



# INDIANA UNIVERSITY

OFFICE OF THE EXECUTIVE VICE PRESIDENT  
FOR UNIVERSITY ACADEMIC AFFAIRS  
University Environmental Health and Safety

## Indiana University Waste Management Program

October 30, 2017

### 1. INTRODUCTION

#### 1.1. Purpose and Background

Indiana University Environmental Health and Safety (IUEHS) has developed this Program to establish standard procedures for safe, environmentally sound and compliant management of wastes generated on any IU campus in accordance with all local, state and federal regulations. These regulations include but are not limited to the Environmental Protection Agency's Resource Conservation and Recovery Act (RCRA) hazardous waste regulations [40 CFR 239-282](#), and the Toxic Substances Control Act (TSCA) polychlorinated biphenyls (PCB) regulation [40 CFR 761](#).

#### 1.2. Scope

This Program applies to all faculty and staff of Indiana University that participate in any activity that results in a general refuse product of any kind, including but not limited to laboratory research, maintenance, grounds keeping, and academic instruction. The objectives of this Program are to protect human health and the environment in compliance with all government regulations by preventing the release of contaminants through sound, best management practices for waste generation, handling and disposal.

### 2. AUTHORITY AND RESPONSIBILITY

#### 2.1. Indiana University Environmental Health and Safety (IUEHS) is responsible for:

- Developing and implementing the Waste Management Program;
- Providing training and/or technical guidance on waste management requirements and procedures to all affected employees;
- Ensuring regulatory compliance and acting as the University liaison for regulatory agencies that oversee waste related activities and/or conduct on-site inspections;
- Maintaining waste contracts with vendors for the respective campuses; and
- Facilitating chemical wastes shipments.

#### 2.2. Departments are responsible for:

- Enforcing Waste Management Program provisions among employees;
- Ensuring that all employees who handle waste receive initial waste management training from IUEHS and task-specific training in waste management procedures as well as annual refresher training if required by this Program;
- Facilitating waste minimization efforts consistent with the IU Waste Minimization and Pollution Prevention program;
- Providing all necessary resources to manage all waste generated within the department in a safe and compliant manner;
- Reporting waste management non-compliance to IUEHS for the respective campus immediately upon discovery;
- Ensuring that all staff utilize the services of IUEHS for chemical waste pick-up and disposal for the respective campus; and
- Funding regulatory fines levied by state or federal agencies that result from mismanagement of waste by individual(s) within a department.

**2.3. Principal Investigators and/or Supervisors** are responsible for:

- Ensuring employees have access to [safety data sheets](#), and know the hazards of all chemicals used in their area;
- Ensuring that all employees who handle waste receive initial waste management training from IUEHS and task-specific training in waste management procedures as well as annual refresher training if required by this Program;
- Ensuring employees and students are properly instructed in the requirements of this program
- Ensuring standard operating procedures based on this Program are developed for waste management, waste minimization, and handling emergencies;
- Ensuring employees and students are supervised as needed when performing standard operating procedures;
- Enforcing Program requirements within their areas of responsibility; and
- Contacting IUEHS for the respective campus if a regulatory inspector arrives.

**2.4. Employees** are responsible for:

- Learning and following Waste Management Program requirements for comprehensive waste management;
- Assuming personal responsibility for compliant identification, labeling, storage, and disposal of all wastes generated as a result of his or her job duties; and
- Developing and implementing waste reduction methods whenever feasible.

### 3. Program Elements

#### 3.1. General Requirements

Waste materials are typically divided into four broad categories: biological, chemical, general refuse, and radiological. Each of these waste types has unique handling and disposal protocols based on regulations and best management practices.

General refuse is not covered by this Program except for certain non-regulated chemicals that require special handling in order to avoid impermissible or unsafe disposal.

Radiological and biological wastes are covered in the [Radiation Safety Manual](#) and [IU Biosafety Manual](#) respectively, and are therefore not detailed in this Program.

Untreated biological waste, regulated hazardous waste, and radioactive waste must not be placed in general refuse dumpsters. With limited exceptions, restrictions are also in place for drain disposal of certain waste types and disposal of debris that is contaminated with any of these waste types. Campus dumpsters and compactors must remain free of liquid or semi-liquid waste of any kind.

The primary focus of this Program is on chemical waste handling and disposal. This waste category is divided into five types based on regulatory requirements:

- **Hazardous waste** as defined in [40 CFR 261](#), incorporated by reference in [329 IAC 3.1-6](#);
- **Universal waste** as defined in [40 CFR 273](#), incorporated by reference in [329 IAC 3.1-16](#);
- **Polychlorinated biphenyl (PCB) waste** as defined in [40 CFR 761](#), incorporated by reference in [329 IAC 4-6](#);
- **Electronic-waste** as defined in [329 IAC 16](#); and
- **Non-regulated waste** with special handling requirements; this class includes materials for sewer disposal as well as materials that are not regulated, but present safety or logistical concerns due to their physical characteristics.

Detailed guidance for waste management is published in the *Indiana University Waste Management Guide* found in [Appendix B](#) of this Program.

### 3.2. Additional Guidance

Certain additional materials require special handling due to complex regulatory oversight. These can include:

- **Controlled Substances:** The U.S. Drug Enforcement Agency (DEA) regulates Schedule I-V controlled substances according to [21 CFR 1300-1321](#). Compliant recordkeeping and disposal of these materials is the responsibility of the authorized registrant. Registrants must be aware that certain controlled substances are also regulated as hazardous waste under RCRA. IUEHS can provide additional guidance, and has limited ability to provide disposal for controlled substances in accordance with DEA requirements. See the [IU Controlled Substances Program for Researchers \(Non-Practitioners\)](#).
- **Mixed Waste Categories:** Wastes that contain any combination of hazardous, biological or radiological waste can pose disposal challenges for IUEHS. The protocols for disposal of such mixtures vary by campus, and are outlined in the campus-specific waste management procedures found in the *Indiana University Waste Management Guide* ([Appendix B](#)).

## 4. TRAINING AND RECORDKEEPING

IUEHS personnel, trained in hazardous waste management, will provide classroom or online instruction to incoming employees that will be performing waste handling functions to ensure that employees understand their roles and responsibilities in order to comply with applicable waste management regulations.

All employees who transfer waste from the point of generation to a separate accumulation area or to an IUEHS storage location, must complete the applicable online Waste Management and Spill Response training annually.

It is the responsibility of supervisors, and/or principal investigators in the case of laboratories, to ensure that employees who will handle waste are identified, and that proper on-the-job training and annual training is completed as required in this Program. On-the-job training must include standard operating procedures for waste handling and emergencies.

## 5. REFERENCES

- [DEA Controlled Substance Regulations 21 CFR 1300-1321](#)
- [Electronic Waste Regulations 329 IAC 16](#)
- [Indiana University Mercury Reduction-Elimination Program](#)
- [IU Bloomington Waste Pick-up Request Form](#)
- [IUPUI Waste Pick-up Request Form](#)
- [Resource Conservation and Recovery Act, hazardous waste regulation 40 CFR 239-282](#)
- [Toxic Substances Control Act \(TSCA\) PCB regulation 40 CFR 761](#)
- [Indiana Department of Environmental Management \(IDEM\) policy for the management of solvent-contaminated wipes \(based on 40 CFR 260.10, 40 CFR 261.4\(a\)\(26\), and 40 CFR 261.4\(b\)\(18\)\).](#)
- [Indiana University Waste Minimization and Pollution Prevention Program](#)

## 6. REVISIONS

- April, 2015                      New Document
- October, 2017                    Annual Review

## **APPENDIX A - Glossary**

Best Management Practices – Methods or techniques found to be the most effective and practical means in achieving an objective (such as preventing or minimizing pollution) while making the optimum use of the firm's resources.

Biological Waste – Material that contains, or may contain pathogens that can cause disease in human or animals, or that poses any other risk requiring autoclave treatment or disinfection before final disposal.

CFR – Code of Federal Regulations

DEA – Drug Enforcement Agency

Electronic Waste – Includes electrical or battery operated devices, or appliances such as computers or lab equipment that require recycling or special disposal due to the presence of toxic metals or other contaminants.

EPA – Environmental Protection Agency

Hazardous Material – Any substance regulated by the Department of Transportation because the material poses an unreasonable risk to health, safety, and property during transport.

Hazardous Waste – Listed or characteristic waste regulated for handling and disposal as defined by the EPA Resource Conservation & Recovery Act.

IAC – Indiana Administrative Code

Non-Hazardous Waste – Waste that does not meet the definition of a RCRA hazardous waste; but may still be regulated as a hazardous material under Department of Transportation Regulations during transportation.

Non-Regulated Waste – Waste that does not meet the definition of a RCRA hazardous waste, and also does not meet the definition of a Department of Transportation hazardous material during transportation.

Polychlorinated Biphenyls (PCB) Waste – Waste contaminated with polychlorinated biphenyls in excess of 50 parts per million.

RCRA – Resource Conservation and Recovery Act

TSCA – Toxic Substances Control Act

Universal Waste – Certain wastes that meet the definition of a hazardous waste but have modified regulatory requirements to encourage recycling. Includes batteries, fluorescent light bulbs, mercury containing equipment and certain pesticides.

Waste Chemical - Any expired, spent or unwanted chemical or chemical mixture, including hazardous and non-hazardous wastes.

Waste Minimization - Procedures to minimize the volume and/or toxicity of hazardous waste produced at the University.

## **APPENDIX B - IU Waste Management Guide**



**INDIANA UNIVERSITY**

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FOR UNIVERSITY ACADEMIC AFFAIRS**

University Environmental Health and Safety

# **Indiana University**

# **Waste Management Guide**

Revised October 2017

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# Section 1: Introduction

Indiana University Environmental Health and Safety (IUEHS) developed this Guide based on local, state and federal regulations applicable to a broad variety of waste generated at the University. In addition, this Guide supplements Program requirements for the IUEHS Waste Management Program. **Read and follow this Guide carefully.** Indiana University employees play a vital role in the proper management of waste through their daily activities.

## 1.1 Purpose and Use of This Guide

This Guide serves as a resource for IU employees who participate in activities that generate waste from various campus operations. The primary focus is on chemical waste. Several key concepts are covered, including: an overview of waste regulations; waste minimization and recycling; IU waste collection programs; disposal of specific waste streams; and handling chemical spills. Hyperlinks throughout the text provide direct navigation to additional information as needed. This Guide does not address detailed procedures for managing radioactive or biological wastes. For more information, refer to the [Radiation Safety Program](#) or the [IU Biosafety Manual](#) as appropriate.

Each IU campus has unique infrastructure that requires certain procedures remain campus-specific. Therefore, some protocols are provided in campus-specific sections of this document.

## 1.2 Key Terms and Definitions

**Accumulation** – Continuous addition of waste into container(s); also refers to the time-period over which waste is collected and stored (e.g. “*accumulation* start date” on a waste label).

**Accumulation Container** – A container used to collect waste in a satellite accumulation area.

**Biohazard** – Biological material that contains, or may contain pathogens that can cause disease in humans or animals, or that poses any other risk requiring inactivation or disinfection before final disposal.

**Controlled Substance** – A drug or chemical whose manufacture, possession or use is regulated by the United States Drug Enforcement Agency (DEA).

**Consolidate/Consolidation** – Mixing similar wastes together, generally from smaller containers into larger accumulation containers.

**Cylinder** – A container used to store pressurized liquid or gas.

**General Refuse** – Items that can be discarded in campus trashcans, dumpsters or compactors because they do not pose hazards that require treatment, special handling or disposal.

**Generator** – A person or entity that creates hazardous waste.

**Hazardous Waste** – Materials defined as hazardous by the Environmental Protection Agency (EPA) due to hazards they pose to human health or the environment; includes listed and characteristic wastes (see [Section 2](#)).

**Personal Protective Equipment (PPE)** – Garment or equipment that employees wear to protect themselves against chemical exposure hazards. Examples include safety glasses, gloves, and lab coats.

**Satellite Accumulation Area (SAA)** – Any area where hazardous waste is generated and stored until containers are full, up to 55 gallons total for all waste (See [Section 2](#)). SAAs must be at or near the point of waste generation, within the same room.

**Universal Waste** – Classification of hazardous waste managed under a special exemption to encourage recycling of certain materials. These wastes are still subject to certain regulatory requirements. Materials that can be managed as Universal Waste are:

- Batteries
- Fluorescent light bulbs/lamps
- Mercury containing devices
- Pesticides

**Unknowns** – Unidentified chemical waste resulting from lack of proper identification or labeling.

**Waste Chemical** – Any expired, spent or unwanted chemical, chemical mixture, or chemical product, including hazardous and non-hazardous wastes.

**Waste Stream** – Generic term for either specific waste generated by a continuous process, or for wastes that are similar, but come from various campus generators. Examples include non-chlorinated solvents, HPLC waste, used oil, etc.

