

WASTE MANAGEMENT GUIDE

Creighton University

Environmental Health and Safety

www.creighton.edu/ehs

402-546-6400

Updated April 2021 by Mary Duda

Overview

With over 150 teaching and research labs, as well as other areas such as fine arts studios and operational activities, at Creighton University, a variety of waste is generated each day. This guide is intended to help Creighton personnel determine how best to handle waste generated in their spaces across campus.

Creighton's Environmental Health and Safety department (EH&S) is responsible for the proper handling and disposal of chemical waste; in this capacity, the department provides training and consultation to individuals and departments who generate waste to help them comply with various regulations.

EH&S can be reached by calling 402-546-6400 or on the web at <http://www.creighton.edu/ehs>.

Definitions:

- Biohazard: infectious agents or hazardous biological materials that present a risk or potential risk to the health of humans, animals, or the environment. The risk can be direct through infection or indirect through damage to the environment.
- Hazardous waste: See section regarding Hazardous Wastes
- Universal waste: Hazardous wastes that are common across all industries and have been granted less-restrictive storage and shipping requirements
- EPA: United States Environmental Protection Agency
- NDEQ: Nebraska Department of Environmental Quality
- RCRA: Resource Conservation and Recovery Act.
- EH&S: Creighton University Environmental Health and Safety

BIOHAZARDS, BIOLOGICAL WASTE, AND INFECTIOUS SHARPS

Biohazardous waste is to be decontaminated before leaving the university. Most of the waste can be autoclaved prior to disposal, while some waste will need to be incinerated. The responsibility for decontamination and proper disposal of biohazardous waste lies with the producing facility (*i.e.*, laboratory and department).

Disposal in bags or bins

All biohazardous waste must be placed in red or orange biohazard bins, boxes or bags. Both the outer container and the bag inside must be clearly labeled with the biohazard symbol and the word "Biohazard". These containers must be handled properly for disposal, as described below.

Autoclaving

Most biohazardous waste from the laboratories will be autoclaved on campus. Creighton requires the use of orange or red biohazard bags with a heat indicator, either on the bag or by using autoclave tape on the bags. After the waste has been autoclaved (decontaminated), it should be placed in the appropriate bin in the autoclave room for disposal.

Chemical treatment

In cases where autoclaving is not feasible or appropriate, some biohazardous wastes can be disinfected using an EPA-registered chemical disinfectant such as 10% bleach or 70% alcohol. It should be noted that bleach solutions lose their effectiveness over time and should be made fresh.

Regulated Medical Waste, including Sharps

A “sharp” is defined as any object that may be contaminated with an infectious substance and is able to cut or penetrate the skin or packaging material. The term includes needles, syringes, scalpels, broken glass, culture slides, culture dishes, broken capillary tubes, broken rigid plastic, and exposed ends of dental wires.

Sharps must be placed in a sharps container and never in regular trash. Sharps containers are available for purchase through vendors such as Fisher Scientific. Do not fill them more than 2/3 full and close and lock them when they have been filled.

There is no central location for disposal of biohazardous waste, as there is with chemical hazardous waste. Currently, each department has its own account with **Stericycle**, the hazardous waste disposal vendor. Contact your department administrator for more information on this.

Personnel responsible for signing the waste pickup manifest for Stericycle are required to complete Regulated Medical Waste training through CITI and the Research Compliance Office.

Do not recap needles.

HAZARDOUS WASTE/CHEMICALS

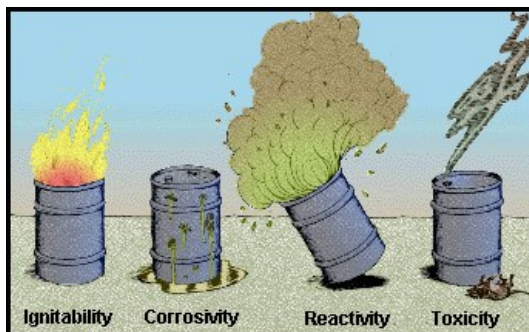
Hazardous waste is a waste with properties that make it dangerous or potentially harmful to human health or the environment. Hazardous waste is regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle C. In regulatory terms, a RCRA hazardous waste is a waste that appears on one of the four hazardous wastes lists or exhibits at least one of four characteristics. More information can be found in the Code of Federal Regulations, Title 40, Part 261, which can be accessed at <http://www.ecfr.gov> or Title 128 of the Nebraska Administrative Code.

Creighton University is a Small Quantity Generator (SQG) of hazardous waste and must follow all regulations related to this generator status. No chemicals may be disposed of in sinks without prior approval from EH&S. Please contact EH&S to determine proper disposal methods for your waste.

