Handling Hazardous Waste

Hazardous Waste at NC State

- NC State generates a variety of hazardous wastes in more than 1,500 laboratory and shop locations
- Responsible hazardous waste management ensures the safety of facilities, the environment and campus community

Compliance

- Hazardous waste practices are regulated by
  - Environmental Protection Agency
  - Occupational Safety and Health Administration
  - State of North Carolina

What is waste?

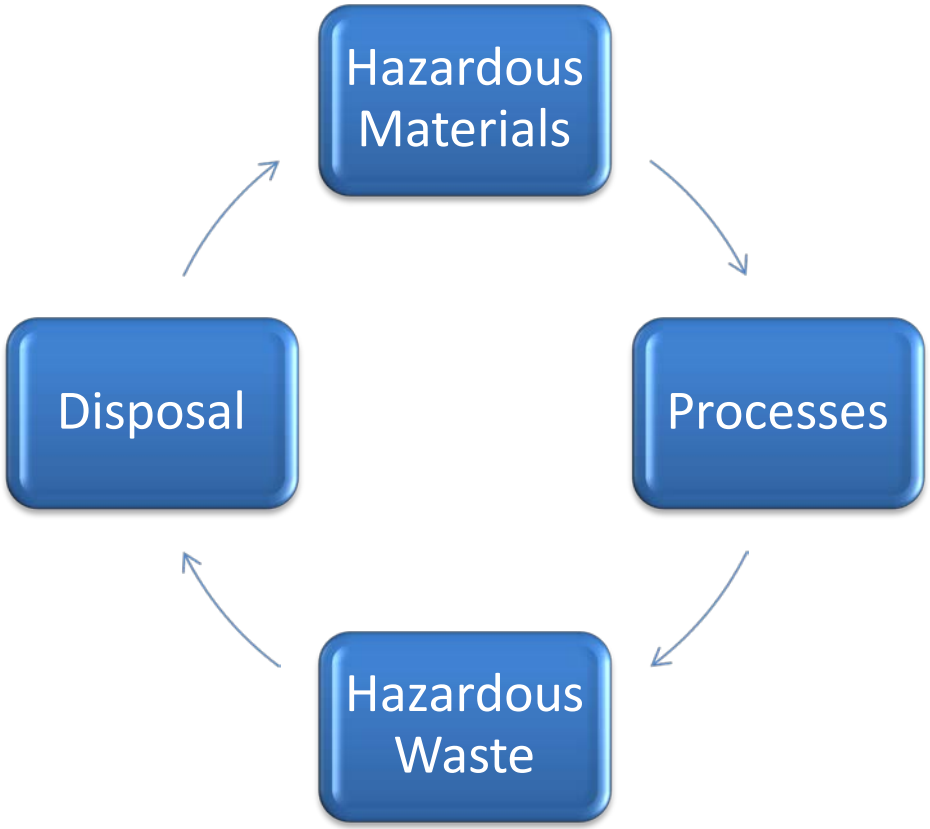
- Waste is defined as a material that is discarded through
  - Abandonment
  - Disposal
  - Dumping
  - Discharge
- Waste may also include materials accumulated for recycling, reclamation, and reuse

Inherent Wastes

- Materials that are degraded through age or storage conditions, improperly managed, or managed as if they had no value are considered inherently waste-like, and subject to waste regulations
- Materials are considered inherently waste-like, regardless of recycling, recovery, or reuse considerations

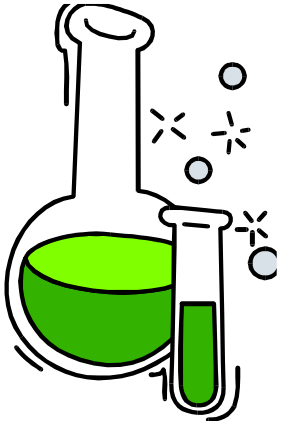
Hazardous Waste Cycle

- A hazardous material becomes hazardous waste once the generator (owner) removes it from a process or storage
- **Hazardous Waste** is any solid waste that is ignitable, corrosive, reactive, or toxic, a listed hazardous material, or contains a listed hazardous material.