### 1.3 The Role of Environmental Health and Safety

The principal role of IUEHS is to serve as the primary University resource for all matters pertaining to occupational health, safety, and environmental management. IUEHS provides technical guidance, compliance assistance, quality assurance, remediation oversight, and training to the campus community.

For the purposes of waste management, the main role of IUEHS is to provide waste management oversight and services in conjunction with technical assistance, training, and support resources so that all IU employees are aware of their individual responsibilities in helping the University meet the following goals:

- Ensure all waste materials are managed in a way that protects the health and safety of faculty, staff, students and visitors to the University;
- Use the most responsible and environmentally sound management and disposal methods as are practical, and that prevent release into the environment;
- Reduce the quantity and/or toxicity of chemical waste generated by the University to the lowest level possible;
- Comply with all local, state and federal government regulations regarding waste management and disposal; and
- Make accurate determinations of regulatory status and sound disposal decisions for all waste generated at IU.

IUEHS will update this Guide as necessary to reflect any applicable changes in procedure or regulation.

## 1.4 IUEHS Contact Information

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<b>IUPD-IUPUI</b>			
	Emergency	(317) 274-7911	
	Non-Emergency	(317) 274-2058	<a href="mailto:police@iupui.edu">police@iupui.edu</a>
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## 1.5 Your Responsibilities

The success of the Waste Management Program depends on the conscientious efforts of all IU employees. When waste materials are mismanaged, they have the potential to threaten human health and pollute the environment. To ensure safety and compliance with the law, the first responsibility of all employees is to follow the procedures in this Guide. Additional individual responsibilities are to:

- Understand the hazards of all chemicals in your work area. Safety Data Sheets (SDS) must be available for all chemicals that you work with.
- Identify and label all chemical containers accurately and promptly so that unidentified wastes (“unknowns”) are not generated.
- Label, store and package wastes according to the procedures in this Guide until IUEHS for your respective campus can take possession of them and/or arrange for off-campus disposal.
- Contact IUEHS for your respective campus for assistance with questions on how to handle or dispose of a waste material.
- Include the waste minimization strategies outlined in [Section 3](#) of this Guide in written procedures when possible, and make every effort to reduce the amount of waste you generate.



## Section 2: Regulatory Overview

All waste must be evaluated to determine whether or not it is regulated as a “hazardous waste” under the Environmental Protection Agency’s (EPA) Resource Conservation and Recovery Act (RCRA). Through RCRA regulations, EPA requires that all hazardous waste be properly identified, labeled, stored, treated and disposed. From a regulatory standpoint, EPA and the Indiana Department of Environmental Management (IDEM) defines a hazardous waste as:

- A listed hazardous waste (specifically identified by an alpha-numeric code from one of four lists maintained by EPA), or
- Waste that exhibits certain hazardous characteristics (also identified with an alpha-numeric code) as determined by standardized testing procedures.

**IUEHS always makes the determination as to whether or not a waste is regulated by RCRA.** Usually the determination is based on information provided on the waste container, the Chemical Waste Label, and SDS. Occasionally, a waste sample must be analyzed to obtain more detailed information before a determination can be made. [Annex 1](#) details the RCRA regulatory requirements under which IUEHS makes hazardous waste determinations.

For practical purposes, IU employees should manage all chemical waste as hazardous unless otherwise specified in this Guide or IUEHS has specifically made an evaluation and determined that a waste can be managed in another way. It is important to note that some wastes are restricted from sewer or landfill disposal even if they are not regulated by RCRA as hazardous waste. Specific disposal guidance for the most common waste streams generated at IU can be found throughout this Guide.

It is also important to understand the following key concepts:

- Satellite Accumulation Areas (SAAs) are what EPA calls individual locations, including laboratories, where hazardous waste is generated. The requirements for management of waste in SAAs can be found in [Attachment B](#).
- Indiana University facilities are subject to routine, unannounced regulatory inspections. IDEM typically conducts these inspections; however the EPA also has this authority. Inspectors visit SAAs as part of the inspection process. Always be courteous and cooperative with regulatory inspectors if they visit your area.

## Section 3: Waste Minimization

As required by the EPA, IU has established procedures to minimize the volume and/or toxicity of hazardous waste produced at the University, and to manage any waste that must be produced in the most responsible way possible. Some waste minimization methods are outlined in this section, and more information can be found in the [IU Waste Minimization and Pollution Prevention Program](#).

### 3.1 Substitution

Often a non-hazardous or less toxic chemical can be used in place of a more hazardous chemical in a given process. Some specific examples can include:

- Citrus-based solvents instead of chlorinated solvents,
- Low VOC latex and water based paint instead of oil based paint,
- Eco-friendly alternatives for stripping instead of methylene chloride based strippers,
- Detergent or surfactant based cleaners instead of corrosive cleaners,
- Pump sprays instead of aerosol cans,
- Low-mercury “green” fluorescent bulbs or LED bulbs instead of high mercury fluorescent bulbs, and
- Baits, diatomaceous earth, borates or botanicals (like Pyrethins) instead of chlorinated pesticides or carbamates.

### 3.2 Volume Reduction

Whenever possible, do not mix hazardous chemical waste destined for IUEHS disposal with wastes that can be disposed through recycling, sewer or trash disposal. This increases the volume of regulated waste for off-site disposal. Another option is using micro-scale chemistry, which greatly reduces the volume of waste produced.

### 3.3 Inventory Management

Carefully maintain an inventory and ordering system that reduces unnecessary or surplus containers. Check your current stock before ordering new chemicals. It may also be possible to borrow chemicals from other departments, which can reduce costs.

Also consider that many chemicals have a limited shelf life. Please check inventory before ordering large quantities of stock chemicals, and do not buy materials in bulk unless there is a true need for large volumes of a reagent. *The amount saved by purchasing bulk quantities may be offset by excess, unneeded material that often ends up as waste.*

### 3.4 Recycling

Many types of waste can be recovered for recycling. This includes things like mercury, glycols, batteries, and oil. The specific materials that can be handled for recycling by IUEHS are different for each campus. Other departments collect general recycling and surplus property. Arrangements may also be made with an approved vendor for recycling materials such as scrap metal and fluorescent lamps. General recycling and surplus property are managed by Facilities Services/Physical Plant. Keep in mind, empty chemical containers cannot be recycled.

## Section 4: In-Lab Disposal Options

This section contains procedures specific to laboratory waste handled by laboratory personnel familiar with chemical operations. IUEHS collects a wide range of chemical waste from laboratories, but alternative disposal options are acceptable for some of these wastes. Refer to [Attachment A](#) of this Guide for a list of disposal options for common laboratory chemicals. [Contact](#) IUEHS for your respective campus for questions regarding any chemical not found in Attachment A. There are three basic routes of disposal of laboratory chemical waste:

- Sanitary sewer or trash disposal of non-hazardous materials;
- Acid-base neutralization, followed by sewer disposal. **Note:** *Any other type of treatment must be part of an experimental procedure to be considered legal;* and
- IUEHS management for offsite treatment or recycling - Campus-specific waste management procedures are found in Sections 5-7. Those sections outline how to correctly identify, package, and segregate waste; waste storage requirements; and IUEHS waste collection for both laboratory and non-laboratory operations.

### 4.1 Acid-Base Neutralization

Wastes designated in [Attachment A: Disposal Options for Specific Chemicals](#) for *acid-base neutralization* may be handled in-lab using the procedures below. Please note the following restrictions:

- Strong, concentrated acids or bases are limited to quantities of 25 milliliters (ml) or less, and must be diluted 10 to 1 before being neutralized and discharged to the sewer. Quantities that exceed 25 ml must be managed by IUEHS.
- Oxidizing acids including chromic, perchloric and nitric acids in any amount are to be managed by IUEHS.
- Acids or bases that contain heavy metals must be managed by IUEHS.

#### Neutralization Procedures

**Caution: vapors and heat are generated during neutralization.** Note that acid-base neutralization is not required for disposal with IUEHS. When in doubt, or if neutralization is not feasible, any material can be placed in disposable containers for IUEHS management.

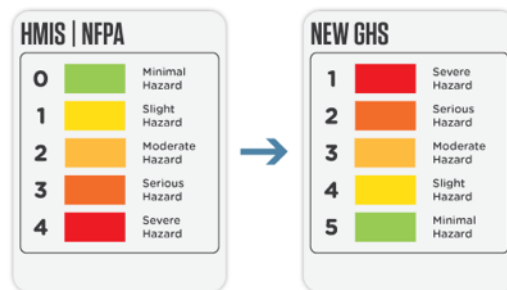
- Perform all steps slowly and keep containers cool while neutralizing.
- Acid neutralization: Make a basic solution using a large volume of cold water and an appropriate inorganic base. Stir the solution while slowly adding diluted acid.
- Base neutralization: First add the base to a large vessel containing water. Slowly add an appropriate inorganic acid.
- Allow the contents to react for 15 minutes to dissipate any heat before testing the pH. The container should not be hot, and the contents should not be smoking. If the container is still hot after 15 minutes, allow the reaction to continue until the heat has dissipated before continuing to the next step.

- Test the neutralized solution to confirm a pH between 5 and 9, and flush to the sewer with at least 20 parts water.

## 4.2 Sewer Disposal

Limited volumes of chemical waste can be disposed by sanitary sewer under certain conditions. If a material meets the following criteria\*, it may be flushed to the sewer with at least an equal volume of water.

- The material must have a Hazardous Materials Identification System (HMIS) or National Fire Protection Association (NFPA) rating of 0 or 1 for health and fire, and a rating of 0 for reactivity. These ratings can be found on the material's Safety Data Sheet (SDS) **and/or**;
- A GHS rating of 4 or 5 for health and fire, and 5 for reactivity. Note: As shown in the figure below, the Global Harmonized System (GHS) rating system is the **opposite** of HMIS and NFPA, with Category 1 materials exhibiting the highest level of hazard and category 5 exhibiting the lowest level of hazard;



**and;**

- Volume of material is limited to 5 gallons of chemical per discharge for liquids and 1 kilogram for solids **and**;
- Must be liquid or a water soluble solid **and**;
- Must not be a severe irritant or lachrymator **and**;
- Must not emit strong or noxious odors (examples include mercaptans (thiols) or amines) **and**;
- Must not be harmful to aquatic life or dangerous to the environment as specified on the label or SDS.

**\*Note:** Dilute solutions of some materials with a higher HMIS/NFPA rating before dilution are acceptable for sewer disposal.

Many common sewer-acceptable chemicals are listed in [Attachment A](#) of this Guide, including some solutions. Contact IUEHS for your respective campus with any questions.

## Section 5: IU Bloomington Waste Management

The success of the IU Waste Management Program depends on the cooperation and conscientious efforts of everyone on the IU Bloomington (IUB) campus. IUB EHS collects a wide variety of chemical waste from laboratories, shops, offices, etc. for off-site treatment or disposal. This section outlines the general procedures for managing waste from [laboratory](#) and [non-laboratory](#) operations on the IUB campus. Waste handling and disposal protocols for specific waste types commonly generated by both of these operations is also included. The procedures and methods provided must be followed to ensure your health and safety, as well as regulatory compliance. If you have any questions, [contact IUB EHS](#) immediately.

### 5.1 IUB Laboratory Waste Management

The following general requirements apply to waste generated by laboratory operations. Laboratories generate a large variety of waste types. Those waste types should be managed as hazardous waste, unless otherwise specified by this Guide or IUB EHS staff.

#### General Requirements

##### 1. Identify and label - *All waste must be identified and labeled!*

When a chemical waste is first created, its identity must be recorded. Waste accumulation containers are to be labeled at the time the first waste is added. If more waste is subsequently added to a waste container, constituents must be added to the container label as needed. Tags should not be dated until the container is ready to transfer to IUEHS. IUB provides a printable waste tag template ([Figure 5A](#)) that must be used to identify waste materials and to fulfill IU's waste minimization obligations. IUB EHS will not accept waste that is not labeled properly. If the waste cannot be identified, the requirements in Section 5.3 for [unknowns](#) will apply.

#### ***IUB EHS Waste Chemical Tag information:***

- A printable template for IUB EHS Waste Chemical Tags (“tags”) is available online at <http://ehs.iu.edu/docs/printable%20waste%20tags.pdf>.
- Tags must state each chemical constituent in the waste container and corresponding percentages. Waste constituents must be spelled out completely. Avoid acronyms, chemical structures or abbreviations. Provide percentages of all chemicals in a mixture, including water. The percentages must add up to 100%. Please write legibly.
- Affix tags to containers with a rubber band, twist tie, or tape. Or, an electronic version of the tag can be printed on adhesive stock and affixed directly to disposable containers, Ziploc® bags, or boxes of containers for disposal. An adhesive tag can be affixed to an index card for reusable containers - punch a hole in the corner and attach with a rubber band or twist tie, or place in a sleeve on the side of the container.
- A “Hazardous Waste Label” (Figure 5B) with general contents, and running log of specific container contents, may be used as an alternative to a tag while waste is accumulating in reusable containers, until it is presented to IUB EHS when a completed tag is required. Alternatively, each time a reusable container is emptied by IUB EHS, a new tag can be started, kept in a sleeve on the side of the container, and updated until it is presented to IUEHS to be emptied and the completed tag is provided to IUEHS. Neither the Hazardous Waste Label nor the waste tag should be dated until the container is ready to transfer to IUEHS.

