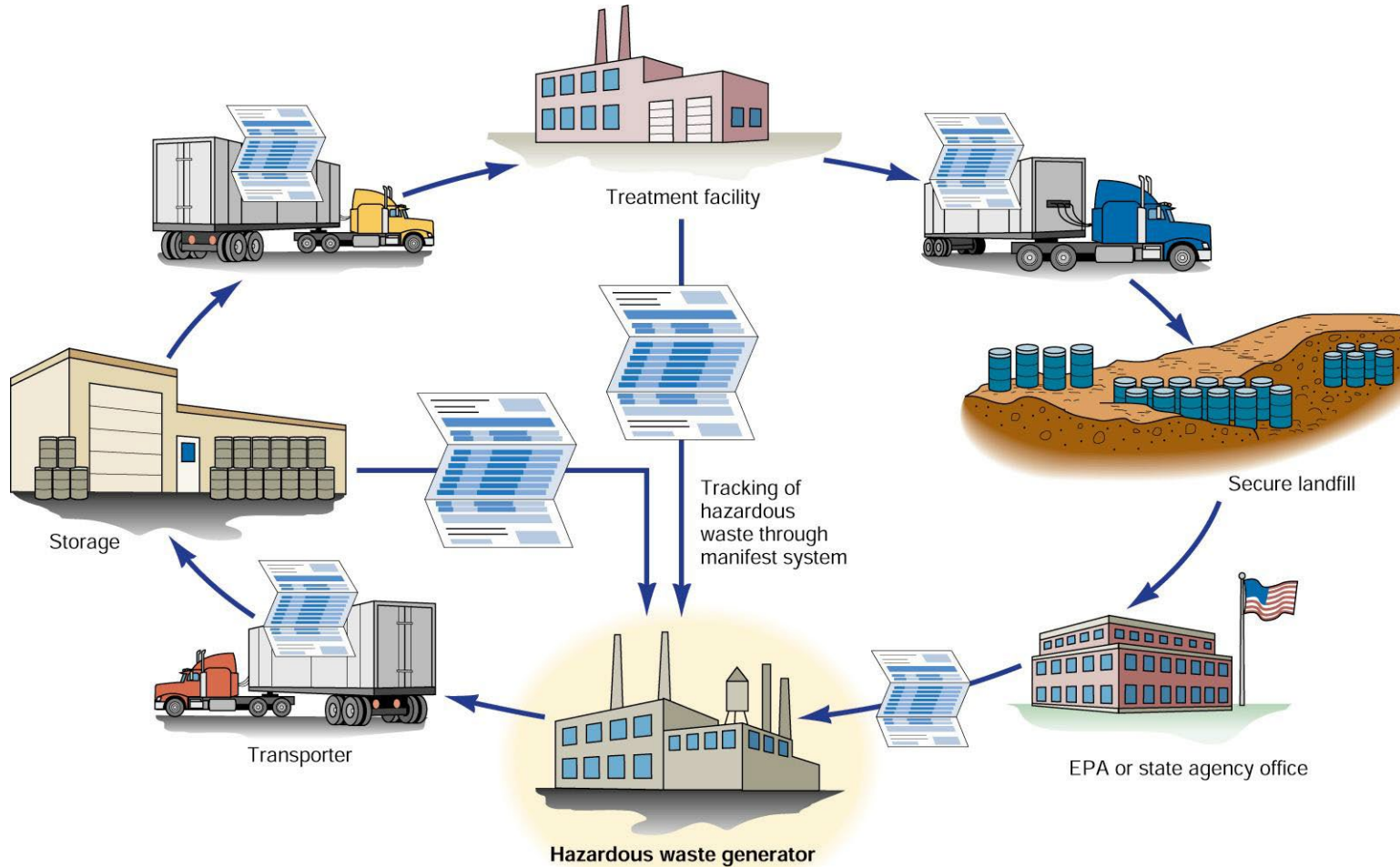
Waste Minimization

- CSN is required by Federal and State regulations to develop and implement a Waste Minimization Strategy. Ways to help achieve the goal of reducing the volume of chemical waste generated on campus include but are not limited to:
 - Order the smallest quantity of chemical materials required for your needs.
 - Keep an inventory of chemicals in your lab.
 - Share surplus chemical with other labs.
 - Purchase mercury-free instruments.
 - Substitute hazardous chemicals with non-hazardous chemicals whenever possible.