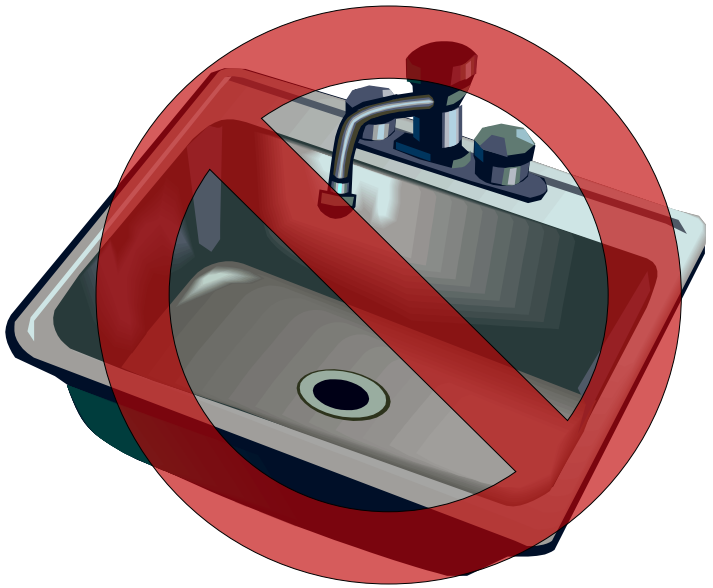


- Processes that create hazardous waste include but are not limited to:
  - Laboratory and research processes
  - Field/agricultural applications
  - Facility support

- Hazardous material streams include biological, chemical and radiological materials used in teaching, research, facility operations and institutional maintenance



- **No hazardous waste at NC State University should be discarded with ordinary trash or flushed down the drain!**
- Hazardous waste determination is required for wastes, unidentified containers and materials, old chemicals, spills not properly cleaned up, and residues on inside or outside of containers



Waste Determination

- The waste generator is responsible for determining if a material is:
  - In storage
  - Being used in a process
  - A product
  - Waste
- The waste determination must be done before disposal (before dumping, discharge, recycling, or reclamation)
- A material is waste if it can no longer be applied (used) in a process as-is
- All unlabeled material containers are considered hazardous waste

- Materials not considered hazardous waste:
  - Office supplies
  - Household-type cleaning agents in small quantities (Soaps, detergents)
  - Incandescent light bulbs
  - Alkaline Batteries

Common Hazardous Waste Concerns

- Waste determination
- Generator control of waste
- Accumulation areas
- Orderly work area
- Aisle space
- Secondary containment
- Appropriate containers
- Container closure
- Filling of containers
- Marking/labeling containers
- Clean containers
- Material compatibility
- Quantity limits

Generator Control

- Controlling waste accumulation areas reduces the risk of mixing incompatible materials and exposure
- Hazardous waste accumulation areas must be under the control of the generator
- Control includes attendance, observation, and security issues

Generator Control

- Until collection by EH&S, wastes should remain in the room where generated, and certainly must not pass through more than one doorway from generation to storage
- Wastes generated in the same lab by several PI's should be accumulated separately

Satellite and Central Accumulation

- Satellite Accumulation
  - Waste stays in the same room (shop or lab) as it is generated
  - Waste may move through one doorway under certain conditions
- Central Accumulation
  - Waste is accumulated in a room other than one approved for satellite accumulation;
  - Waste is moved from satellite to another room; or
  - Accumulate more than 55 gallons of hazardous waste

Orderly Work Area

- To minimize the potential for fires or chemical releases, all work areas should:
  - Be free of clutter
  - Minimize spills or stains on equipment surfaces
  - Maximize viable work surfaces
- Initiate and maintain good housekeeping practices
- Reduce the accumulation of papers, books and unused experimental apparatus

Examples of cluttered laboratory areas

Example of a cluttered shop area

Aisle Space

- Maintain 36 inch aisle clearance
- Aisles and means of egress should be free of stored materials and tripping hazards
- Maintaining sufficient aisle space ensures mobility for emergency personnel and other area occupants

Examples of Insufficient Aisle Space

Secondary Containment

- Secondary containment can be a tray or pan underneath the primary waste container
- Required for all hazardous waste accumulation areas
- Reduces the risk of contamination from incidental spills