- Waste chemicals in their original containers with legible, intact labels do not need to be re-labeled with a tag. However, the materials require a completed Hazardous Waste with Date label (date label) (Figure 5C) to be affixed on the container in a manner that does not obscure the chemical name. Small containers of the same material can be placed inside a closed Ziploc® bag or box, with a completed waste tag or date label. Note: If the bag or box does not close completely or the materials are different, each container will need a separate tag or date label.
- More than one tag per container may be used if extra space is needed. Be sure to fill in information on the top two lines of the continuation tag; sign and date all tags when the waste is ready to transfer to IUEHS.
- Do not date your tag until it is ready for disposal through a waste collection or IUB EHS pick-up. If you have close to 55 gallons of waste in your lab, and a waste collection or IUB EHS pick up is not scheduled within 72 hours, contact EHS immediately. Never exceed 55 gallons of waste in any one satellite accumulation area.
- Note: If your lab generates this quantity of waste on a regular basis, contact IUB EHS for further guidance.

2. **Ensure waste containers are appropriate and in sound condition** – Wastes collected by IUB EHS may be transported within buildings, on University streets, and eventually off of University property after storage for up to 90 days. Therefore, chemical waste must be packaged in containers suitable for extended storage and transportation.

Acceptable waste containers for common chemicals are as follows:

- Flammable and halogenated solvents: Four-liter glass solvent bottles, four or eight-liter Nalgene bottles, one or five-gallon size metal cans, any safety can, or any original solvent container;
- Strong acids and bases: Glass or compatible plastic bottles up to 4 liters in volume, original bottles preferred;
- Miscellaneous organic and inorganic reagents: Original containers or their equivalent.
- Do not use biohazard bags for storage of chemical waste.

All containers must have tight sealing caps or lids (no Parafilm® or tape in place of lids). If your waste is in a container that does not close or does not have a lid, you will need to transfer it to an acceptable container before presenting it to EHS. If you have any questions, contact EHS prior to presenting the waste for disposal.

**Notes:** IUB EHS provides 5-gallon buckets with lids and 1-gallon wide mouth plastic jars that can be used for collection of compatible wastes. If you are going to reuse a chemical container for waste, it is your responsibility to insure that it is completely free of residue from its original contents before adding any incompatible waste to the container, and also that any labeling from the original contents has been removed or **completely** obscured.

3. **Consolidate wastes wisely** –When waste consolidation is not performed properly, it can lead to increased safety risks and expense. However, using proper procedures for consolidating wastes can be an efficient way to save space and resources. The procedures below must be followed when consolidating waste:

- Compatible waste from the same or similar processes can be consolidated into one waste container. Never mix incompatible materials together in the same container. [Attachment C](#) provides more information on compatibility.

- Whenever possible, wastes that are different in form or chemical make-up (solids vs. liquid, solvents vs. aqueous) should be accumulated in separate waste containers.
  - Never consolidate wastes consisting of oxidizers, strong acids (such as nitric and perchloric), or water-reactive material with other wastes. These materials should be disposed as individual wastes in the form they are generated.
- Do not mix high hazard waste materials with low hazard waste materials, unless the experimental procedure requires it. Doing so may inadvertently create a large quantity of regulated hazardous waste where a much lower quantity may have existed otherwise.
- If consolidation is unnecessary, you are unsure whether or not your waste is compatible with the waste in an accumulation container, or your waste accumulation container is poorly labeled – do not consolidate. **Note:** *Never assume the contents of unknown or poorly labeled containers, and never consolidate unknown or unidentified wastes with other waste materials.*
- See Section 5.3 for specific information on consolidating [laboratory solvents, acids and bases](#), and [silica gel](#), as well as management of [empty containers](#) and [chemically contaminated items](#).

**4. Manage containers in accumulation areas properly** - Proper management of containers is imperative to ensure safety and compliance. Follow all requirements outlined in [Attachment B](#) in addition to the following:

- Ensure waste containers remain in sound condition as outlined in [Section 5.1](#).
- Keep ignitable waste away from ignition sources.
- Keep the outside of containers free of contamination.
- Do not over-fill containers. **Note:** *Full means 90% or less to allow for expansion within the container.*
- Do not use biohazard bags for the storage of chemical wastes.
- Safety cans are mandatory for ignitable solvents and advised for halogenated solvents. Safety cans must be in good working order (i.e. not rusted and able to spring closed and stay tightly sealed) or must be replaced. IUB EHS will request that cans be replaced when non-functioning cans are noted during a waste collection, and will confiscate cans if generators do not comply. IUB EHS does not supply safety cans. Glass bottles are discouraged, but will be accepted from labs that do not generate enough ignitable waste to justify maintenance of a safety can.
- See [Section 5.3](#) for specific information on the management of [peroxide-forming agents](#), [explosive or shock-sensitive materials](#), [air reactive materials](#), and [sharps](#).

**5. Dispose** – Once a waste accumulation container is full, or a chemical has been determined to be a waste, it should be transferred to IUB EHS for disposal as soon as reasonably possible.

- Laboratories at IUB may deliver chemicals to IUB EHS staff in Chemistry A027 during predetermined hours for waste collections, or [request a pick-up](#) depending upon location. See the online [Waste Collection Schedule](#) to determine the procedure for your location.

- Dispose of waste in a timely manner to ensure safety and compliance. *Reminder: If you have close to 55 gallons of waste in your lab, it must be transferred to IUB EHS through waste collection or pick-up within 3 days. Contact IUB EHS immediately if these options are not available within that timeframe.*
- EHS will not accept waste that is not properly packaged, labeled, and dated. Any container or label corrections must be made before IUB EHS can accept waste. [Call IUB EHS](#) for assistance before waste is presented for disposal.

**Figure 5A:**

**IUB EHS Waste Chemical Tag**

<b>WASTE CHEMICAL TAG</b>			
IUB Office of Environmental Health & Safety			
Bldg/Rm #:	<input type="text"/>	Lab Group or Dept.:	<input type="text"/>
Contact Person:	<input type="text"/>	Phone #:	<input type="text"/>
			<input type="text"/> <i>EHS date</i>
<b>COMPOSITION OF WASTE: Please list ALL chemicals and % composition (including water). DO NOT USE ACRONYMS OR ABBREVIATIONS!</b>			
Waste Name: <input type="text"/>			
Chemical Name:		% Composition:	
<input type="text"/>		<input type="text"/> %	
<input type="text"/>		<input type="text"/> %	
<input type="text"/>		<input type="text"/> %	
<input type="text"/>		<input type="text"/> %	
<input type="text"/>		<input type="text"/> %	
		<b>TOTAL: 100%</b>	
I certify this information is true, accurate, and in compliance with IUEHS label instructions; also, I have made my best effort to reduce the volume and toxicity of waste generated.			
Signature: <input type="text"/>		Date: <input type="text"/>	
To request a pick-up visit: <a href="https://apps.ehs.iu.edu/waste/main.htm">https://apps.ehs.iu.edu/waste/main.htm</a>			

**Figure 5B:**

**IUB EHS Hazardous Waste Label**

# HAZARDOUS WASTE

**ACCUMULATION**

START DATE \_\_\_\_\_

CONTENTS \_\_\_\_\_

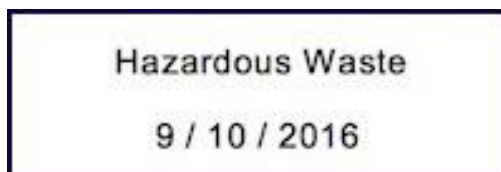
**HANDLE WITH CARE!**

**CONTAINS HAZARDOUS OR TOXIC WASTES**

**Figure 5C:**



## Hazardous Waste Date Label



### 5.2 IUB Non-Laboratory Waste Management

Non-laboratory operations, such as facilities maintenance, information technology support, and academic or administrative offices, are distinctly different from laboratories in the types and quantities of waste that they generate as well as the physical facilities and locations on campus. This section outlines the general requirements for managing non-lab waste materials. Additional guidance on handling and disposal of specific waste types is found in [Section 5.3](#).

#### General Requirements

1. **Identify** your waste. Below is a list of waste types common to non-research operations on campus. Information about each waste type can be found in Section 5.3. This information will guide you in identifying your waste and, for some wastes, in proper management of the waste. Unless the waste specific information indicates otherwise, this section must be followed for all wastes.

- [Aerosols](#)
- [Antifreeze/glycols](#) (under “non-hazardous waste”)
- [Asbestos containing materials](#)
- [Ballasts](#) (PCB and Non-PCB)
- [Cleaners](#) (under “chemical waste”)
- [Compressed gases](#) (propane, acetylene, etc.)
- [Electronic waste](#) (E-waste)
- [Fuels and fuel/oil mixtures](#) (under “chemical waste”)
- [Oil](#) (includes cutting fluid, hydraulic fluid, etc.)
- [Paint and paint products](#)
- [Pesticides](#) (under “chemical waste”)
- [Pool chemicals](#) (under “chemical waste”)
- [Solvent-contaminated wipes](#)
- [Spill cleanup debris](#)
- [Universal Waste \(batteries, fluorescent light bulbs, and mercury devices\)](#)
- [Unknowns](#) (unlabeled, unidentified materials that need to be disposed)
- [Water-based coatings, adhesives, detergents, and surfactants](#) (under “non-hazardous waste”)

2. **Label and date** – Regulations require that all waste containers be labeled to identify the contents. A label must identify the contents of the waste container. The description must be specific enough that a person who does not work in the area could read it and know what the material is and what hazards to expect. Containers must be labeled as soon as the waste is identified or, in the case of an accumulation container like a bucket or a drum, as soon as the first waste is added. Additional content information must be added as additional waste is added. IUB EHS requires that you use the Waste Chemical Tag (tag) [Figure 5A](#) or the Hazardous Waste Label (sticker) [Figure 5B](#). IUB EHS will provide stickers upon request. Tags can be printed online at [IUB EHS webpage](#).

Unless otherwise stated in this Guide, waste containers should not be dated until you are ready to transfer them to IUB EHS. You should manage the waste in your accumulation area

so that your total quantity of chemical waste (unless designated as non-hazardous by this Guide or EHS) remains under 55 gallons at all times.

**Note:** *If you are approaching 55 gallons of waste, that has not been designated as non-hazardous, in your accumulation area, and a waste pickup is not scheduled within 72 hours, notify EHS immediately.*

Some wastes, such as used oil, PCB ballasts, and Universal Waste have special labeling requirements, and different accumulation time limits. See [Section 5.3](#) under these specific waste types for guidance. Chemical waste should be managed as [hazardous waste](#) unless otherwise stated in this Guide.

3. **Consolidate wastes wisely** – Consolidating waste into fewer containers can be efficient and can save space and resources if done properly. However, it can lead to increased costs and safety risks if the guidelines below are not followed:
  - Accumulate different waste types in separate containers (solids vs. liquids, solvents vs. oil, oil-based paint vs. latex paint). This simplifies tracking of waste constituents in each container for labeling purposes, reduces the risk of reaction between incompatible wastes, and avoids costly generation of excess regulated hazardous waste from potential mixing of non-hazardous wastes with hazardous wastes.
  - When possible, avoid reusing plastic containers for liquid waste other than containers provided by or approved by EHS. Plastic breaks down over time especially when exposed to adverse weather conditions.
  - Choose an accumulation container size that fits the quantity of waste that you will generate in a reasonable amount of time.
4. **Manage containers in accumulation areas properly** – Good management of containers in waste accumulation areas increases safety for everyone involved in handling and transporting waste chemicals. All requirements in [Attachment B](#) in addition to the following must be practiced to ensure safety and compliance:
  - Label containers with an accurate description of their contents.
  - Keep containers closed at all times unless you are actively adding or removing waste.
  - Keep containers free of contamination on the outside.
  - Check containers for corrosion, leaks or other problems routinely.
  - Check product Safety Data Sheets (SDS) for information on ingredients and other hazard information to ensure proper storage with other materials.
  - Flammable liquids should be stored in approved containers. Do not store corrosive liquids in metal containers or drums.
  - Keep flammable waste away from ignition sources.
  - Only fill liquid waste containers to 90% full to allow for expansion.
  - Do not accumulate or store waste containers outdoors.
  - Do not use red biohazard bags or red sharps containers for storage of any wastes. If you have questions, [call IUB EHS](#).
5. **Package** – Containers must be packaged properly to be accepted by IUB EHS.