Characteristic Hazardous Waste: —

- Ignitability: Liquids with a flash point of 140°F or below, oxidizers, or spontaneous combustible materials
- Corrosivity: pH ≤ 2 or ≥ 12.5
- Reactivity: Materials that readily explode or undergo violent reactions; shock sensitive, explosive

- Toxicity: Wastes likely to leach dangerous concentrations of toxic chemicals into ground water. Substance undergoes a TCLP and contains specific quantities of at least one of the waste code numbers D001-D043



Listed Hazardous Waste (F-list, K-list, P-list, or U-list):

- Listed Hazardous Wastes from Nonspecific Sources (F-List)
- Listed Hazardous Wastes from Specific Sources (K-list)
- Listed "Acutely Hazardous" Waste, from discarded commercial chemical products (P-list)
- Listed "Toxic" Waste from discarded commercial chemical products (U-list)

Most of the hazardous waste at Creighton is "characteristic" waste. Typical wastes include: organic solvents; most waste acids, bases, and other corrosive materials; some materials containing heavy metals; explosives; and highly reactive materials, among others. Many discarded chemicals and laboratory reagents can also be included.

*Empty bottles and containers that contained **P-listed materials*** are also considered to be hazardous waste and must be disposed of as such. Common chemicals include *sodium azide, cyanides, nitro compounds, guanidinium/guanidine thiocyanate and osmium tetroxide*, although there are many more. Due to the university's status as a small quantity generator, there are limits of 2.2 kg/month that can be disposed of. If in doubt about whether a material is P-list and how to handle it, please contact EH&S for more information.

Aerosol cans: Aerosol cans are considered to be hazardous waste in Nebraska, *even when they are empty*. As such, they must be disposed of in an appropriate manner. Please contact EH&S to coordinate the disposal.

Flammables. Creighton has a variety of flammable liquids on campus. Common waste streams include xylene, ethanol, acetone, and other organic solvents. None of these can be poured down the drain, according to federal regulations, as well as city sewer restrictions. *This includes any alcohols*. More information can be found in the City of Omaha Municipal Code, Section 31-57.

Ethidium Bromide is not considered to be a hazardous waste by the EPA, but is considered a special waste due to its mutagenicity, and is therefore managed the same as hazardous waste. Solids, including gels, that contain ethidium bromide should be handled as hazardous waste. Liquid wastes containing

<0.5 mg/ml of ethidium bromide can be filtered using one of the commercially available products such as the S&S Extractor or The Green Bag. Please note that the saturated charcoal filters should be given to EH&S for disposal. Solutions with greater concentrations than those listed above should be given to EH&S for disposal.

Diaminobenzidine (DAB) is not considered to be a hazardous waste, but is a mutagen and possible carcinogen, and is therefore managed in the same way as hazardous waste.

HPLCs. High performance liquid chromatography (HPLC) is an analytical technique used to separate, identify, quantify, and purify individual components of a mixture. Creighton University has numerous HPLC units located in several laboratories around campus. Because organic solvents (e.g., methanol and acetonitrile) are used in the process, HPLC waste is regulated by the Environmental Protection Agency as hazardous waste. Please see the Appendix for more information on this topic.

Storing waste

Satellite accumulation areas are locations in a laboratory, studio, or room where hazardous waste is stored. According to the regulations, this area must be “at or near the point of generation” and “under the control of the operator” generating the waste. Please note that if waste will be moved from this “point of generation”, different regulations apply (see below on “moving waste from one room to another”). In satellite accumulation areas, the following rules apply:

- Waste must be stored in leak-proof, sealed containers that will safely contain the contents.
- Do not overfill a container with liquid waste. Allow an empty space of approximately five percent of the container volume for thermal expansion.
- The lid must be on the container unless it is being currently filled; do not leave funnels in the collection container.
- Do not mix incompatible chemicals.
- Do not mix hazardous materials with non-hazardous materials.
- Sharp items that have been contaminated with chemicals must not be disposed with medical/biohazard waste.
- Containers must be labeled with the proper chemical name and percentages of the substances.
- Containers must have the words “Hazardous Waste” and the date the container was started. Labels are available on the EH&S website or you may create your own.
- Chemical wastes should be segregated by waste type (e.g. flammables, acids, bases, poisons) such that incompatible substances will not mix or react.
- Chemical hazardous wastes should have the appropriate “Hazardous Waste Storage Area” sign on the cabinet or otherwise nearby the storage location. Signs are available from EH&S.
- Inspect the area daily to ensure the containers are not leaking or deteriorating and are properly labeled.
- More information on HPLC containers is available in the Appendix.