Secondary Containment Device

Hazardous Waste Containers

- Waste containers and their closures must be appropriate for their contents and in good condition
- Inappropriate waste containers include:
  - Beverage and other food product containers
  - Rusted cans or drums
  - Cracked containers
  - Torn bags
  - Deformed containers

Container Closure

- All waste containers must be securely closed when not in use
- Appropriate waste container closures include:
  - Screw caps
  - Bungs
  - Clamps

Inappropriate Container Closure

- Inappropriate waste container closures include:
  - Parafilm
  - Wax paper
  - Foil

Inappropriate Container Closure

- Other inappropriate container closures include:
  - Cork
  - Ground glass
  - Rubber stoppers
  - Snap-cap containers

Funnels

- Funnels are recommended when accumulating wastes and other hazardous materials to reduce the risk of spills
- Only latching funnels that provide a fixed closure are allowed to remain in a container following collection

Drain Lines

- For accumulation containers connected to drain lines:
  - Secure closure with positively connected drain lines
  - Container is considered open if drain lines are smaller than container opening

Filling of Containers

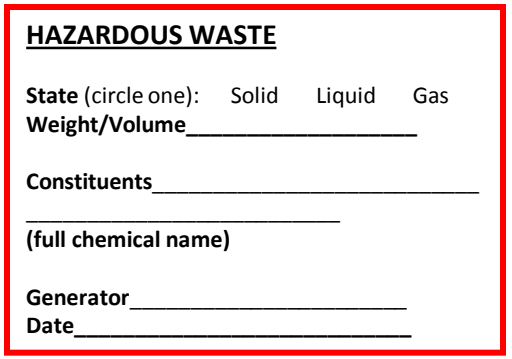
- Sufficient headspace:
  - Required for thermal expansion
  - 10% for most liquids
  - Starts at the shoulder (curvature) of container

Container shoulder

10% Headspace

Marking and Labeling

- With few exceptions, waste containers must be labeled with:
  - "Waste" or "Hazardous Waste"
  - Chemical name(s) of constituents (no abbreviations)
  - Physical state
  - Generator name
  - Date of accumulation



- An inventory log listing chemicals and dates added may be associated with the container
- Unidentified materials are a violation of EPA and OSHA regulations

Oil Marking and Labeling

- Mark as “Used Oil” (not “waste oil”)
- Accumulation start date

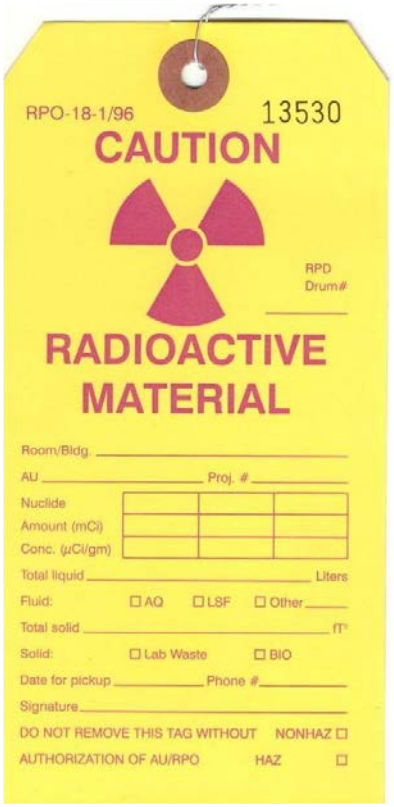
“Used Oil” applies to both “spent” and “unused” oils intended for recycling or disposal

Special Rules for Universal Waste

- Mark with words “Universal Waste” plus article type:
  - Batteries (rechargeable, lead-acid, etc.)
  - Lamps (fluorescents, etc.)
  - Mercury-containing equipment (mercury switches, thermometers, etc.)
  - Pesticides
- Mark the date as:
  - Date item was taken out of service (individual item)
  - Oldest item taken out of service (container)

Radioactive Waste Labeling

- All radioactive waste containers require a completed radioactive waste tag
  - Room & building
  - PI & Project Number
  - Radionuclide & activity
  - Quantity & waste type
  - Signature



Clean Containers

- Waste containers must be clean and free of external contamination
- Residual contaminants may appear as:
  - Stains
  - Film
  - Inks that run or “bleed”
  - Crust