***For containers <5 gallons:***

- Each container must have a properly completed, signed, and dated tag attached with a rubber band, twist tie, or tape.
- The tag must list all of the ingredients of the waste and their percentages. The percentages must add up to 100%. No acronyms or abbreviations should be used on the tag.
- An SDS may be attached to the container along with the tag if the waste is a chemical product and you do not know all of the ingredients.
- Every effort must be made to ensure that waste containers are sound and that lids are tight sealing, even if that means the waste must be repackaged. If a problem with a container cannot be resolved, the container must be placed into an individual bucket with a lid, and the outside of the bucket must be labeled the same as the container would be. IUB EHS can provide buckets with lids as needed.

***For containers >5 gallons (drum quantities):***

- Ensure bungs are tightened, lids are secured, and there is no bulging from pressure build-up. Contact IUEHS before requesting a pickup for any containers that are missing bungs or have lids that cannot be secured.
- Each drum must have a properly completed Hazardous Waste Label or Waste Chemical Tag unless otherwise indicated in this Guide or by EHS.
- If the waste pickup area cannot be accessed with a drum cart, or is only accessible by stairs, waste must be stored in 5 gallon containers or smaller so that they can be carried out.

**6. Dispose** – Once a waste accumulation container is full or an unused chemical has been determined to be a waste, it should be transferred to IUB EHS for disposal as soon as reasonably possible. Keep in mind the regulatory accumulation time limits specified for some waste types in [Section 5.3](#), and remember that storing waste past the time limits can result in regulatory citations for the University.

- Unless otherwise indicated in this Guide or by IUB EHS, waste is picked up by IUB EHS on request during regularly scheduled pickups. See the online [Waste Collection Schedule](#) to determine when to expect a pickup after making a request. Once a waste is ready for disposal, ensure that it is packaged, labeled or tagged and dated. Then request a pick-up.
- Dispose of waste in a timely manner. IUB EHS offers ample opportunities for disposal. Safety and compliance is maximized when waste is disposed on a regular basis.
- At the time you offer your waste for pickup, make sure that it is properly packaged and labeled. Problems must be corrected by the generator before IUB EHS will accept the waste. [Call IUB EHS](#) before you are ready to transfer waste if you have any questions or need assistance.

## 5.3 IUB Management of Specific Waste Types

### Acids or Bases (Laboratory operations only)

This section explains the disposal options for solutions of acids, such as hydrochloric, nitric and sulfuric acid, and bases such as ammonium sodium hydroxide from laboratories. It is best to dispose of concentrated solutions of acids or bases with IUB EHS due to the difficulty of neutralization. Use only disposable containers for waste that will not be neutralized because these containers will not be returned to you. Wastes that have been pre-approved by IUB EHS for neutralization following the [neutralization procedures](#) outlined in Section 4.1 are listed in [Attachment A](#). If a material that you want to neutralize is not listed in Attachment A contact IUB EHS for approval.

#### 1. Concentrated acids

- $\leq 25$  ml and approved for sewer disposal in Attachment A - Follow neutralization procedures in [Section 4.1](#) or dispose directly with IUB EHS.
- $> 25$  ml or not approved for sewer disposal – Dispose directly with IUB EHS.

#### 2. Dilute acid solutions or concentrated or dilute base solutions with no toxic metals

- Approved for sewer disposal in Attachment A - Follow neutralization procedures in [Section 4.1](#) or dispose directly with EHS.
- Not approved for sewer disposal – Dispose directly with IUB EHS.

#### 3. Dilute acid solutions or concentrated or dilute base solutions containing toxic metals

- Dispose directly with IUB EHS. All toxic metal ingredients must be identified on the [Waste Chemical Tag](#). Many toxic metals are regulated hazardous wastes at very low concentrations, and IUB EHS must make that determination. See [Aqueous Solutions of Toxic Metals](#) for a list of metals that cannot be sewer disposed.

**Note:** Nitric and perchloric acids are not approved for neutralization or consolidation at any concentration.

### Aerosol Cans

Aerosol cans are pressurized, and often contain flammable propellants. Even empty aerosol cans remained slightly pressurized, and should not be thrown away. Refer all aerosol cans to IUB EHS for chemical waste disposal. An exception to this would be non-flammable compressed air dusters, which can be discarded as general refuse, after consulting the SDS for the material to ensure the air duster does not contain flammable propellants. All aerosol cans for disposal with IUB EHS must have a completed tag or date label.

### Air and Water Reactive Materials

Dispose of all air and water reactive materials, such as those listed below, through IUB EHS. Package any liquids separately from solids and note any special hazard and/or handling precautions on the [Waste Chemical Label or tag](#).

Acetyl chloride	Lithium metal	Sodium metal
Bromine	Phosphorus (yellow)	Thionyl chloride
Calcium metal	Potassium metal	Trichlorosilane

### Animals and Animal-Related Materials

Refer to the [IU Biosafety Manual](#) for disposal procedures for animals and animal-care-related materials.

## Asbestos Containing Materials

Asbestos containing materials (ACM's) are commonly found in older University buildings. Examples can include floor tiles, pipe insulation, plaster and caulk. The presence of asbestos in a building does not mean that occupant health is at risk. As long as ACM's remain in good condition, exposure is unlikely.

Do not remove or disturb asbestos containing materials. If asbestos or asbestos containing materials are found, immediately report the nature and location of the material to IUB EHS for evaluation. Whenever possible, isolate the asbestos containing material by restricting access to the area in which it is found.

## Aqueous Solutions of Toxic Metals

All aqueous solutions containing the following toxic metals must be disposed of by IUB EHS:

Aluminum	Chromium	Nickel
Arsenic	Copper	Selenium
Barium	Lead	Silver
Cadmium	Mercury*	Zinc

**Note:** For any solutions containing mercury, the [Waste Chemical Tag](#) must indicate whether the mercury concentration is less than or greater than 260ppm. If you are unsure, assume >260ppm.

## Ballasts

There are three types of lamp ballasts in use at IUB:

### *PCB Ballasts*

Polychlorinated biphenyls (PCB) containing ballasts are regulated by the Toxic Substances Control Act (TSCA), and must be collected by IUB EHS for disposal. These ballasts are hazardous because of the toxic fluid inside. PCB ballasts are found in older lighting fixtures. Lighting fixtures in campus buildings have been systematically upgraded over the last several years. When the fixtures are upgraded, they no longer use PCB ballasts. Eventually there will be no more PCB ballasts on campus.

IUB EHS will supply drums for collection of PCB ballasts. Employees must ensure that the drums are properly labeled (see [Attachment D](#)) and dated. Date drums as soon as the first ballast is added.

PCB ballasts are required to be disposed of within *one year* from the time that they are removed from service. [Call IUB EHS](#) to pick up the drum as it approaches 9 months old even if it is not full so that the disposal time limit is not exceeded.

### *Non-PCB Ballasts*

Non-PCB ballasts can be disposed in the regular trash or salvaged for scrap metal if an outlet is available. IUB EHS does not collect these ballasts.

### *Electronic Ballasts*

Electronic ballasts are essentially non-PCB ballasts that contain a Ni-Cd battery. The batteries must be removed and disposed through Facility Operations. These ballasts can be disposed in the regular trash or salvaged for scrap. IUB EHS does not collect these ballasts.

## Batteries (Universal Waste)

IUB EHS has chosen to manage *all* batteries as Universal Waste. There is a separate recycling exemption that applies to lead acid batteries only, and alkaline batteries are non-hazardous. From a practical standpoint, though, it would be impossible to get the University community to sort their batteries consistently enough to rely on, and there is not enough cost or regulatory burden savings to justify managing them separately.

See [Universal Waste](#) for more information.

### *General Rules for Universal Waste Batteries:*

(A [printable guidance document](#) is available at the EHS website.)

- Batteries should be in good condition and non-leaking. If there is visible evidence of corrosion, they must be placed in a closed container (a lid with a hole is not considered closed). *This is a regulatory requirement.* If there is no visible evidence of corrosion or leaking, a lid is not required on the container.
- Each battery or container must be marked with the words “Universal Waste” and a description of the material such as “used batteries”, or “spent batteries” as soon as it is collected or the first battery goes into the container. A printable label template is available online at <http://www.ehs.iu.edu/topics/waste-management/chemical-waste/waste%20label%20templates.shtml>.
- Each battery or container must be marked with the date that it was collected or the first battery went into the container.
- Each battery or container must be shipped offsite to an authorized Universal Waste handler for disposal before one year from the date marked to avoid violation of the regulations.

### *Battery Disposal at IUB*

Facility Operations manages battery disposal at IUB. Building Services maintains battery-recycling containers around campus for employees and University community members to use. These containers must be managed according to Universal Waste rules as soon as the first battery goes into them no matter where they are located on campus. IUB EHS may inspect any of these areas periodically to insure compliance with the regulation. Contact Building Services for a recycling container or for more information.

**Note:** *While EHS does not manage the accumulation and collection of batteries at IUB, we do provide oversight of the Universal Waste program. We may inspect any accumulation areas and require corrections to packaging and labeling if they do not meet the regulatory requirements. We also provide training to departmental personnel.*

## Biological Materials

Refer to the [IU Biosafety Manual](#) for disposal procedures for biological materials.

## Cardboard

Cardboard recycling at IUB is part of the larger recycling effort coordinated by Building Services and the Office of Sustainability. “Cardboard Only” dumpsters are located at the receiving docks of many campus buildings. A [Recycling FAQ](#) is available on the campus sustainability website.

Cardboard that is grossly contaminated with chemical(s) that exhibit flammable, corrosive, reactive and/or toxic characteristics should be placed in a sealed container and disposed through IUB EHS following the general procedures in [Section 5.1](#).

## **Chemical Waste**

Since IUB EHS determines which chemicals are regulated as hazardous waste, all unwanted chemicals should be managed as hazardous waste when discarded unless specific instructions in this Guide or from IUB EHS personnel state otherwise (See [Section 2](#)). Areas that generate hazardous chemical waste must follow the Satellite Accumulation Area Requirements in [Attachment B](#) as well as all IUB EHS general requirements for waste management in [Section 5](#) of this Guide. Discard chemical waste often to avoid deterioration of containers and labels. Waste must be removed from your satellite location within 3 days if you accumulate more than 55 gallons. This is a regulatory requirement. Waste pickups can be requested at <http://apps.ehs.iu.edu/waste/main.cfm>.

### ***Laboratory Operations***

Follow all general requirements in [Section 5.1](#) for any chemicals or chemical wastes to be discarded, and check [Section 5.3](#) for any additional requirements for specific waste types.

### ***Non-Laboratory Operations***

Non-laboratory chemical waste may be generated by maintenance, custodial, landscaping, or other facilities operations. Common examples include:

- Aerosols and cylinders such as propane tanks;
- Cleaning compounds (many are corrosive);
- Pesticides with toxic ingredients;
- Mercury and mercury debris;
- Paints (oil based), solvents, stains and adhesives;
- Pool or water treatment chemicals;
- Fuels and fuel/oil mixtures; and
- Spill debris from hazardous chemical spills.

Follow all general requirements in [Section 5.2](#) for any of the above materials or any other chemical product to be discarded, and check [Section 5.3](#) for any additional requirements for specific waste types.

## **Chemically Contaminated Items (CCIs)**

Chemically contaminated items (CCIs) such as disposable labware and gloves, bench top coverings, pipets, test tubes, aprons, etc. can be put into the normal trash if they are not reactive, ignitable, infectious, or radioactive; the contaminant is not highly toxic; and the material will not cause a nuisance or physical hazard when placed in the trash. If your CCI contaminant is not listed in [Attachment A](#) and you are unsure whether normal trash is an appropriate disposal route for your CCIs, contact IUB EHS for approval prior to disposal.

If your CCIs cannot be placed in the normal trash for one of the above reasons, package them in a 5-gallon-size plastic bag, at least 2ml thick (obtained through the Chemistry or Biology stores). These bags can be placed conveniently inside a 5-gallon plastic bucket for in-lab accumulation. Remove the bag from the bucket and close it with a rubber band, twist tie, zip tie, or by tying the top when it is full. Label the [Waste Chemical Tag](#) as "chemically contaminated items" or "CCIs" and list all chemical

contaminants. Contaminant concentrations can be listed as “trace.” [Call IUB EHS](#) if you have any questions.

**Note:** All PCB contaminated materials at  $\geq 50$  ppm must be packaged separately, and given to IUB EHS for disposal with the PCB concentration clearly indicated on the Waste Chemical Tag. **See also:** [PCB's](#).

