

University of Scranton
Chemistry Department

Hazardous Waste Guidelines

Version 2009

DEP Fact Sheet: Hazardous Waste, 2510-FS-DEP1961 Rev. 2/2004

WHAT IS HAZARDOUS WASTE?

Hazardous wastes are wastes that, in sufficient quantities and concentrations, pose a threat to human life, human health, or the environment when improperly stored, transported, treated or disposed. In regulating hazardous waste, Pennsylvania uses a federal list of over 600 specific wastes. Other wastes are designated hazardous, if they contain any of the following characteristics:

1. **IGNITABLE** - combustible under certain conditions.
2. **CORROSIVE** - highly acidic, basic and/or capable of corroding metal.
3. **REACTIVE** - unstable under normal conditions and capable of creating explosions and/or toxic fumes, gases, and vapors when mixed with water.
4. **TOXIC** - harmful or fatal when ingested or absorbed.

Mixtures of hazardous and nonhazardous waste are also labeled hazardous. The hazardous waste designation does not include low-level radioactive waste, which is covered under separate state and federal rules.

HOW IS HAZARDOUS WASTE MANAGED?

Hazardous waste should be managed to minimize the amount of waste that must be disposed through the following methods:

1. **SOURCE REDUCTION.** Hazardous waste generators try to minimize the amount of hazardous waste they produce. Some have accomplished this by eliminating production steps, some by introducing new technologies.
2. **RE-USE/RECYCLING/RECOVERY.** Many hazardous wastes can be recycled, re-used, or recovered. Solvents, for example, can be rerefined and recycled. This reduces the need for waste disposal.
3. **TREATMENT.** Waste that cannot be reduced or recycled may be treated to change their chemical composition to reduce the volume of waste or make it nonhazardous.
4. **STORAGE.** Hazardous waste may be stored until they can be re-used or treated. If the storage period is longer than 90 days or the location of the storage facility is at a site other than where the waste was generated, the storage facility must have a permit.
5. **DISPOSAL.** Landfilling and Incineration. DEP regulations require waste minimization mandatory for generators of both hazardous and industrial nonhazardous wastes.

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Waste Disposal Procedures

Proper disposal of substances they have used is the responsibility of all workers. While methods of disposal may vary depending on the particular substances used, the basic principle that substances must be disposed of in such ways that assure minimal harm to people, animals, and the environment should be the primary criterion in determining disposal procedures.

1. General Considerations

The plan for safe disposal of chemicals is as much a part of the experimental plan as is the acquisition of materials, the experimental procedures, and storage. If an experiment involves new types of disposal problems, the laboratory worker should discuss the disposal plan with the area supervisor and, if necessary, with the Chemical Hygiene Officer.

If practical, very hazardous substances should be converted into less hazardous substances in the laboratory rather than being placed directly in containers. For example, strong carcinogens can often be oxidized in the laboratory and converted into the less toxic counterparts. Highly reactive substances, such as metallic sodium, can be converted to less reactive substances relatively easily and quickly.

All persons using chemicals should be aware of the toxic properties of the specific substance being worked with, as well as the toxic properties of possible reactions products. If the toxic properties of the reaction products are not known, the products should be treated with respect and disposed of in such a manner that takes into account the uncertain hazards.

The disposal of chemicals from instructional laboratories is a special problem because students in such laboratories are inexperienced; the quantities may be large, while the facilities for handling them may be less than optimum. Safe disposal of chemicals should be made an integral part of student laboratory training.

2. Disposal to the Sewer System

The Scranton Sewer Authority has charge of the local regulations governing materials which may be disposed of down the drain. The area supervisor must know these regulations and communicate them to the workers. In general, the following rules regarding sewer disposal should be followed:

- a. Only water soluble, non-hazardous substances should be disposed of in the laboratory sink. Chloride salts, nitrate salt, and sulfates may be washed down the drain with copious amounts of water as long as they do not contain heavy metals.
- b. Strong acids and strong bases should be neutralized to the pH 6-8 region before they are poured in the sewer system. Even then, these solutions

should not be poured into the drain at a rate exceeding 50 milliliters (a half-cup) per minute.