Tips for segregation of unwanted hazardous materials

Proper segregation of unwanted hazardous materials is important to enhance safety and to increase options for managing these materials. EH&S recommends the following:

- Evaluate possible mixing hazards before combining unwanted hazardous materials.
- Collect recyclable materials separately from non-recyclable materials.
- Collect unwanted hazardous materials separately from non-hazardous materials.
- Keep solids and liquids separate.
- Collect unwanted organic materials separately from metal-bearing and inorganic materials.
- Collect unwanted mercury, mercuric compounds, and mercury solutions separately from all other materials. Do not mix mercury solutions of different concentrations.
- Collect highly toxic materials, such as cyanide, separately from all other materials.
- Collect vacuum pump oil and machine oil separately from solvents.

Empty chemical container disposal

Most hazardous chemical containers are considered empty when as much material as possible has been removed through ordinary means (pouring, pumping, scraping, etc.) and there is less than 3% by weight of the original contents left in the container. Once these types of containers are empty, remove or deface the label prior to placing in the regular trash. Please place glass bottles in a broken glass box for the safety of our custodial staff.

The exception to this is containers that contained P-listed (acutely toxic) materials; please see the section on listed hazardous waste for more information. These empty containers must be treated as hazardous waste. Common chemicals that are included in this list are sodium azide, cyanides, nitro compounds, guanidinium/guanidine thiocyanate and osmium tetroxide.

Moving hazardous waste from one room to another

Typically, hazardous waste must be stored where it is generated. However, in some instances, it may be more prudent to store the waste in a different room. It is important to note that different rules apply to this situation. The rooms are called the “waste generation area” and the “hazardous waste accumulation area”. These steps are required by regulation; failure to follow them can result in a Notice of Violation from the EPA and/or a fine.

In the waste generation area (the room where the waste is being generated):

Label the hazardous waste as soon as you start using the bottle:

- The words “**Hazardous Waste**”
- The contents of the container

In the waste accumulation area (the room you are storing your waste in):

- Check your bottles weekly for signs of leaks or release of materials.
- Label the bottle with the date the material first entered the accumulation area. This is the date that starts the countdown until the bottle must be removed.
- A spill kit appropriate for the materials being stored must be available.
- Post a sign with an emergency phone number and the location of emergency equipment, such as the spill kit and fire extinguisher.

These containers can be moved between the accumulation area and the waste generation area but cannot be kept for more than **6 months** after the date it arrived in the accumulation area. Please coordinate with EH&S to remove the materials from this area to EH&S's storage room on a 3-6 month basis to coincide with the waste removal from campus.

Chemical spills and cleanup materials

All waste debris collected during a chemical spill clean-up must be packaged, labeled and disposed of as hazardous waste.

Anticipate spills by having the proper safety equipment on hand. For specific spill clean-up information, consult the MSDS or contact your supervisor, instructor or EH&S.

How to get hazardous waste removed

Hazardous waste is picked up on a quarterly basis. The pickups will be announced approximately one month in advance. The generator then sends a list of chemicals for disposal to the Chemical Coordinator in EH&S. These waste inventories will be due approximately 1 ½ weeks prior to the pickup, and EH&S will come to the labs during the week before the actual pickup date to collect the waste to prepare it for shipment. Between these regular pickups, please make arrangements with EH&S to have excess waste moved to the waste storage facility by contacting the Chemical Coordinator. *Please note that EH&S will not pick up improperly labeled waste.*

Notices of pickup dates will be announced via contacts in each department who then forward the information throughout the departments. Please contact EH&S to be added to the list of contacts.

There is no charge for the disposal of routine hazardous waste. Please understand, however, that in cases of willful neglect, hoarding, or materials that are extremely difficult to dispose properly, charges may still apply. A document outlining these special circumstances is [available here](#).

This only applies to chemical hazardous waste; individual departments will continue to contract directly with Stericycle for medical and/or biohazardous waste disposal.

OTHER TYPES OF WASTE

Sharp items (non-infectious), including glass

This includes any item that can poke through a trash bag, such as broken glass, pipets, slides, etc. which are not contaminated with toxic chemicals (more than a trace amount), radioactive materials (any amount), or biological substances (any amount). These waste materials are considered to be "clean" waste laboratory glassware.

While they are a hazardous waste or biohazard, they do have the potential to puncture skin and therefore should be disposed of in designated "broken glass" boxes. These containers can be commercially purchased Broken Glass boxes or any sturdy container such as a cardboard box or coffee can. Please tape the container shut with packing tape, label it as broken glass, and leave it in the hall for pickup by the custodial staff.

Please note that sharps that are contaminated with bodily fluid or other biohazardous materials must be handled as biohazards. Please see that section for more details. Further, syringes with needles, even if they are not infectious, should be placed in the Stericycle containers for disposal.

If laboratory glass contains or is contaminated with radioactive material or chemicals, then dispose of according to hazard.