### **Compressed Gases/Pressurized Liquids**

Compressed gas cylinders that are no longer wanted should be disposed in a timely manner to prevent deterioration of the containers, valves, or labels. Leased cylinders should be closed, capped and returned to the original gas supplier. Non-returnable cylinders such as lecture bottles and disposable fuel bottles must be referred to IUB EHS for disposal. Indicate on the cylinder whether it is at atmospheric pressure (empty), or if it is above 1 atmosphere of pressure (not empty). See [Section 5.4](#) for additional information regarding potential charges for non-returnable cylinders. **See also:** [Aerosols](#).

### **Contractor-Generated Waste**

Contractors may generate a variety of wastes during construction and renovation projects. It is the responsibility of the contractor to ensure that these wastes are accumulated on site in accordance with all applicable regulations, and disposed properly by the time the project closes. However, in the case of regulated wastes, IUEHS reserves the right to approve or reject proposed disposal methods and/or facilities. For hazardous waste (such as lead paint debris), universal waste, and PCB waste, IUEHS must be provided with signed disposal documentation within five days of receipt by the designated disposal facility. For hazardous waste disposal, a representative of IUEHS must be contacted to sign the Uniform Hazardous Waste Manifest unless the contract specifically designates the contractor as an agent of Indiana University for purposes of signing manifests.

### **Controlled Substances**

Controlled substances are regulated by the US Drug Enforcement Agency (DEA) on Schedules I-V. These materials require registration with the DEA, careful inventory protocols, and documentation of on-site destruction. For disposal instructions, refer to the [IU Controlled Substances Program for Research \(Non-Practitioners\)](#). IUB EHS performs witness-destructions onsite in the presence of the original registrant and IU Police after proper DEA notification has been made, in accordance with regulatory requirements. If for any reason the original registrant cannot be present, IUB EHS will coordinate with the registrant or registrant’s departmental representative (in the case of abandoned materials or a deceased registrant), IU Police and the local DEA office to arrange for on-site destruction or disposal.

### **Electronic Equipment**

Electronic waste (E-waste) contains toxic metals in components like screens and circuitry, but is exempt from hazardous waste regulations as long as the equipment is intact. Most e-waste is currently managed at IUB by Surplus Stores. Request a pickup of electronic waste by filling out the online [Surplus E-Waste Form](#). If equipment is crushed and leaking, contact IUB EHS for guidance. Examples of common e-waste at IUB include:

- Computer monitors
- Printers
- Mobile phones
- Video equipment
- Speakers
- Laptops



## Empty Containers

Bottles and containers are considered “empty” when you have removed all contents possible by normal means (pouring, scooping, etc.). Slight residue may remain, but these containers can generally be placed in the normal trash (see table below). Some buildings provide a special dumpster for glass containers. Consult building policies or your building safety officer. To prevent re-use, punch a hole in 5-gallon containers or safety cans that are no longer needed, and place in the normal trash dumpster. A non-sparking pick is available in Chemistry A027 during waste collection hours for safely punching holes in metal containers that held ignitable materials.

### Empty Container Management

Contamination Type	Residue Amount	Container Type	Handling Procedure
Non-Reactive Chemical/ Pharmaceutical	Minimal/ None	Glass	Remove and discard lid. Pour out all free liquid. Allow residue to dissipate under hood. Deface labels, place in sealed box, and dispose box in regular trash.
	Minimal/ None	Plastic	Remove and discard lid. Pour out all free liquid. Allow residue to dissipate under hood. Deface labels and dispose in regular trash.
	Gross Contamination	All	Tag and dispose with IUB EHS.
Air or Water-Reactive Chemical	Any	All	Purge container so that residue is eliminated or no longer reactive, deface labels, and dispose in regular trash. (Put in sealed box for trash disposal if the container is glass.) OR Tag and dispose with IUB EHS.
<u><a href="#">Acutely Hazardous (P-Listed) Waste</a></u>	Any	All	Tag as “empty container, last contained _____” and dispose with IUB EHS.
Biological	Any	All	<u><a href="#">Dispose as biological waste.</a></u>
Radioactive	Any	All	<u><a href="#">Dispose as radioactive waste.</a></u>
Gas	Any	Returnable Cylinder	Arrange return to vendor**
Gas	Any	Non-Returnable Cylinder	Tag and dispose with IUB EHS*
Gas/Pressurized liquid	Any	Sure-Pack	Tag and dispose with IUB EHS*
Gas/Pressurized liquid	None	Sure-Pack	Purge according to manufacturer’s guidelines and remove valve, mark as empty, give to IUB EHS.

Aerosols	Any	Aerosol can	Tag and dispose with IUB EHS.
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\*Due to the high disposal costs of many materials purchased in cylinders and Sure-Packs, EHS charges the cost of disposal for these items back to the generating department. It is up to each department whether to pass that cost back to the individual researchers.

\*\*Because lease/maintenance and return agreements for returnable cylinders are generally arranged and maintained by parties outside the purview of EHS, if those agreements are abandoned and EHS must arrange disposal or return of these items – costs are charged to the generating department. It is up to the department to decide if they want to pass that cost back to the individual researcher or not.

## Ethidium Bromide

Ethidium bromide is a strong mutagen that, in its pure powder form, is also highly toxic by inhalation. Although solutions at the concentrations typically used in electrophoresis are relatively low toxicity, ethidium bromide preparations including stock solutions and gels are collected by IUB EHS for disposal as chemical waste.

Solutions, gels, and contaminated solids such as filter paper, gloves, and pipette tips, must be accumulated separately. Solutions and gels must be accumulated and disposed in rigid containers, while contaminated solids may be accumulated in plastic bags for disposal. One-gallon wide-mouthed plastic jars and five-gallon plastic buckets are available from IUB EHS for waste accumulation.

## Explosive or Shock-Sensitive Chemicals

If you have an explosive or shock-sensitive material for disposal, [call IUB EHS](#) for assistance. Many of these materials become less stable over time or as they dry out. Therefore, they should never be stored in a desiccator, or under any other condition that would allow for the material to dry out. Do not store unused amounts for an extended period of time. See [Section 5.4](#) for additional information regarding potential charges for disposal of high-hazard materials. Potentially explosive chemicals include:

- Aged peroxide forming agents,
- Diazo compounds,
- Dinitro compounds,
- Hydrazine compounds,
- Nitrocellulose,
- Dry picric acid, and
- Trinitrotoluene

## Fluorescent Light Bulbs (Universal Waste)

Fluorescent light bulbs come in different sizes and shapes; long, straight lamps used in ballast operated light fixtures, or compact fluorescent bulbs used in place of incandescent bulbs. All fluorescent bulbs or lamps contain a small amount of mercury. Bulbs known as “green” or “green tip” contain mercury in low enough amounts to be exempt from waste regulations. They can be distinguished from higher level mercury bulbs by their green endcaps or other markings. Bulbs that are not “green” must be managed as Universal Waste. Collecting green lamps along with regular lamps for Universal Waste recycling is encouraged, but not required. Bulbs that are not “green” must be managed as Universal Waste.

See: [Universal Waste](#) for more information.

### ***General Rules for Universal Waste Bulbs:***

(A [printable guidance document](#) is available at the IUB EHS website.)

- All used bulbs must be stored in a **closed** container to protect against breakage as soon as they are collected.

- Use boxes that the bulbs came in or round fiber drums provided by the disposal vendor. Make sure to use a box or drum that is long enough to fully cover the entire length of the bulbs in the container. Fill containers carefully to avoid breaking bulbs.
- Each container must be marked with the words “Universal Waste” and a description such as “Used Bulbs” or “Used Lamps” as soon as the first bulb goes into the container. A printable label template is available online at <http://www.ehs.iu.edu/topics/waste-management/chemical-waste/waste%20label%20templates.shtml>.
- Each container must be marked with the date that the first bulb went into the container.
- Each container must be shipped offsite to an authorized Universal Waste handler before one year from the date marked on the container to avoid violation of the regulations.
- If a bulb breaks before it is placed into a container, it is no longer a Universal Waste. The debris from the cleanup of the broken bulb must be managed as hazardous waste. Follow the general requirements set out in Section 5.2 of this Guide for management and disposal of hazardous waste.

\*The [bulb cleanup procedure](#) can be found at the IUB EHS website.

### ***Disposal of Fluorescent Bulbs at IUB by location:***

- **Facility Operations** - bulbs from fixture lighting in areas maintained by Facility Operations are collected, stored, and shipped by Building Services and Zone Maintenance personnel.
- **Residential Programs and Services (RPS)** - bulbs from fixture lighting in areas maintained by RPS are collected, stored, and shipped by RPS personnel.
- **All other areas or buildings at IUB** - bulbs from fixture lighting from all other areas aside from Facility Operations and RPS must be collected and stored according to the rules above for Universal Waste bulbs. Offsite shipping arrangements must be made by the department or contractor responsible for the area or building, and shipping documents must be available to IUB EHS upon request.
- **IUB EHS** – specialty bulbs from any campus location, including bulbs from specialized fixtures such as some outdoor lighting, sodium discharge lamps, high intensity discharge lamps, and mercury vapor bulbs, are managed by IUB EHS. Package and label bulbs according to the general rules for Universal Waste bulbs and [request a pickup](#) from IUB EHS within 9 months.

**Note:** *While EHS does not manage the storage and disposal of all bulbs at IUB, we do provide oversight of the Universal Waste program. We may inspect any accumulation and storage areas and require corrections to packaging and labeling if they do not meet the regulatory requirements. We also provide training to departmental personnel.*

### **General Refuse (Trash)**

Non-recyclable, non-hazardous refuse (trash) should be placed in designated area trashcans or dumpsters. Liquids and semi-liquids are prohibited from disposal in campus dumpsters and compactors. Broken glass must be placed into a rigid cardboard box and clearly marked with the words “BROKEN GLASS”.

Treated biological waste containers must have autoclave indicator tape placed on them in order to confirm they were autoclaved prior to disposal in the general trash. Biohazard symbols must be completely marked out or removed.

Dust forming materials must be containerized to eliminate release in the dumpsters and/or compactors.

## **Glass Waste**

Glass, whether intact or broken, should be disposed in a rigid container such as a cardboard box unless it is placed in "Glass Only" dumpster. Boxes that contain broken glass must be marked with the words "Broken Glass" highly visible on the outside of the container before they are placed into a general use dumpster. Broken glass accumulation buckets are located in many labs that can be emptied into glass dumpsters. Ensure all glass bottles are empty and free of chemical residue before placing them into a dumpster or glass accumulation bucket.

## **Lead**

Lead has many uses, and is common at IU. The most common lead wastes at IU outside of laboratories are lead paint debris, lead acid batteries, and lead sheeting.

Lead acid batteries are managed by Facility Operations. Lead sheeting should be recycled with a reputable metal salvage facility.

Lead paint removal projects can generate both stripping solution waste and lead paint debris. Often, the stripping solution is diluted from project activities, but IUB EHS must determine if the solution is corrosive or contains regulated levels of lead. Therefore, stripping solution waste must be collected and tested for lead content by a reputable analytical laboratory prior to disposal. Lead paint debris is hazardous for lead content and must also be collected and disposed.

## **Mercury and Mercury Compounds**

Mercury and mercury compounds are limited by the [IU Mercury Reduction and Elimination Program](#), to approved essential uses. If you have mercury or mercury compounds that have not been approved, you must seek approval or dispose of them with IUB EHS.

Free-flowing metallic mercury must be accumulated in tightly sealed and leak-free containers.

Broken mercury thermometers should be placed in a one-gallon over-pack (obtainable from IUB EHS) or a secured plastic bag and bring to dispose with IUB EHS. Spirit, or other non-mercury, thermometers should be used whenever possible to avoid the contamination and exposure issues associated with mercury.

## **Mercury Containing Devices (Universal Waste)**

Mercury containing equipment includes devices, items, or articles, which contain elemental mercury that is integral to their function, and contained in ampules or otherwise enclosed intact. Examples are:

- Thermostats,
- Thermometers,
- Barometers,
- Mercury switches, and
- Specialty meters, regulators, and gauges.

These devices have been given an exemption from full hazardous waste regulation to be managed as Universal Waste as long as they are properly recycled. Devices must be intact and not leaking mercury to qualify for the exemption. Devices that contain mercury should never be thrown in the trash or sent to surplus.

**Note:** The Universal Waste exemption does not apply to metallic mercury that is not contained in a device or to mercury-contaminated debris.

See [Universal Waste](#) for more information.

### ***General Rules for Universal Waste Mercury Devices:***

(A [printable guidance document](#) is available at the EHS website.)

- Devices and equipment must be placed in containers such as buckets or drums provided by IUB EHS, or in boxes that can be closed securely.
- Mercury must not be leaking from the equipment.
- Containers must be closed at all times when a device is not being added.
- Containers must be labeled with the words “Universal Waste – mercury-containing equipment” and the date that the first item was added. A printable label template is available online at <http://www.ehs.iu.edu/topics/waste-management/chemical-waste/waste%20label%20templates.shtml>.
- Each container of mercury-containing equipment being managed as Universal Waste must be shipped off campus to an authorized Universal Waste handler before one year from the date marked on the container to avoid violation of the regulations.