- c. Highly toxic, malodorous, or lachrymatory chemicals should not be disposed of down the drain. Laboratory drains are generally interconnected; a substance that goes down one drain, may well come up as vapor in another. Sinks should be regarded as communal property, and there is a very real danger of two chemicals from two different sources contacting one another. Strong odors or explosions may be the result.
- d. Heavy metal compounds should not be disposed of in the sink. These materials pose a hazard for the sewer system as well as water supplies.

3. Disposal of Solid Chemical Wastes

Solid waste material that is not water soluble, or contains heavy metals may not be disposed of in the drain. This material is to be placed in a solids waste bottle. This bottle must be appropriately labeled with a red and white hazardous waste label.

The label should contain the following information:

- a. **The full name of the person generating the waste.**
- b. **The start date the material was placed in the bottle.**
- c. **The names of all solids (Hazardous or Non-hazardous) placed in the bottles, along with the quantities of each material.**
- d. **The concentrations of any heavy metals present in the waste liquids.**
- e. **Hazardous characteristics (flammable, corrosive, reactive, toxic, etc.)**
- f. **The EPA hazardous waste number, if assigned.**

Each laboratory should have waste bottles removed as soon as they are filled. Weekly surveys should be conducted by the area or research supervisor to gather filled waste bottles. The Hazardous Waste Coordinator, Richard Trygar, should be contacted to arrange for collection of the filled bottles. It should be remembered that waste disposal companies often charge by the size of the bottles being disposed of, and not the quantities present in the bottles; the smallest bottle possible should be used to store solid waste material.

4. Disposal of Liquid Chemical Wastes

All **toxic, corrosive, and flammable** liquids must not be poured down the drain. This material must be disposed of properly in liquid hazardous waste bottles for later treatment or burial. **Liquids should be segregated into four classes for disposal: halogenated wastes** (chloroform, carbon tetrachloride, etc.) **materials capable of forming peroxides** (ethers, certain alcohols), **general organic solvents** (hexane, benzene, acetone, etc.), and **waste-based solutions containing heavy metals**. Each of these classes should be placed in

separate bottles, as chemical incompatibility may result if the materials are mixed.

The label should contain the following information:

- a. **The full name of the person generating the waste.**
- b. **The start date the material was placed in the bottle.**
- c. **The names of all liquids (Hazardous or Non-hazardous) placed in the bottles, along with the quantities of each material.**
- d. **The concentrations of any heavy metals present in the waste liquids.**
- e. **Hazardous characteristics (flammable, corrosive, reactive, toxic, etc.)**
- f. **The EPA hazardous waste number, if assigned.**

It is important that room be allowed for expansion when liquid waste bottles are filled; they must not be filled to the top of the bottle. Leave 1-2 inches below the neckline of the bottle for expansion.

Each laboratory should have waste bottles removed as soon as they are filled. Weekly surveys should be conducted by the area or research supervisor to gather waste bottles. The Hazardous Waste Coordinator, Richard Trygar, should be contacted to arrange collection and proper disposal of the filled bottles. Removal of all wastes from the general waste storage area shall take place at regular intervals as determined by the Director of Central Services and the Chemical Hygiene Officer.

5. Disposal of Especially Hazardous Wastes

Whenever substances of high chronic toxicity (section 3-B and Appendix 4) must be disposed of, the Hazardous Waste Coordinator and the Chemical Hygiene Officer shall be consulted to determine the safest disposal procedures and storage areas. These procedures will include all of the information listed in the disposal sections above, as well as those necessary to control the particular substance.

Answers to Frequently Asked Questions

The University is a **Small Quantity Generator**, which generates greater than 220 pounds, but less than 2200 pounds of hazardous waste per month.

Labeling:

All chemicals must be listed on the **label**, including non-hazardous chemicals like water, and approximate concentrations listed.

The **generator's name must be listed**, so the generator can be contacted if a question arises.

List the **pH of aqueous solutions**, if pH is below 2 or above 12.5.