Recordkeeping and Reporting

- Uniform Hazardous Waste Manifests
- Land Disposal Restrictions
- Monthly accumulation amounts
- Waste determinations and analysis
- Biannual reports
- Exception reports
- Training records

Cradle to Grave Accounting



Personnel Training

The scope of the training is to ensure that personnel who use chemicals:

1. Understand how to identify hazardous wastes
2. Understand how to package and label hazardous wastes
3. Understand how to have their hazardous wastes disposed of
4. Know how to respond effectively to emergencies

Note: Additional DOT training is required for personnel responsible for shipping hazardous wastes.

Elementary Neutralization

- Always use fume hood & wear PPE.
- Dilute with cold water to 1:10 [always add neutralizer (acid/base) to water].
- Slowly add neutralizer until pH between 5 & 10.
- Allow solids to settle.
- Decant solution to sink drain and flush at least 50 times the volume with water.
- Allow solids to dry and package for disposal in normal trash.

Biohazard Wastes

- Containers, materials, or glassware contaminated with biological hazards (viruses, bacteria, blood, body fluids, etc.) must be placed in an approved biohazard waste disposal container.
- Containers must be clearly marked as “Biohazard” with the international biohazard symbol.
- Contaminated sharps (syringes, pipettes, scalpels, blades) must be placed in a sharps container. DO NOT place in plastic bags, cardboard boxes, metal cans and/or old paint cans.
- Disposal containers must be disposed of by an approved biohazard waste disposal company.



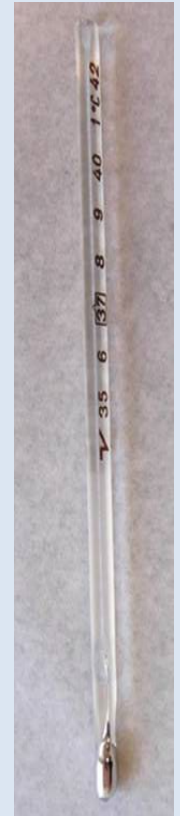
Bagged Hazardous Wastes

- Animal and specimen wastes containing preservatives such as Carasafe, formaldehyde, formalin, or other preservatives.
- Gloves, masks, PPE, paper towels, absorbent items, Glass or plastic pipettes, petri dishes, slides, ampoules contaminated with hazardous materials.
- Specimen buckets can be left next to the yellow waste cans and labeled for disposal or requested for pick-up by EHS.
- Do not dispose of animal or specimen wastes in the regular trash cans.



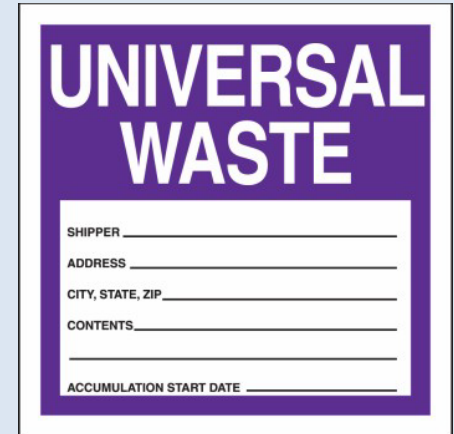
Universal Wastes

- **Batteries:**
 - Lithium and lithium ion batteries
 - Lead acid batteries
 - Nickel-cadmium batteries
 - Nickel-metal hydride batteries
- **Lamps:**
 - Fluorescent lamps and ballasts
 - High intensity UV lamps
 - Mercury vapor lamps
 - High pressure sodium lamps
 - Metal halide lamps
- **Mercury-containing devices:**
 - Thermometers
 - Manometers
 - Temperature and pressure gauges
 - Mercury switches