### ***Disposal of Mercury Devices at IUB:***

EHS manages the off-site disposal of mercury-containing equipment. In order to insure that containers are shipped off campus before one year to remain in compliance with regulations, pickups must be requested for all containers once their dates reach 9 months. Pickups can be [requested online](#) at the IUB EHS website. EHS may inspect accumulation areas periodically to insure compliance with Universal Waste requirements.

## **Mixed Waste**

Mixed wastes are those that pose multiple hazards including biological, chemical and/or radiological. Handling and disposal of mixed wastes can be complex due to overlapping regulatory requirements and restrictions imposed by treatment facilities. IUB EHS cannot dispose of waste that is radioactive, or that poses both chemical and biological hazards.

### ***Radioactive Mixed Wastes***

In general, if a mixed waste is radioactive it must be decayed in-lab according to [IUB Radiation Safety](#) protocols first. If you will be generating a radioactive mixed waste with a long-lived isotope, you must contact IUB EHS before you begin generation or as soon as you know you have it if it was unintentional. All waste containers must be fully and accurately labeled with the date of generation, the isotope, and the chemical or biological components.

### ***Biological and Chemical Mixed Wastes***

Wastes that contain a mixture of both biological and chemical components must be evaluated to determine if the chemical in the waste has deactivated/disinfected all biological hazards present. If not, the generator must add an adequate volume of an approved disinfectant or fixative that is chemically compatible with the waste such as ethanol, bleach, formalin, etc. The generator of the waste must certify that it has been disinfected, and communicate with IUB EHS the type and volume of chemical disinfectant or fixative used.

## Nonhazardous Waste

### *Laboratory Operations*

Most chemical waste is handled by IUB EHS. However, you might have some nonhazardous waste listed as acceptable for sewer or trash disposal in [Attachment A](#) of this Guide.

Chemicals (liquids and solids) can be flushed to the sanitary sewer if they are:

- water soluble,
- degradable in the sanitary sewer system, **and**
- non-toxic.

Solid chemicals or spill clean-ups that are not water soluble, but are non-toxic, and do not present any other safety hazard or nuisance, can be disposed in the regular trash. All chemicals poured into the sewer must be followed by at least 20 parts water.

**Notes:** *If you intend to dispose of more than one liter of a non-hazardous liquid or 5 pounds of solid, or if the material is not listed in Attachment A of this Guide, contact IUB EHS for pre-approval.*

### *Non-Laboratory Operations*

Some materials are not hazardous, but still cannot be disposed directly into the trash because of landfill restrictions. The most common restriction encountered is that liquids and semi-liquids are not allowed to be landfilled. Many oils, latex paint, and other water-based materials are non-hazardous and could be landfilled if they were solid, but cannot be when they are liquid.

Spill debris from non-hazardous wastes can be discarded in the trash, as long as all free liquid is absorbed. Minimal amounts of liquid in otherwise empty containers of non-hazardous wastes can be absorbed with kitty litter or other suitable absorbent material and disposed in the trash also.

Common examples of non-hazardous chemical waste include:

- Antifreeze and other glycols;
- Latex paint;
- Non-toxic pesticides (such as dormant oil), fertilizers and plant food;
- Oils (non-PCB) and cutting fluid; and
- Water-based coatings, detergents and surfactants.

## Oil

Various types of oil, including vacuum pump oil, motor oil, cutting oils, etc., that is not contaminated with solvent or other chemicals, may be referred to IUB EHS for used oil management or arrangements may be made with an approved vendor. Contact IUB EHS for approval of used oil management vendors. Oil containers must be labeled as “used oil” while being accumulated.

Any used oil that is contaminated with other chemicals must be accurately described and disposed as a chemical waste through IUB EHS. If the oil contains PCB, the generator must indicate such on the label and as part of the chemical description on the waste pick-up request form. The concentration of PCB in parts per million (PPM) should also be listed if known. Oil containers must be labeled as “used oils” while being accumulated.

**See also:** [Polychlorinated Biphenyls](#), [Vacuum Pump Oil](#)

## Paint and Paint Products

Latex paint that is still in good condition, even if the container has been opened, should be referred to Surplus Property for re-distribution or sale. Paint that is no longer useable, contains lead, or is oil based, as well as spray paint, must be referred to IUB EHS for chemical waste disposal. For lead-based paint chips, see: [Lead](#).

## Peroxide-Forming Agents

Peroxides are low power explosives and are very sensitive to shock and heat. A variety of organic compounds react with oxygen from the air to form unstable peroxides. One of the following conditions must be met before peroxide formers may be accepted by IUB EHS for disposal. These are requirements enforced by our disposal contractor, as well as good laboratory safety practices.

- The material must be **less than twelve months old**. This information must be marked clearly on the Waste Chemical Tag.
- If the material is **greater than twelve months old but less than two years old**, check for peroxide formation by using peroxide paper stocked at Chemistry Stores. If peroxide formation is less than 100 ppm, add 1 tsp. of hydroquinone per pint of material to prevent the formation of additional peroxides. Mark this information on your waste tag (e.g., "<100 ppm, hydroquinone added") and bring it to an Open House. If peroxide formation is greater than 100 ppm, [call IUB EHS](#) for technical assistance.
- If the material is **greater than 2 years old but less than 5 years old**, it should be assessed for other factors such as: duration of exposure to sunlight, volume of container (i.e., "Is it full?"), security of the seal, exposure to changes in temperature, etc. If you do not know the answer to any of these questions, find someone who does. **Do not open the container to check for peroxide formation**, as the material could be shock-sensitive. [Call IUB EHS](#) for technical assistance.
- If the container is **more than five years old**, do not move the container at all. Post a sign reading "DANGER: possible shock-sensitive chemical" and [call IUB EHS](#) for technical assistance.

### Safety Tips for Peroxide Formers

Date peroxide formers when received and when first opened. In general, discard according to time limitations suggested by the manufacturer. For severe and high peroxide formation hazard chemicals, the storage limitations are:

#### *Severe Peroxide Hazard (Discard within 3 months)*

Diisopropyl ether	Potassium amide
Divinylacetylene	Potassium metal
1,1-dichloroethylene (vinylidene dichloride)	Sodium amide

#### *High Peroxide Hazard (Discard within 6 months)*

Cumene	1,4-Dioxane
Cyclohexane	Diethyl ether
Cyclopentane	Ethylene glycol ethers
Methyl isobutyl ketone	Furan
Vinyl ethers	Tetrahydrofuran

- Avoid exposure to light or air and store in light-resistant containers.
- Refrigeration does **not** prevent peroxide formation.

- As is the case with all hazardous chemicals, order only those amounts that you need.
- Do not move or attempt to open containers of unknown age. An obvious indicator of peroxide formation is evidence of needle-like structures or crystals in the liquid. However, dangerous peroxides may be present without obvious crystal formations. Peroxide crystals may have formed on the cap and threads. [Call IUB EHS](#) for assistance.
- Never distill peroxide-forming solvents.

See also: [Explosive or Shock-Sensitive Chemicals](#)

## Pesticides

See [Chemical Waste](#).

## Pharmaceuticals

Prescription, over the counter, and research drugs should be referred to IUB EHS for disposal. **See:** [Controlled Substances](#) for disposal of DEA scheduled materials.

## Picric acid

In its solid form, picric acid can be explosive if it dries out sufficiently. Never store solid picric acid in a desiccator. **See:** [Explosive or Shock-Sensitive Chemicals](#) for disposal information.

Dilute solutions of picric acid are not explosive, and may be disposed as chemical waste. (**See:** [Chemical Waste](#)).

## Polychlorinated Biphenyls (PCBs)

PCBs are synthetic chemicals manufactured until 1979 when they were banned in the United States. PCBs can be found inside heat transfer systems, hydraulic systems, transformers and lighting ballasts manufactured before that time. IUB EHS must collect and dispose of PCB containing fluids, equipment, research chemicals and contaminated debris. If you need to dispose of equipment that contains oil, dielectric fluid, hydraulic fluid or other potential sources of PCBs, please note the date that the equipment was taken out of service, and any information that can help EHS determine the date the equipment or fluid was manufactured. If fluid suspected of containing PCBs has leaked from equipment, follow campus emergency procedures to report a chemical spill immediately. **See also:** [Ballasts](#), [Oil](#)

## Radioactive Waste

All radioactive materials and waste must be handled and disposed in accordance with the IU Office of Radiation Safety policies and procedures. More information can be found at <http://ehs.iu.edu/topics/radiation-safety/index.shtml>.

## Recycling

A collaboration of student groups, IU Management, and diligent employees have made Indiana University's Bloomington Campus recycling program one of the best in the nation. Internally, the Physical Plant recycles tires, automotive batteries, all metals, refrigerant CFCs, antifreeze, motor oil, wooden pallets, and most organic materials. For more information, visit: <http://www.iu.edu/~phyplant/operations/building-services/recycling/index.shtml>.



## Refrigerants and Equipment

Refrigerants such as Freon® must not be released into the atmosphere, and must be properly removed from equipment such as air conditioners, refrigerators and freezers. At IUB, refrigerant reclamation is managed by Facility Operations.

## Sharps

Various sharps are generated on campus, such as needles, razor blades, and broken glassware. Although most are not regulated as hazardous waste, they do require special handling for safety reasons. Regardless of contamination, sharps must be placed in appropriate, rigid containers that guard against puncture and injury (no Ziploc bags), and labeled as “sharps” prior to disposal unless your building procedures specifically allow for alternative handling. Manage sharps in the following manner:

- Chemically contaminated sharps that are grossly contaminated with hazardous chemicals must be collected in puncture-resistant containers, marked as “sharps contaminated with \_\_\_\_\_”, and sealed tightly. These sharps should then be disposed through IUB EHS.
- Biohazard sharps: Metal and glass sharps contaminated with biological materials must be packaged and disposed according to procedures outlined in the [IU Biosafety Manual](#).
- Radioactive sharps: Metal and glass sharps contaminated with radioactive materials must be packaged and disposed according to procedures outlined in the [IUB Radiation Safety Manual](#).
- Uncontaminated metal sharps must be packaged in puncture-resistant containers, labeled as “nonhazardous waste sharps”, and sealed tightly. Dispose in the normal trash.
- Uncontaminated glass sharps must be packaged in a puncture-resistant container, labeled as “nonhazardous waste sharps”, and sealed tightly. Dispose in the normal trash. These sharps may be placed directly in glass dumpsters with no special labeling or container requirements, if one is available at your building. This category includes sharps that are minimally contaminated with non-reactive chemicals.

**Note:** Sharps containers are sold in chemistry stores, the biology stock room and lab supply catalogues. **Red biohazard sharps containers are prohibited.** Clear sharps containers with a biohazard symbol should be used for biohazard sharps and green or blue containers or white buckets should be used for nonhazardous sharps.

### *Packaging, Labeling, and Disposal of Sharps Waste*

<b>Contamination Type</b>	<b>Package</b>	<b>Labeling</b>	<b>Disposal</b>
Biological	See <a href="#">IU Biosafety Manual</a> .	See <a href="#">IU Biosafety Manual</a> .	See <a href="#">IU Biosafety Manual</a> .
Chemical	Closed sealed box or plain (non-red) puncture resistant container	Hazardous Chemical Waste Tag with the description: Sharps contaminated with: “ _____ ”	Request pickup by IUB EHS or bring to a waste collection.
Radiological	See <a href="#">IUB Radiation Safety Manual</a>	See <a href="#">IUB Radiation Safety Manual</a>	See <a href="#">IUB Radiation Safety Manual</a>

Uncontaminated	Closed sealed box or plain (non-red) puncture resistant container or nonhazardous sharps bucket in lab	“Non-hazardous Waste Sharps” Or “Non-hazardous Sharps – Solid Waste”	Take to building dumpster.
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## Silica Gel

Amorphous silica gel is widely used at IUB as column packing media, especially in the Chemistry department. IUB generates approximately one ton per year of used silica gel. IUB EHS has determined it to be nonhazardous, but it is dusty and has a nuisance odor if disposed in the dumpsters. Therefore, it is required to be disposed through IUB EHS.

Used silica gel can be accumulated in 5 gallon plastic buckets or 1 gallon plastic jars depending on your rate of generation. IUB EHS has containers available during waste collections or by request to be delivered at the time of waste pickups. Store all containers closed and label "waste silica gel." Only gel should be accumulated in these containers – no plastic wrap, instruments, gloves, bench paper, or other debris.