Material Compatibility

- Materials should be stored with compatibility in mind to minimize reactions if spilled
- Minimize unplanned chemical reactions by:
  - Separating all incompatible materials
  - Safely dispensing materials
  - Attendance during laboratory operations
  - Equipment inspection

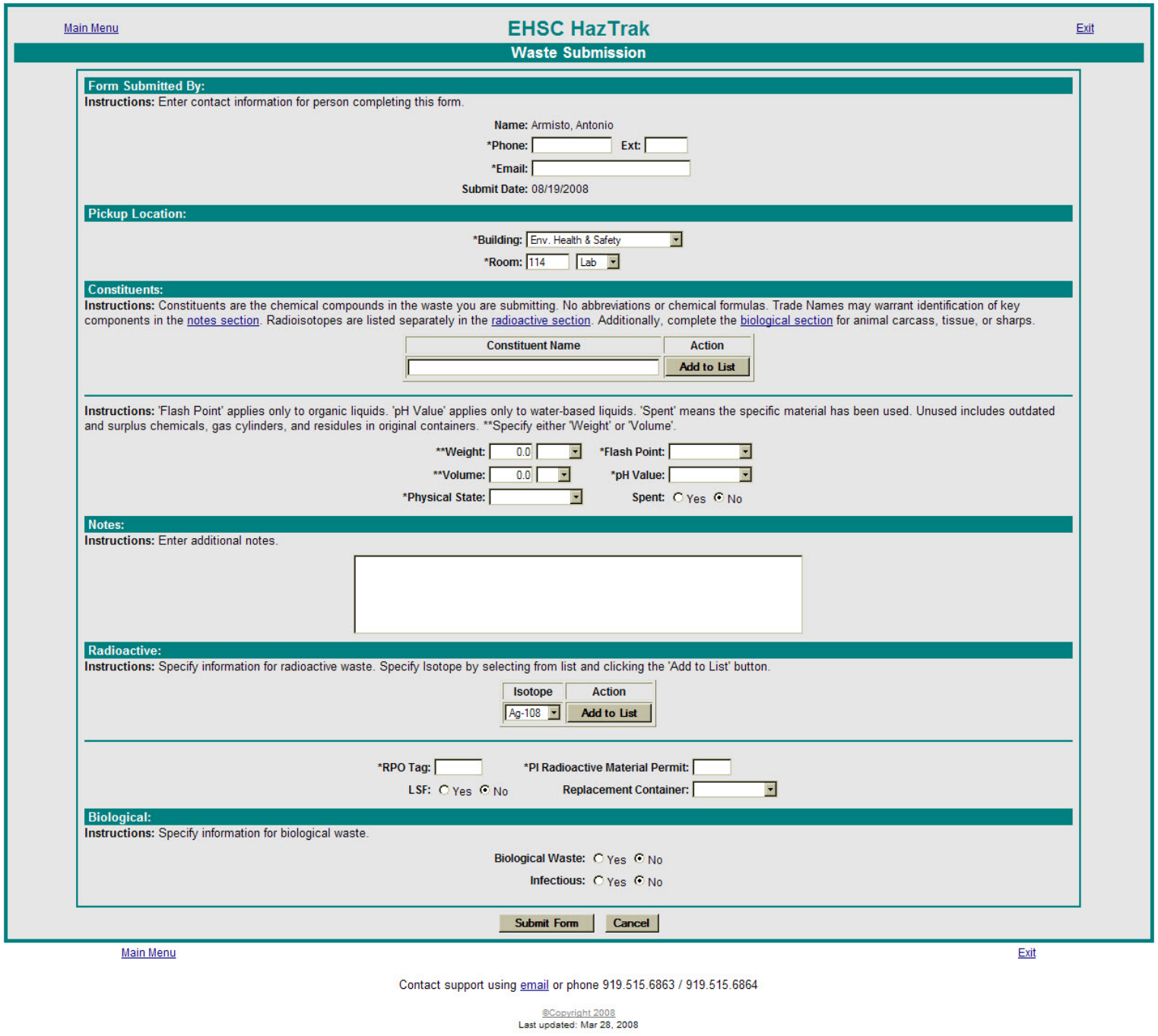
Quantity Limits

- Areas must not accumulate greater than 55 gallons of hazardous waste or one quart of acute hazardous waste
- Minimize waste quantities by regularly submitting hazardous waste for disposal
  - When container is full
  - Within 90 days of initial accumulation

