Hazardous Waste Manual

Wichita State University
Environmental, Health & Safety Department

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1.0 Introduction

The guidance in this manual has been established to protect the health and safety of all personnel on campus and to meet hazardous waste management regulatory requirements.

The U.S. Environmental Protection Agency (EPA), and Kansas Department of Health and Environment (KDHE), regulate the generation, storage, and disposal of hazardous waste chemicals. These regulations apply to all hazardous waste generated by Wichita State University and impose specific requirements on all waste generators.

The Department of Environmental Health and Safety (EHS) provides the hazardous waste chemical management and disposal services for all Wichita State University main campus operations. Staff at outlying facilities must comply with the same federal and state regulations, and should contact EHS for questions about managing hazardous waste at their facilities.

In order for all campus personnel to properly dispose of hazardous wastes generated in their respective work areas, they must make accurate waste characterizations and disposal determinations. Guidance for making these characterizations, determinations, and their required waste management activities is provided in this document.

2.0 Responsibilities

Every student, staff, and faculty member is morally and legally responsible for ensuring the proper disposal of hazardous waste generated on campus. Various state and federal regulations govern the disposal of chemical wastes. There are also criminal and civil penalties that can result from improper disposal of these wastes. In addition to potential citations, fines, and imprisonment, improper waste disposal can also result in national media attention and damage to the University's reputation.

Willfully and knowingly violating federal or state regulations can result in criminal or civil prosecution of the individual.

University policies for environmental compliance can be found in Chapter 10 of the "Wichita State University Policies and Procedures Manual": https://www.wichita.edu/about/policy/index.php.

2.1 Liability

Individuals who knowingly choose to ignore the regulations may face civil or criminal proceedings by state or federal agencies.

2.2 Penalties

EPA regulators are authorized to fine non-compliances at a rate up to $37,500 per violation per day of occurrence. In general, EPA fines are much larger than any other federal agency.

Waste generators that fail to follow the EHS hazardous waste requirements are liable for the costs created by the disposal of their wastes, in addition to any regulatory fines that may be incurred.

2.3 Waste Generator Responsibilities

Individual investigators, supervisors, workers, students, laboratory staff, visitors, etc. are considered the actual originators (generators) of these regulated materials. Therefore, it is the responsibility of each generator to identify all hazardous wastes that he or she might be producing, and to assure the waste is handled in a manner consistent with the EHS requirements listed in this document.

Where EHS requirements identify solvents that must be collected separately for distillation and reuse, the waste generator must make every effort to segregate those solvents from their regular hazardous waste collection containers.

2.4 Principal Investigators / Functional Supervisors Responsibilities

For laboratories, the principal investigator (PI) or his/her designee, and for other campus work areas, the functional supervisor, have the responsibility to ensure the personnel working under their direction follow all policies and procedures established in this manual. General responsibilities include:

Attending Chemical Waste Disposal Training
Proper identification and labeling of chemicals.
Collecting all chemical wastes in accordance with established guidelines.
Cleaning up incidental spills (with the proper training and spill equipment).

3.2 Purchasing Chemicals

When ordering new chemicals, only order the amount of chemicals needed for the experiment being conducted. Do not order a larger size container for an experiment that will only last a semester or for an experiment that may occur in the future. Although chemicals usually cost less per unit when purchased in larger containers, when the actual usage, storage, and disposal are factored in, the cost savings diminishes significantly and may result in higher costs overall.

In addition, chemicals in large containers that are not used frequently can be rendered useless over time by contamination or degradation. In general, only order the minimum quantity of a chemical needed for the experiment, or one year's worth of stock at the absolute most.

3.3 Nonhazardous Substitutes

There are many nonhazardous substitutes for hazardous chemicals used in laboratories. Hazardous chemicals should be substituted with nonhazardous alternatives whenever possible, in particular thG5.r97T/F2 11.04 Tf1 0 0 1.d(s alte)7(rnm0d(b)3ec

4.0 Hazardous Waste Generator Requirements

The following describe the various requirements for managing hazardous waste for each of the different types of generators. Generator status is mainly dependent on the quantity of hazardous waste generated in a calendar month. Satellite Accumulation Area (SAA) is the name given to the- location (the lab or work area) where hazardous wastes are generated and stored before being moved to a central storage area.

4.1 Hazardous Waste Generation, Management, and Disposal:

RCRA established a nationwide hazardous waste management law. The EPA promulgates federal regulations governing hazardous waste generation, ma

Personnel generating hazardous waste must make a conscious effort to prevent chemical contamination of exterior surfaces of waste containers.

Additionally, the following are state and federal regulatory requirements for the management of hazardous waste containers:

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5.1 Listed Hazardous Wastes:

The EPA has four lists of hazardous wastes. Any waste with a contaminant meeting the definition of any of these lists is considered hazardous waste regardless of the hazardous characteristics. The Lists are found in 40 CFR 261 Subpart D.

5.1.1 F-Listed Waste:

These wastes are known as "Non-Specific Source Wastes." They are mostly spent solvents and wastewaters. Many of WSU's laboratories generate these spent solvent wastes.

5.1.2 K-Listed Waste:

These wastes are "Specific Source Wastes" Most are from industrial process wastes and are very specific to a particular industrial process. For example; K050…Heat exchanger bundle cleaning sludge from the petroleum refining industry. WSU does not generate any K-Listed Waste.

5.1.3 U and P Listed Waste:

U and P listed wastes are discarded commercial chemical products, off-specification species, container residues, and spill residues thereof. In general, they are unused materials containing only one active ingredient. Wichita State generates many of these wastes during lab cleanouts or disposal of outdated chemicals.