**Note:** *If you use pyridine in your chromatography procedure, you must separate the silica gel from that procedure from any other silica gel that you generate, and indicate pyridine as a component of the waste on the [Waste Chemical Tag](#).*

## Sodium Azide

See: [Explosive or Shock-Sensitive Chemicals](#)

## Solvents (Laboratory operations only)

Due to the large volume of organic solvents generated at IUB, EHS consolidates these materials from the small containers received from numerous laboratories into large drums to be shipped to off-site waste vendors. This results in a significant cost-savings for the University as well as addressing safety, compliance, and convenience issues in the labs. To facilitate this program, you must follow the procedures below.

### *Safety Can Use*

- Place your organic solvents in a safety can. The safety cans are reusable. They will be emptied by IUB EHS and returned to you. Very small generators can use other containers if a safety can is not practical. Be mindful of the fill line on the can. It is difficult to pour liquid from an overfull can without spilling.
- Label your safety can with the words “hazardous waste” and some description of the contents as soon as any waste is put into them. This is a regulatory requirement. IUB EHS can provide a Hazardous Waste Label ([Figure 5B](#)) for this purpose.
- Start a waste tag or a content log for your safety can or container as soon as the first material is added to it so that you will be able to account for 100% of the chemical composition of the container.
- Waste must have a pH between 3 and 11 or it will be rejected. Because we are comingling your waste with other solvents, we need to ensure compatibility using pH as a gauge.

- **Note:** Safety cans with broken springs or other defects make them no longer operable as safety cans. Inoperable cans will not be returned. Safety cans are to be used for **solvents only**. The following should **NOT** be placed in your safety cans in any concentration:
  - **Acid and base solutions** - If you have large volumes of solvents with low or high pH, you may use safety cans and neutralize the waste before offering to EHS according to the neutralization procedures outlined in [Section 4](#) of this Guide. Waste with a pH less than 3 or greater than 11 at the time it is presented for disposal may be rejected. Also, be sure to allow 24 hours after neutralization before disposal to insure that the pH has stabilized and the heat of reaction has dissipated. **Note:** *If a solution is warm to the touch when presented for disposal in a reusable container, it may be rejected or you may be asked to leave the container until the next waste collection.*
  - **Aqueous solutions of toxic organic chemicals** - If your procedures are such that water is mixed with solvents during the course of a reaction, it is okay to put in a safety can with other solvents. Do not add primarily aqueous solutions to solvents in a safety can.
  - **Metals** (e.g., Sb, As, Ba, Cd, Cr, Pb, Hg, Ni, Se, Ag)
  - **Inorganic cyanides**
  - **Oxidizers or reducers**
  - **Reactive substances** – This includes air and water reactive chemicals, as well as materials that are known to react badly with organic solvents.
  - **Unknowns**
  - **Stench compounds** – Safety cans are to be poured in our processing area using local exhaust, and returned to you while you wait. Stench compounds which include all sulfides, thiols, mercaptans, some amines, butyric acid, valeric acid, etc., overwhelm the exhaust system. Odors accumulate in the processing area and can escape into the general building ventilation. Safety cans with stench compounds will be taken for disposal without return. If you have a safety can that contains stench compounds, and you want to keep it, IUB EHS can provide a 5-gallon bucket that you can take back to your lab and use your fume hood to transfer the contents. *These wastes will not be poured in the IUB EHS waste processing area.*

## Solvent-Contaminated Wipes

Wipes and rags contaminated with solvents are subject to hazardous waste exemptions in certain circumstances. Wipes and rags contaminated with common solvents like turpentine and mineral spirits may be disposed in the regular trash as long as they are not dripping liquid.

**Note:** *Waste wipes and rags that contain solvents, oil based paints or oils should be placed in a covered metal container and taken to a dumpster at the end of each day to minimize odors and accumulation of combustibles.*

Wipes and rags contaminated with one or more of these solvents:

- |                       |                          |
|-----------------------|--------------------------|
| - Acetone             | - Ethyl acetate          |
| - Benzene             | - Ethyl benzene          |
| - n-Butanol           | - 2-Ethoxyethanol        |
| - Chlorobenzene       | - Isobutyl alcohol       |
| - Creosols            | - Methanol               |
| - Cyclohexanone       | - Methyl ethyl ketone    |
| - 1,2-Dichlorobenzene | - Methyl isobutyl ketone |

- Methylene chloride
- Tetrachloroethylene
- Toluene
- 1,1,2- Trichloroethane
- Trichloroethylene (*\*For reusable wipes only.\**)
- Xylenes

must be collected and accumulated according to the following guidelines:

- They must be accumulated in your area in non-leaking containers that are closed at all times except when wipes and rags are being added.
- The accumulation containers must be labeled with the words “excluded solvent-contaminated wipes” or with other words that accurately describe the container contents.
- The containers must be shipped off-site for disposal within 180 days of the date that the first wipe or rag was placed in the drum. To ensure that this time limit is being heeded, IUEHS requires the containers to be dated when the first material is added, and for the containers to be transferred to IUEHS or to a reusable wipe/rag laundry service within 5 months.
- Wipes and rags must not contain free liquids when they are offered for disposal.
- If you use a laundry service for reusable wipes or rags, you must maintain the following information and make it available to IUEHS for inspection:
  - Name and address of the laundry service.
  - Shipment records showing that the 180-day accumulation time limit is being met.
  - A description of the process that you use to make sure that the wipes or rags contain no free liquids when shipped off-site.

## Spill Debris

For liquid spills that meet all of the reporting exception criteria listed in [Section 8](#) of this Guide, absorb with spill pads, disposable towels, or other absorbent material and place them into a sealed container or leak resistant bag. After absorption, use a small amount of soap and water to clean spill surfaces and dry thoroughly. For solids, sweep up the spill with a broom and dustpan. Collect the material into a plastic or glass container or Ziploc® bag. Do not use a shop vac or vacuum cleaner.

- For inert, non-hazardous chemical spills, place in a sealed container, including the broken chemical container, contaminated towels, etc. for general trash disposal. Be sure all liquid spills are fully absorbed into the absorbent material.
- For spills involving material that must be collected by IUB EHS, the debris must be placed in a closed container with a [Waste Chemical Tag](#) described as “Spill debris containing \_\_\_\_\_.” with the identity of the material that was spilled filled in.

## Universal Waste

Some waste materials meet the definition of a hazardous waste, but the EPA provides an exemption if they are destined for recycling. These wastes are referred to as Universal Waste. They are subject to less stringent documentation and recordkeeping requirements as well as extended accumulation time limits. Generators of Universal Waste must still comply with rules for accumulation including segregation, labeling, and container management. See [Fluorescent Bulbs](#), [Batteries](#), and [Mercury-Containing Devices](#) for specific requirements for each waste type. IUEHS has chosen not to use the available Universal Waste exemption for hazardous pesticides because it does not have any significant effect on the University’s regulatory burden or costs. Hazardous pesticides, and those that are non-hazardous such as dormant oils and insecticidal soaps, should be managed as [chemical waste](#).

[Attachment D](#) contains some sample examples of labels that can be used to meet the labeling requirements. IUB EHS also has printable label templates available online at [http://www.ehs.iu.edu/topics/waste-management/chemical-waste/waste\\_label\\_templates.shtml](http://www.ehs.iu.edu/topics/waste-management/chemical-waste/waste_label_templates.shtml).

**Note:** *Spill debris from Universal Waste must be managed as a hazardous chemical waste through IUB EHS.*

## **Unknowns**

Unlabeled or poorly labeled containers of chemicals or products in areas where hazardous materials are used or stored represent serious legal and safety problems for the University. They must be assumed hazardous unless evidence or certification to the contrary can be obtained.

Without an accurate description, it is difficult to characterize the hazards presented and dispose of the material legally and safely. Disposal companies will not accept chemical waste without an analysis or specifically defined characterization of hazards.

It is the responsibility of the person generating a waste to accurately keep track of the contents of containers so that the material can be described adequately for the disposal vendor when it is discarded. If proper labeling and records on containers are not maintained and an adequate description cannot be provided; or if the disposal company requires further analysis, EHS will charge-back the generating department. See [Section 5.4](#) for additional information.

## **Vacuum Pump Oil**

Uncontaminated vacuum pump oil should be referred to IUB EHS for recycling. Contaminated vacuum pump oil should be marked or labeled as a waste chemical with the words “Used Pump Oil” and, if known, “contaminated with (list all known chemical contaminants)”. **See also:** [Oil](#)

## 5.4 Cost Recovery

IUB EHS charges auxiliary and administrative departments for the direct disposal costs of waste that they generate. Under normal circumstances, IUB EHS does not charge for the cost of waste handling and disposal services for academic or research groups. However, IUB EHS reserves the right to charge the department of any waste generator who incurs regulatory fines as a result of non-compliance with this Guide, or who requires services that result in significant costs to IUB EHS or to the University as a whole. Services that commonly result in charges include:

- **Cylinder Disposal:** Many cylinders can be returned to the manufacturer for refill or recycling in quantities as low as 1lb. In most cases, disposable cylinders (non-returnable) with remaining pressure, product or product residue must be referred to IUB EHS for waste disposal. Empty cylinders can only be discarded as general refuse or scrap metal if they once contained an inert, non-toxic gas and are proven to be at atmospheric pressure by valve removal or puncture. IUB EHS reserves the right to charge back special handling or disposal charges incurred *per disposable cylinder* to the responsible department. Check with your department representative for returnable options before purchasing a disposable cylinder.
- **High-Hazard Waste Disposal:** Unstable, reactive or peroxide-forming chemicals that are improperly stored, mixed with incompatible materials or otherwise mishandled can pose serious risks, including fire or explosion. Due to the high-hazard nature of these materials, IUB EHS must contract special services for stabilization, transportation and disposal at an extremely high cost. IUB EHS reserves the right to charge back for specialized high-hazard waste management services *per container*.
- **Laboratory Chemical Moves:** Personnel must comply with campus specific guidelines for inter and intra-building chemical moves found in the [IU Hazardous Materials Transportation Program](#). The program provides detailed procedures for notification of IUB EHS, timeframes, and preparation of materials. Preparation and move assistance from IUB EHS personnel is also available with adequate notification for a fee that includes time and materials. Responsible departments must ensure that guidelines are followed so that all chemicals, wastes, and contaminated items are identified and managed properly *before* a lab is vacated. IUB EHS charges the responsible department for any unreasonable costs incurred for the cleanout of labs that do not comply with the proper procedures.
- **Mercury Disposal and Spill Response:** As part of the University's waste minimization effort, and due to the high cost of disposal, all non-essential uses of mercury are prohibited at Indiana University. Authorization for essential uses of mercury and/or mercury compounds must be obtained from IUB EHS. Details are outlined in the [Mercury Reduction/Elimination Program](#). Charges related to disposal and/or spill cleanup of unauthorized mercury will be referred back to the generating department.
- **Unknown Fingerprinting:** All chemical materials must be fully identified and labeled by the generator with adequate information for IUB EHS to determine potential hazards and a proper disposal method. Unidentified chemicals are expensive to dispose, and dangerous to emergency responders. IUB EHS reserves the right to charge the responsible department for *each container* of unknown material. The amount charged is determined by IUB EHS based on the cost of characterization and disposal. To avoid these charges, trained laboratory personnel may opt to perform their own unknown fingerprinting for unknowns <5 gallons in size using the [IUB Unknown Characterization Procedure](#).

## Section 6: IUPUI Waste Management

The success of the IU Waste Management Program depends on the cooperation and conscientious efforts of everyone at IUPUI. IUPUI EHS collects a wide range of chemical waste from laboratories, shops, offices, etc. for off-site treatment or disposal. This section outlines the general procedures for managing waste from laboratory and non-laboratory operations on the IUPUI campus. Waste handling and disposal protocols for specific waste types commonly generated by both of these operations, is also included. The procedures and methods provided must be followed to ensure your health and safety, as well as regulatory compliance. If you have any questions, contact [IUPUI EHS](#) immediately.

### 6.1 IUPUI Laboratory Waste Management

The following general requirements apply to waste generated by laboratory operations.

Laboratories generate a large variety of waste types. Those waste types should be managed as hazardous waste, unless otherwise specified by this Guide or IUPUI EHS staff.