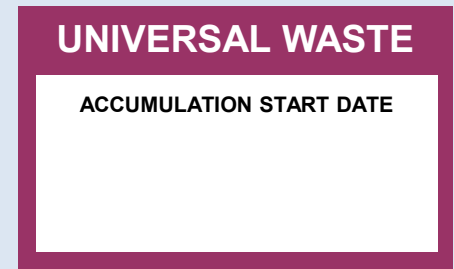


Universal Wastes

- Universal wastes must be placed in containers or packages that are labeled “Universal Waste” in addition to the type of article.
- Containers must remain closed unless adding or removing articles.
- Containers must be dated when the first article is placed into the container.
- Universal wastes can be stored for up to one year before they are disposed of.



A purple rectangular label with a white border. The text "UNIVERSAL WASTE" is written in large, bold, white capital letters at the top. Below this, there is a white rectangular area containing several lines of text, each followed by a horizontal line for writing: "SHIPPER", "ADDRESS", "CITY, STATE, ZIP", "CONTENTS", and "ACCUMULATION START DATE".



A purple rectangular label with a white border. The text "UNIVERSAL WASTE" is written in large, bold, white capital letters at the top. Below this, there is a white rectangular area containing the text "ACCUMULATION START DATE" in bold black capital letters, followed by a horizontal line for writing.

Expired Chemicals

- Expired or obsolete chemicals are any chemicals that will no longer be used for their intended purpose.
- Conduct routine inventories to identify any expired or obsolete chemicals.
- Relocate expired chemicals to a chemical waste storage area for pick-up and properly label or mark them as expired.
- Typically shipped off for disposal within 90 days (LQG) or 180 days (SQG).

Common Violations

- Open Containers
- Unmarked/unlabeled containers
- Improper storage of chemicals
- Improper disposal of wastes
- Poor records management:
 - Training records
 - Storage area inspection records
 - Hazardous waste determinations
 - Manifests, LDRs, exception reports



Chemical Emergencies

Simple Spills or Leaks

- Incidental spills which you can safely clean up yourself.

Major Emergency or High Hazard Spills

- Spills which you cannot safely clean up yourself.

Simple Spills

- Spills that represent a low risk to personnel and the environment.
- Spills that are contained or are isolated.
- Spills that can be adsorbed and controlled at the time of release by employees working in the area.
- The spill will not reach a floor drain.
- The spill can be cleaned up wearing basic PPE to prevent skin and eye contact such as gloves and eye protection.

High Hazard Spills

- Spills that have the potential to harm the environment or represent a risk to human health.
- These spills must be addressed only by trained emergency responders that have the appropriate personal protective equipment.
- Never put yourself or others at risk to clean up a major spill.

Response Actions

- **Notify** your fellow workers and supervisor.
- **Control Access** to the area, prevent contact or spread of spill.
- **Report** all spills as soon as possible to the University Police Dept. and EHS.
- **Call University Police Dept. , if:**
 - Fire (even if you extinguish it yourself).
 - Explosion.
 - Injury.
 - Unknown vapors, fumes or smoke.
 - Spills that threaten human health or the environment.

Waste Management Risks/Rewards

- **Risks – Poor Management**
 - Non-compliance enforcement
(up to \$32,500 per day/violation)
 - Employee health and safety exposure
 - Negative publicity
 - Negative environmental impact
- **Rewards – Good Management**
 - Safe work environment
 - Regulatory Compliance
 - Efficient use of resources
 - Positive public image
 - Positive environmental impact

Questions?

Contact Environmental Health & Safety Department

ehs@csn.edu

702-651-7445