Chemical Waste Policy
Duke University/Medical Center
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Occupational Environmental Safety Office

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INTRODUCTION

PURPOSE

The Environmental Protection Agency (EPA) promulgated regulations under the Resource Conservation and Recovery Act (RCRA) of 1976, which established a "cradle-to-grave" management system for hazardous chemical waste. Duke University, as a Large Quantity Generator, is required to identify all hazardous wastes generated at its facilities and properly handle and dispose of these wastes in accordance with State and Federal laws.

RESPONSIBILITIES

Generators of hazardous chemical waste shall:

- Contact the Occupational and Environmental Safety Office, Environmental Programs Division;
- Read, understand, and comply with this policy;
- Minimize the quantities of waste generated;
- Comply with the procedures outlined in OESO practice EMP 1.3 *Laboratory Chemical Waste Management Practices*; and
- Properly store waste materials in the designated area.

Occupational and Environmental Safety Office, Environmental Program Division (OESO EP) will:

- Collect waste from the laboratory and other areas;
- Make hazardous waste determinations in accordance with RCRA guidelines;
- Prepare wastes for shipment and disposal;
- Provide assistance to generators as necessary; and
- Coordinate the chemical waste minimization program.

IDENTIFYING HAZARDOUS WASTES

Proper determination of chemical waste is the critical first step in a waste management program. Failure to identify regulated chemical waste could lead to environmental damage and civil penalties. Identification and labeling of materials within a storage area is the first step to responsible waste disposal.

PROCEDURES

REQUESTING A WASTE PICKUP

Pickups are requested online at www.safety.duke.edu, utilizing the Laboratory Safety Management System. If you are not listed in the Laboratory Safety Management System, then contact OESO Environmental Programs to be added to the system.

The pickup request system uses assigned barcode labels to facilitate the chemical waste pickup process.

CONTAINER MANAGEMENT

Waste chemicals accumulated either during the operation of a process or otherwise accumulated in the laboratory must be placed into containers that are in good condition and compatible with the collected waste. Each container should be clearly marked with the words "Waste (name of chemical)" and labeled with the date waste is first placed into that container. All containers must be kept closed unless adding or removing waste. Missing, corroded, or broken lids or containers will not be accepted until waste is transferred to an appropriate container for disposal.

> **NOTE: Biohazard bags are not an acceptable container for non-infectious chemical waste and will not be accepted for disposal.**

Areas where waste chemicals are accumulated must have secondary containment sufficient to collect incidental spills that might occur when adding waste to containers.

INFORMATION NEEDED FOR REQUESTING A CHEMICAL WASTE PICKUP

The following information will need to be entered into the online system when requesting a waste pickup:

- Building and Room number (where the waste is located)
- Barcode number (from the barcode label that you attached to the container of waste)

  A box containing three one-gallon bottles of Acetone waste can have one barcode label on the box (same type of waste). The same box containing a one gallon bottle of chloroform, a one gallon bottle of formaldehyde, and a one gallon bottle of acetonitrile must have an individual barcode label on each bottle (different types of waste).
- Container Type (metal, glass, plastic, bag, fiber)
- Container Size/Units(the total volume or weight of the waste container in any common unit)
- Physical State (solid, gas, liquid, gel)
- Unused (Identify any unopened chemicals that can be placed in the Chemical Exchange Program)

- Chemical(s) (list any chemical(s) that are in the waste container)

SPECIAL CASES

LABORATORY CLOSE-OUTS

All wastes and unwanted chemicals should be routinely purged from a chemical storage area. This practice becomes more critical when a facility is scheduled for relocation or renovation. All chemical users that are scheduled to move must consider waste chemical removal as part of their relocation plans and provide OESO with as much advanced notification as possible. Since lab close-outs are beyond the scope of normal OESO operations, the use of an outside contractor may be used to complete the cleanout. The associated contractor costs will be charged to the department for which the clean out was performed.

REQUIREMENTS FOR CYLINDERS AND COMPRESSED GASES

Users wishing to dispose of compressed gas cylinders should first contact the cylinder manufacturer or supplier and request they accept the unwanted materials as returned stock. If the manufacturer will not accept a return, the gas may be submitted to OESO for chemical waste disposal. As part of the cylinder disposal request, please include: the complete gas and percent composition contained within the cylinder, the approximate cylinder size, and whether the cylinder is full or empty. Any dissolved or liquefied gas submitted for chemical waste disposal should be accompanied by temperature parameters (if appropriate) as well as any solvents contained in the cylinder.

POTENTIALLY UNSTABLE SUBSTANCES

A potentially unstable substance presents a threat to life and health if it is moved. A few examples of potentially unstable substances are dry picric acid, dry perchlorates, elemental phosphorus, and old ethyl ether. These items are initially packaged for safety, but sometime after use they may become unstable.

Due to their potential hazard, these materials require additional inspection by OESO EP personnel and they may require additional preparation or treatment by trained reactives specialists.

UNIDENTIFIABLE CHEMICAL WASTES

Unidentifiable chemical wastes should be labeled as “Waste Unknown”, dated, and submitted to OESO EP for collection. Unknown chemical wastes must be removed from the generator’s chemical waste storage area no later than **30** days after being designated as no longer needed.

WASTE MINIMIZATION

The first and most important function of a hazardous waste management program is to minimize the amount of wastes generated. The effectiveness of this function represents a shared responsibility between the individual generators and OESO EP. Our current opportunities to minimize the wastes being generated at Duke include:

PRE-PURCHASE CONSIDERATIONS

Too many of the chemicals shipped as waste from Duke are unused. It is common for users to order quantities larger than what is needed to take advantage of large volume discounts. However, disposal costs for these unused portions largely outweigh any savings gained through high volume purchases. In addition, these excess chemicals present a safe storage challenge for the user as well as place an unnecessary burden on the hazardous waste system and the environment. With these considerations, persons ordering chemicals should purchase only the amount of chemicals which are reasonably needed.

INVENTORY CONTROL

Chemical inventory control systems can prevent the purchase of new chemical containers when the chemicals already exist. This reduces purchase time, purchase cost, and disposal cost. Implementation of an inventory control system across an entire department has the potential to create even greater savings in time and money. Inventories should be regularly purged for proper chemical management. Submit old or expired chemicals for disposal on a regular basis to avoid chemical stockpiles.

VOLUME REDUCTION

Chemical users should attempt to minimize the volume of waste produced by utilizing "micro" volume methods whenever possible. By reducing the aqueous components in samples, the total amount of waste generated for disposal will be reduced. Segregating wastes will also reduce the total volume of hazardous waste. Once a material is mixed with a hazardous waste the entire mixture becomes hazardous by definition. Simple separation of hazardous and non-hazardous components will effectively reduce the amounts of hazardous waste requiring disposal.

PROCESS CHANGE

One of the best waste minimization strategies is to change the process that generates the waste. This can result in lower costs and reduced hazards. Such process changes may include: switching to non-hazardous chemicals, changing concentrations of highly hazardous chemicals, or switching to electronics whenever possible. Replacing mercury-containing equipment such as thermometers or barometers with electronic equipment is already a policy in the hospital.

OFF-CAMPUS FACILITIES

Due to Department of Transportation laws pertaining to the transportation of materials on public road ways, OESO may transport waste containers only on Duke owned roads or on roads bordering Duke-owned property contiguous with the Campus. Therefore, off-campus facilities will need to obtain their own individual EPA identification numbers, implement their own hazardous program and designate dedicated waste accumulation areas. OESO will help schedule an EPA permitted contractor to remove waste from the off-campus facility at the next available opportunity.