The main differences between U-Listed and P-Listed waste is that the P-Listed wastes are acutely toxic and the empty containers which held their material must be triple rinsed, and the rinsate collected and shipped as hazardous waste. Alternatively, using a Hazardous Waste label, manage the empty bottle as P-listed hazardous waste ensuring the listed chemical is identified on the label

5.2 Characteristic Waste:

In brief, the following are the characteristics that will cause a solid waste to be regulated as "hazardous waste":

5.2.1 Ignitability:

A liquid other than an aqueous solution containing less than 24 % alcohol by volume, having a flashpoint of less than 140°F.
A non-liquid capable under standard temperature and pressure of causing fire through friction, spontaneous combustion, and when ignited, burns so vigorously and persistently that it creates a hazard.
It is an ignitable compressed gas.
It is an oxidizer.

7.1 Concentrated Solutions of Acids and Bases:

Corrosive acids and bases are common wastes generated in laboratories on campus. Corrosivity is the only hazardous waste characteristic that may be treated by a generator onsite without an EPA permit.

Generators of corrosive wastes that have no other hazardous characteristics should neutralize the wastes to a pH between 5.5 and 9.5. The neutralized non-hazardous waste may then be drain disposed followed with a good water flush (20 parts of water).

Procedures for neutralizing acids and bases are described in the following three sections. Note: Neutralization is recommended only for very small volumes of corrosive acids and bases. You should only perform neutralization of corrosives if you have been trained, you feel confident that you understand the process, you have the proper personal protective equipment, and are comfortable doing it.

7.1.1 General Neutralization Procedures:

Perform neutralizations in a fume hood behind a safety shield, as vapors and heat may be generated.
Wear lab coat or apron, gloves and goggles. A face shield in combination with safety goggles is recommended. Please note, a face shield alone is not sufficient, safety goggles must be worn when using a face shield.
Keep containers cool during process, such as placing a beaker in a bucket with slushy ice.
Work slowly.
After neutralization is complete, dispose of down the drain followed by 20 parts water to the neutralized solution.
Follow the specific neutralization procedures below for the acid or base you are trying to neutralize.

7.1.2 Acid Neutralization:

While stirring, add acids to large amounts of an ice water solution (1:10) of base such as sodium carbonate, calcium hydroxide, or sodium hydroxide for concentrated acids.
When a pH of at least 5.5 to 9.0 is achieved, dispose of the solution down the drain followed by 20 parts water to the neutralized solution.

7.1.3 Base Neutralization:

Add the base to a large vessel containing water (1:10).
Slowly add a 1M 2 11.0W9e3u(g7.261 sq0.00000912 0 612 792 reW*nBT/F2 11.04 Tf1 0 0 1 72.024 244.97 Tm0 g3l2d)3

For more information on mercury and management of mercury at WSU, please contact the EHS department.

7.9 Fluorescent Tubes (Universal Waste Lamps):

Fluorescent bulbs and other hazardous lamps such as mercury vapor, high-pressure sodium lamps, high intensity discharge (HID), neon, and metal halide lamps are regulated as Universal Waste Lamps and must be disposed of properly. These items (including "green tip" bulbs) cannot be placed in the normal trash. Broken fluorescent tubes must be handled as hazardous waste. Every attempt should be made to keep these items intact and to prevent breakage.

7.10 Batteries (Universal Waste Batteries):

There is a program in place to recycle batteries (Ni-Cad, Lithium, Lead-acid, Mercury, and button batteries). There are a number of battery collection containers around campus for Universal Waste Batteries. Contact the EHS department if you would like to request a battery collection container Tm2 0 ltm(batB3(in)5(cl)12(u)3/)-7((o)-5(1/F21k.)10( )9(Thea, -4(an)4(r if

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Active ethidium bromide wastes may not be disposed of via the sanitary sewer or municipal trash without first being deactivated. Ethidium bromide wastes that do not fluoresce are considered to be inactive and could be acceptable for drain or trash disposal depending on the chemical constituents of the dye. There is a variety of options for disposal depending on the type of waste.

7.18.1 Ethidium Bromide Wastes:

Materials that do not fluoresce under UV light may be disposed of directly in the trash.

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ethidium bromide solutions of this dilute concentration are used, the product solution does not show excess mutagenicity over standards in the Ames test.

Note: To extrapolate this method to various concentrations of ethidium bromide, you want to add ~ 10mL of household bleach for every mg of ethidium bromide.

You should check the extent of completion of this process with a Ultra-Violet (UV) lamp. EtBr glows bright orange under UV. If you see no orange fluorescence under the correct wavelength of UV in the detoxified material, then it has effectively been degraded.

8.0 Hazardous Waste Disposal Procedures:

The following information must be included on each Hazardous Waste Disposal Request:

Building & Room: Indicates the area where the hazardous waste is generated and stored.
Name and Telephone Number: Identifies the individual faculty, staff, or student generating the hazardous waste and assuming responsibility for its description. This information is important if subsequent questions arise related to the waste.
Date: At Satellite Accumulation Areas in the lab or work area when the container is ready for removal to a 90 Day Accumulation Area, the date should be added to the label and an online Waste Pickup Request Form submitted. For 90 Day Accumulation Areas, the date the hazardous waste is first placed in the container must be written in this section.
Type: Identifies the general characteristics of the hazardous waste chemicals and indicates which classes of waste should not be mixed or packaged together to facilitate disposal procedures.
Chemical Name: Precisely identify the exact composition of the hazardous waste in each container. You must use words describing the waste e.g., “methanol” or “acetic acid”, etc. Hazardous waste consisting of multiple

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