DEA Controlled Substances

DEA controlled substances must only be in the possession of the registrant or their designee. EH&S personnel are not licensed to possess controlled substances and as such can not store or receive controlled substances.

The current method for destruction of controlled substances is to send them for incineration after placing them into the hazardous waste solvent drum. It is important to note that there must be some solvent inside the drum so that the controlled substance is non-recoverable.

To dispose of controlled substances, the registrant or designee must contact John Baxter or Mary Duda to set up a time for the disposal and to ensure that there is already solvent in the appropriate drum. The registrant or designee places the controlled substance inside the solvent drum, which contains flammable solvents such as ethanol, xylene, methanol, or acetonitrile, among others. The drum is shipped off-campus for incineration with the rest of the university's hazardous waste, typically on a quarterly basis.

At the time of disposal, the registrant should have filled out a DEA Form 41, [Registrant Record of Controlled Substances Destroyed](#). The registrant and the EH&S personnel sign the form, and the registrant retains the form for their records.

For information on other disposal methods available to DEA registrants (i.e. reverse distributors) please visit www.deadiversion.usdoj.gov or contact the DEA Special Agent in Charge of the Administration.

Radioactives

All radioactive materials are handled through the Radiation Safety Office. Please call the Radiation Safety Officer at 402-280-5570 for radioactive waste disposal.

Recycling/Universal Waste

Batteries: Rechargeable batteries are considered to be universal waste and must be recycled. Please contact EH&S to coordinate disposal. Alkaline batteries are not recycled and should be thrown in the trash.

Bulbs: Fluorescent bulbs/lamps are universal waste and must be recycled. They also must be stored in closed containers and properly labeled and dated. In most cases, labs do not generate enough bulbs to require a dedicated container; please coordinate disposal with EH&S.

General recycling (paper, plastic, metal). ~~The university participates in single-stream recycling; all metal, hard plastic, and paper can be placed in the blue recycling bins. The exception is bottles that contained solvents or other chemicals; the recycling plant will not accept these. Please note also that glass is not recycled in Omaha.~~ *(Update for 2020/COVID: The University has suspended single-stream recycling; it is hope that this service will return after the pandemic. In the meantime, recyclable materials can be taken to the Facilities Management building on the southeast corner of 18th and Cuming Streets)*

Trash

True trash – discarded materials that are not hazardous waste, biohazards, recyclable, or sharps (non-infectious or infectious) is picked up by the custodian in your building. Please do not overload the bag or put anything sharp into the trash.

Used Oil

Used compressor, pump, hydraulic or motor oils must be recycled. Collect used oil in proper containers (5-gal or less) which are labeled "Used Oil" and contact EH&S for pickup.

Oils may not be disposed of in the sanitary sewer or regular trash.

APPENDIX: HPLC (HIGH PERFORMANCE LIQUID CHROMATOGRAPHY) WASTE

(This section is used with permission of Purdue University.)

High performance liquid chromatography (HPLC) is an analytical technique used to separate, identify, quantify, and purify individual components of a mixture. This technique is very common in biology and chemistry research and there are numerous HPLC units located in labs in several buildings on campus. Because organic solvents such as methanol and acetonitrile are used in the process, HPLC waste is regulated by the Environmental Protection Agency as hazardous waste.

Containers collecting HPLC waste must remain closed while the HPLC unit is in operation. It is not an acceptable practice to place the waste line running from the HPLC unit into an open waste container as shown in Figure 1. Nor is it acceptable to use foil or Parafilm as a means of closure as shown in Figure 2.

Figure 1 – Improper HPLC Waste Collection Systems (Open)



Figure 2 – Improper HPLC Waste Collection Systems (Foil or Parafilm)



Proper Procedures

In order to comply with hazardous waste regulations for HPLC waste collection systems, one of the following methods must be employed:

1. Purchase an engineered container and/or cap designed for HPLC waste collection.
2. Modify an existing cap.

HPLC Accessories for Purchase

A container and/or cap designed for HPLC waste collection can be purchased by the research lab. There are several companies that provide HPLC waste accessories for purchase, such as Fisher Scientific, Justrite, VWR, and Grainger.

Figure 2 shows several examples of acceptable HPLC waste accessories that can be purchased.

Figure 2 – Proper HPLC Waste Collection Systems for Purchase



How to Modify an Existing Cap

An existing cap can be modified by the research lab for HPLC waste collection. To modify an existing cap, a hole can be drilled into a cap. The diameter of the hole should be similar to the diameter of the waste line; there should be a tight fit between the container opening and waste line. It is recommended that either a 4-liter container or 5-gallon carboy be used for waste collection. The modified cap should be replaced with a regular, unmodified cap once the container is full and ready for waste pickup. See Figure 3 for examples of acceptable modified caps.

Figure 3 – Examples of Modified Caps for Proper HPLC Waste Collection



