

HAZARDOUS CHEMICAL WASTE

Hazardous waste is generally defined as waste that is dangerous or potentially harmful to human health or the environment. Hazardous waste regulations are strictly enforced by both the Environmental Protection Agency (EPA) and the Tennessee Department of Environmental Conservation. The Laboratory Supervisor is responsible for managing the hazardous waste program in a safe and compliant manner. No chemical waste should be poured down the drain or discarded in the trash without specific approval of the Office of Research Safety.

Hazardous waste falls into one of the following categories:

- Characteristic Wastes are wastes that exhibit one or more of the following properties:
 - Ignitable,
 - Corrosive,
 - Reactive, or
 - Toxic
- Listed Wastes are wastes from common manufacturing and industrial processes (F-listed), wastes from specific industries (K-listed), and wastes from commercial chemical products (U- and P-listed). Examples of U- and P- listed wastes sometimes handled in laboratories include cyclophosphamide, warfarin, epinephrine streptozotocin and other hazardous drugs. Empty containers of U- and P- listed materials must be handled as hazardous waste unless triple rinsed with a suitable solvent to remove any chemical residue. Rinse used to clean waste containers must itself be discarded as hazardous waste.
- Universal Waste includes certain batteries (primarily rechargeable batteries such lithium, nickel-cadmium, nickel metal hydride, and mercury oxide), mercury-containing equipment (e.g., thermometers, thermostats), and certain lamps (e.g., fluorescent bulbs). Note: alkaline batteries and incandescent bulbs are not considered Universal Wastes and can be legally disposed of as trash.
- Mixed Waste consists of hazardous chemical waste mixed with radioactive waste.

EPA-regulated hazardous waste should not be mistaken for biological or radiological wastes.

Waste Determinations

All chemical constituents in a hazardous waste container must be identified by knowledgeable laboratory personnel. Not only is this required by the EPA, it also ensures that waste can be properly characterized and disposed of by the Office of Research Safety or Campus Safety. If there is uncertainty about the composition of a waste stream resulting from an experimental process, laboratory employees must consult the Laboratory Supervisor for assistance or the Office of Research Safety for assistance. In most cases, careful documentation and review of the SDS for all chemical products used in the experimental protocol will result in accurate waste stream characterization. Information contained within an SDS pertinent to making a hazardous waste determination can be found in specifically Section 2, "Hazard Identification" and Section 13, "Disposal Considerations." If the

composition of a waste is unknown and cannot be determined the Office of Research Safety may perform additional analysis on this material.

Hazardous Waste Labeling

All waste must be properly labeled as soon the first drop of waste enters a waste container. Containers must be labeled and clearly marked with the words "Waste" or "Hazardous Waste" and list the chemical components of that waste. [Hazardous waste labels](#) are available on the Office of Research Safety website. These labels should be filled out in a percentage format as shown below. Listing accurate percentages is not as important (+ 5% is acceptable and constituents less than 1% can be listed as "trace") as listing all of the chemicals that makeup the waste. If a chemical is found in the laboratory and the composition is unknown, it should be assumed to be hazardous and labeled as "Hazardous Waste – awaiting proper characterization".

Hazardous Waste Label Example

HAZARDOUS WASTE (Complete Label in Pen or Pencil)	
Dept: <u>Neurology</u>	Rm: <u>201</u>
PI: <u>Smith</u>	Tel: <u>8-6114</u>
Handle With Care! CONTAINS HAZARDOUS OR TOXIC WASTE	
Write Out Full Chemical Name (no abbreviations)	
Contents	%
<u>Ethanol</u>	<u>30</u>
<u>Methanol</u>	<u>60</u>
<u>Para-formaldehyde</u>	<u>10</u>
Ignitable <input checked="" type="checkbox"/>	Corrosive <input type="checkbox"/>
Reactive <input type="checkbox"/>	Toxic <input checked="" type="checkbox"/>
Date Full _____	
<small>For Waste Pick-up Contact Safety Affairs at: 8-6115 Email: radsafety@uthsc.edu or labsafety@uthsc.edu</small>	

Waste Storage

Hazardous waste containers in UTHSC laboratories are stored in satellite accumulation areas (SAA). SAAs are used to manage hazardous waste in laboratories and shops because doing so provides safe and effective means to accumulate hazardous waste before removal by Campus Safety. Additionally, SAAs provide the least restrictive regulatory option for the accumulation and storage of hazardous waste containers. The following SAA rules must be followed at all times when managing hazardous waste in a laboratory:

- All waste must be stored in containers.
- Containers must be in good condition and compatible with the waste they contain (no corrosive waste in metal containers).

- Containers must be kept closed at all times except when adding or removing waste.
- Containers must be properly labeled.
- Containers must be stored at or near the point of generation and under the control of the generator of the waste (wastes should remain in the same room they were generated in). A central waste collection room should not be established.
- The waste storage volume should never exceed 55 gallons per SAA.
- Containers should be segregated by chemical compatibility during storage (e.g., acids away from bases, secondary containment can be used as a means of segregation).
- Avoid halogenated and non-halogenated wastes in the same waste container.
- Avoid mixing incompatible waste streams in the same container (e.g., acids with bases, oxidizers with organic solvents) that will potentially create an exothermic reaction in the waste container.
- Collect all highly toxic, reactive, mercury and any exotic wastes (e.g., dioxin compounds, PCBs, controlled substances) separately even if they are chemically compatible with other waste streams. Failing to do so can result in costly disposal fees (e.g., mixing mercury with an organic solvent waste means that the entire waste stream must be treated as mercury waste).
- All spills and leaks must be cleaned up immediately. Spill clean-up waste must be bagged and discarded as hazardous chemical waste.

Waste Disposal Procedure

Campus Safety provides pickup services for all chemical waste generated on the UTHSC campus. Requests a hazardous waste pickup by emailing labsafety@uthsc.edu and identifying the building and room number where the waste is located, the type of waste (e.g. methanol and stains), and the number of containers. Average turnaround time is 1-2 business days.

Liquid Chromatography Waste

Liquid chromatography (LC) is an analytical technique used to separate, identify, quantify, and purify individual components of a mixture. This technique is very common in biological and chemical research. The most common type of LC at UTHSC is High Performance Liquid Chromatography (HPLC). UTHSC has numerous LC instruments located in campus laboratories. Since organic solvents (e.g., methanol, acetonitrile) are commonly used in the process, most LC waste is regulated by the EPA as hazardous waste. Consequently, all containers collecting LC waste be properly labeled and acceptable to place a waste line running from the LC unit into an open waste container nor is it acceptable to use foil or Parafilm® as a means of closure must remain closed while the LC unit is in operation. It is neither acceptable to place a waste line running from the LC unit into an open waste container nor is it acceptable to use foil or Parafilm® as a means of closure.

Improper LC Waste Collection Processes

Open Waste		Foil	Parafilm®
			

Proper LC Waste Collection Processes

Safety Cans	Ported Cap (No Threads)	4 Port (threaded) Cap	Solvent Bottle Cap
			