Haztrak

- Haztrak is an online tool for submitting chemical, radioactive, biological, and universal waste for pickup and disposal by EHS contractors
- Haztrak can be accessed at http://www.ncsu.edu/ehs/waste.htm
- All registered users must:
  1. Submit waste requests—one form per container
  2. Complete all necessary documentation
  3. Affix a copy of the submission to the individual containers for verification at time of removal

Haztrak Waste Submission Form



Main Menu

EHSC HazTrak

Exit

Waste Submission

Form Submitted By:

Instructions: Enter contact information for person completing this form.

Name: Armisto, Antonio

***Phone:** **Ext:**

***Email:**

Submit Date: 08/19/2008

Pickup Location:

***Building:** Env. Health & Safety

***Room:** 114 Lab

Constituents:

Instructions: Constituents are the chemical compounds in the waste you are submitting. No abbreviations or chemical formulas. Trade Names may warrant identification of key components in the notes section. Radioisotopes are listed separately in the radioactive section. Additionally, complete the biological section for animal carcass, tissue, or sharps.

Constituent Name	Action
	Add to List

Instructions: 'Flash Point' applies only to organic liquids. 'pH Value' applies only to water-based liquids. 'Spent' means the specific material has been used. Unused includes outdated and surplus chemicals, gas cylinders, and residules in original containers. **Specify either 'Weight' or 'Volume'.

****Weight:** 0.0 ***Flash Point:**

****Volume:** 0.0 ***pH Value:**

***Physical State:** **Spent:** Yes No

Notes:

Instructions: Enter additional notes.

Radioactive:

Instructions: Specify information for radioactive waste. Specify Isotope by selecting from list and clicking the 'Add to List' button.

Isotope	Action
Ag-108	Add to List

***RPO Tag:** ***PI Radioactive Material Permit:**

LSF: Yes No **Replacement Container:**

Biological:

Instructions: Specify information for biological waste.

Biological Waste: Yes No

Infectious: Yes No

Submit Form Cancel

Main Menu Exit

Contact support using email or phone 919.515.6863 / 919.515.6864

Last updated: Mar 28, 2008

Biological Waste Materials

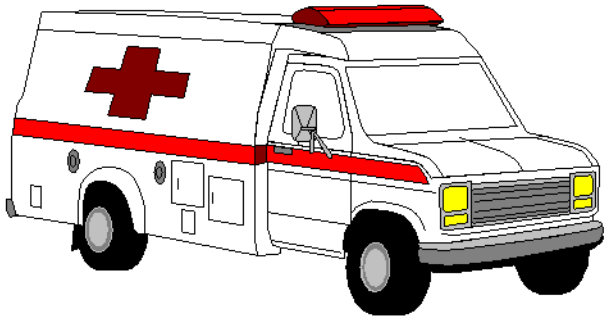
- Biological and medical wastes must be:
  1. Bagged appropriately
  2. Sterilized via autoclaving, or disinfected using bleach or other methods of disinfection
  3. Disposed via red biological waste dumpsters located throughout campus

Biological Waste Materials

Biological waste materials inappropriate for autoclaving and other methods of disinfection are processed individually and disposal should be coordinated through Environmental Health and Safety at (919) 515-7915.

Emergency Response

- It is the responsibility of the generator to provide for prompt cleanup of incidental spills in their work area and/or request assistance
- Contact Campus Police via 911 for any fire, or to request assistance emergency situations involving hazardous materials or waste



Emergency Response

- All waste accumulation areas must have:
  - Ready access to telephone or other emergency communication
  - Sufficient emergency equipment
- All area occupants must be trained for:
  - Evacuation procedures
  - Implementation of protective measures
  - Use and limitations of emergency equipment

NC State is committed to providing a compliant campus environment through initiating safe hazardous material practices. It is the shared responsibility of each member of the campus community to enact prudent hazardous waste practices to ensure the safety and health of the University and the environment.