#### General Requirements:

- 1. Identify and label** – *Note: All waste containers must be labeled!* Containers are to be labeled at the time the first waste is added, and subsequently add constituent names as needed.
  - Chemicals in original containers with intact labels do not need to be relabeled unless they are difficult to read. Small bottles may be labeled by any means which completely identifies the contents of the bottle, such as placing the small container(s) in a labeled, Ziploc® bag.
  - Pre-printed, adhesive [Waste Chemical Labels](#) are available from IUPUI EHS (see [Figure 6A](#)). These labels can also be found on the IUPUI EHS website. Or, labs can create, print and secure custom labels to the container; as long as *all of the constituents* contained in the waste and approximate concentration of each is provided. Avoid acronyms, chemical structures or abbreviations. Provide percentages of chemicals in a mixture, including water.
  - Carboys have an optional [Carboy Waste Container Inventory](#) for use with 5 gallon dump-jugs, *in addition to* the Waste Chemical Label. The Waste Chemical Label must be completed with a general identifying description of the waste, whereas the log should be filled out in detail as waste is added to the container. Include the inventory log in the plastic sleeve found on carboy when the container is full, and ready for IUPUI EHS pick-up.
- 2. Ensure waste containers are appropriate and in sound condition** – Wastes collected by IUPUI EHS are transported within buildings and on University streets. Therefore, chemical waste must be packaged in containers suitable for transportation. Acceptable waste containers for common chemicals are as follows:
  - **Flammable and halogenated solvents:** Four-liter glass solvent bottles, one or five-gallon size metal cans or plastic carboys, or any original solvent container;
  - **Strong acids and bases:** Glass or compatible plastic bottles up to 4 liters in volume, original bottles preferred;
  - **Miscellaneous organic and inorganic reagents:** Original containers or their equivalent.
  - Do not use biohazard bags for storage of chemical waste.

**Notes:** Contact IUPUI EHS for approval to use waste containers larger than 5 gallons in size. All containers should be approximately 90% full and **must have tight sealing caps or lids (no Parafilm®)**. Wastes that are not packaged according to these specifications will not be collected by IUPUI EHS until corrected.

3. **Segregate** – Separate incompatible materials before packing them into boxes. Acids must be kept separate from bases and cyanides, organic material separate from oxidizers, etc. Refer to [Attachment C](#) for more information on chemical compatibility.
4. **Box your waste** – All containers must be in sound, non-leaking condition with tight fitting lids. Place containers in a single layer within each box according to how they should be segregated. Keep incompatible chemicals in separate boxes to avoid adverse reactions. If multiple boxes are used, sequentially number the boxes. If you do not have boxes to containerize your waste for pick-up, segregate the waste in an area where the containers can be safely stored until pick-up by IUPUI EHS. Request that the appropriate number of boxes be brought by IUPUI EHS staff upon pick-up when filling out the online pick-up request form.
5. **Complete an online Waste Pick-up Request form** – The link to this form can be found on the IUPUI EHS website at <http://www.ehs.iupui.edu/waste-manifest.asp>. The hardcopy version of this document is titled *Hazardous Materials Manifest for Intracampus Transportation*, which can be filled out and faxed to our office at (317) 278-2158. Once we have received your request, IUPUI EHS will place your waste pick-up on our service schedule. We strive to respond to all requests within 1-5 business days.

**Note:** IUPUI EHS may require up to 30 days to complete any large-scale clean out (over 50 containers) of laboratories or stock chemical storage areas. IUPUI EHS reserves the right to charge departments for expenses incurred from large clean outs.

**Figure 6A**  
IUPUI Waste Chemical Label

<b>WASTE CHEMICAL LABEL</b>								
IUPUI Office of Environmental Health & Safety								
Building: _____	Contact Person: _____	<table border="1" style="margin: auto;"> <tr> <td style="width: 33%; height: 20px;"></td> <td style="width: 33%; height: 20px;"></td> <td style="width: 33%; height: 20px;"></td> </tr> <tr> <td colspan="3" style="text-align: center;"><i>EHS date</i></td> </tr> </table>				<i>EHS date</i>		
<i>EHS date</i>								
Room #: _____	Phone #: _____							
<b>COMPOSITION OF WASTE: (Please list ALL chemicals and % composition)</b>								
<b><u>DO NOT USE ACRONYMS OR ABBREVIATIONS!</u></b>								
<b>Waste Name:</b> _____								
<b><u>Chemical Name:</u></b>	<b><u>% Composition:</u></b>							
_____	_____ %							
_____	_____ %							
_____	_____ %							
_____	_____ %							
_____	_____ %							
		<b>TOTAL: 100%</b>						
I certify this information is true, accurate, and in compliance with EHS label instructions; also, I have made my best effort to reduced the volume and toxicity of waste generated.								
Signature: _____		Date: _____						
<b>To request a pick-up visit: <a href="http://www.ehs.iupui.edu/waste-manifest.asp">http://www.ehs.iupui.edu/waste-manifest.asp</a></b>								



## 6.2 IUPUI Non-Laboratory Waste Management

Non-laboratory operations, such as facilities maintenance, information technology support, and academic or administrative offices, often generate similar types of waste. This section outlines the general requirements for managing non-lab waste materials. Additional guidance on handling and disposal of specific waste types is found in [Section 6.3](#).

### General Requirements

- 1. Identify** - There are several types of waste common to non-research operations including:
  - [Aerosol cans](#),
  - [Antifreeze \(glycol solutions\)](#),
  - [Asbestos-containing materials](#),
  - [Ballasts](#) (PCB and Non-PCB),
  - [Chemical waste](#) (Cleaning compounds, fuels, solvents, water treatment, etc.),
  - [Compressed Gases](#) (Cylinders),
  - [Electronic waste](#) (E-waste),
  - [Lead waste](#) (Metallic and lead paint),
  - [Spill clean-up debris](#),
  - [Universal Waste](#) (Batteries, fluorescent light bulbs, and mercury devices), and
  - [Unknowns](#) (Unidentified waste)
- 2. Label and date** - *Note: All waste containers must be labeled to identify ingredients!*

Containers are to be labeled at the time the first waste is added, and subsequently add additional information as needed.

  - Used oil, PCB ballasts, and Universal Waste have special labeling requirements, and limited storage times (See [Attachment D](#)).
  - Chemical wastes should be managed at hazardous waste (see [Section 2](#)) unless otherwise stated in this Guide ([Section 6.3](#)).
  - Label all containers. The description should be specific. IUPUI EHS will provide hazardous waste labels upon request (See [Attachment D](#)).
- 3. Store Containers Properly.** Containers must be appropriate, in good condition, and kept closed. (See also: [Attachment B](#)) Check product Safety Data Sheets (SDS) for information on ingredients and other hazard information to ensure proper storage.
  - Flammable liquids should be stored in approved containers and keep away from ignition sources.
  - Do not store corrosive liquids in metal containers or drums.
  - Check containers for corrosion, leaks or other problems routinely.
  - Keep containers closed unless adding waste.
  - Only fill liquid waste containers to 90% full to allow for expansion.
- 4. Package** – Box small, compatible materials. Ensure all lids are tightly closed. For drum quantities, ensure bungs are tightened and there is no bulging from pressure build-up. Place any items with missing or broken lids, leaking containers, or other problematic items into individual buckets with lids, and label the outside of the bucket with the contents.

- 5. Dispose** – The link to the online request form can be found on the IUPUI EHS website at <http://www.ehs.iupui.edu/waste-manifest.asp>. The hardcopy version of this document is titled *Hazardous Materials Manifest for Intracampus Transportation*, which can be filled out and faxed to our office at (317) 278-2158. Once we have received your request, IUPUI EHS will place your waste pick-up on our service schedule. We strive to respond to all requests within 1-5 business days. Keep in mind regulatory accumulation time limits provided for some waste types, and remember that storing waste longer can result in regulatory citations for the University.

**Note:** *IUPUI EHS may require up to 30 days to complete any large-scale clean out (over 50 containers) of laboratories or stock chemical storage areas. IUPUI EHS reserves the right to charge departments for expenses incurred from large clean outs.*

## 6.3 IUPUI Management of Specific Waste Types:

### Aerosol Cans

Aerosol cans are pressurized, and often contain flammable propellants. Even empty aerosol cans remained slightly pressurized, and should not be thrown away. Refer all aerosol cans to IUPUI EHS for chemical waste disposal. An exception to this would be non-flammable compressed air dusters, which can be discarded as general refuse, however consult the SDS for the material to ensure the air duster does not contain flammable propellants.

### Air and Water Reactive Materials

Dispose of all air and water reactive materials, such as those listed below, through IUPUI EHS. Package liquids separate from solids, and note any special hazard and/or handling precautions on the [Waste Pick-up Request Form](#).

Acetyl chloride	Lithium metal	Sodium metal
Bromine	Phosphorus (yellow)	Thionyl chloride
Calcium metal	Potassium metal	Trichlorosilane

### Animal Related Materials

Animal related materials such as waste food, water, bedding and animal carcasses should be handled through the Indiana University Laboratory Animal Research Center (LARC) unless the materials are contaminated with hazardous chemicals. Animal-related materials that are contaminated with hazardous chemicals must be referred to IUPUI EHS for disposal. All chemical contaminants and potential biological hazards must be communicated to IUPUI EHS by the generator.

### Asbestos Containing Materials

Asbestos containing materials (ACM's) are commonly found in older University buildings. Examples can include floor tiles, pipe insulation, plaster and caulk. The presence of asbestos in a building does not mean that occupant health is at risk. As long as ACM's remain in good condition, exposure is unlikely.

Do not remove or disturb asbestos containing materials. If asbestos or asbestos containing materials are found, immediately report the nature and location of the material to IUPUI EHS for evaluation. Whenever possible, isolate the asbestos containing material by restricting access to the area in which it is found.

### Ballasts

Ballasts are used in fluorescent bulb light fixtures. Ballasts from lighting maintenance activities may contain polychlorinated biphenyls (PCB). The other two types are non-PCB and electronic ballasts.

- **PCB ballasts** contain a toxic liquid, and are regulated by EPA's Toxic Substance Control Act (TSCA). Only ballasts manufactured before 1979 contain PCB. All ballasts should be inspected for a marking that states in some way that the ballast does not contain PCB. If no such wording is located, the ballast(s) must be collected for disposal through IUPUI EHS. Non-PCB ballasts can be discarded as trash or scrap metal. **See also:** [Polychlorinated Biphenyls](#)
- **Non-PCB ballasts** can be discarded as general refuse or salvaged for scrap metal if an outlet is available. IUPUI EHS does not collect them.

- **Electronic ballasts** contain a Ni-Cad battery that must be removed. Refer the battery to IUPUI EHS for disposal. Discard the ballast as general refuse or salvage metal scrap. IUPUI EHS does not collect these.

## Batteries

Most batteries are regulated by the Environmental Protection Agency as [Universal Waste](#), which are special regulations for hazardous waste batteries designated for recycling. However, University operations that sporadically generate spent batteries from laptops, cell phones, or other electronic devices should: segregate batteries by type. Most batteries are marked with a symbol or abbreviation that indicates battery type. Manage batteries in the following manner:

- **Alkaline** – Unfortunately there is limited net value to recycling alkaline batteries. These are not regulated, and can be discarded in the general trash.

For the following battery types, tape the terminals and dispose through IUPUI EHS by submitting an online [pick-up request](#):

- **Lead-acid** – Follow the chemical spill reporting procedures in the IUPUI Emergency Procedures Handbook for leaking lead-acid batteries.
- **Lithium** – Primary lithium and rechargeable Lithium-ion batteries are potentially reactive, and pose a fire hazard.
- **Nickel-cadmium**
- **Nickel-metal hydride**
- **Mercury**

If collecting batteries for recycling in a container over a period of time, follow [Universal Waste](#) rules for labeling and accumulation time limits.

## Biological Materials

Biological materials, including unfixed human or animal tissue must be treated according to approved protocols, either autoclave or chemical disinfectant, before disposal. Autoclave indicator tape must be used, and the universal biohazard symbol must be defaced to confirm that the waste has been treated. Biological materials and fixed tissues that are chemically treated or otherwise mixed with chemicals must be referred to IUPUI EHS for waste disposal. More information can be found in the [IU Biosafety Manual](#).

## Cardboard

Clean, dry cardboard boxes that have been broken down flat can be recycled in campus single-stream recycling bins or recycling dumpsters. This includes pizza boxes that are free of food scraps. Wax coated cartons or contaminated cardboard items are not acceptable for recycling and should be discarded in the trash as general refuse. Cardboard that is grossly contaminated with hazardous chemicals should be placed in a sealed container and referred to IUPUI EHS for waste disposal.

## Chemical Waste

The disposal of hazardous wastes is regulated by the Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA). Consult [Attachment A](#) for chemicals that require IUPUI EHS collection. Chemicals known to present mutagenic, teratogenic, or carcinogenic hazards as indicated on the SDS must also be referred to IUPUI EHS for disposal. Attachment A also lists chemicals eligible for IUPUI Waste Management

lab for acid-base neutralization, or drain disposal of non-hazardous chemicals. These methods are limited to chemicals that meet the parameters outlined in [Section 4](#) of this Guide. No liquid or semi-liquid wastes of any kind are permitted in campus dumpsters or compactors.

### **Chemically Contaminated Items**

Chemically contaminated items can include pipettes, cuvettes, spill debris, etc. Disposal guidance for non-infectious, chemically contaminated sharps and debris is found [here](#). **See also:** [Empty Containers](#)

### **Compressed Gases**

Compressed gas cylinders that are no longer wanted should be disposed in a timely manner to prevent deterioration. Leased cylinders should be closed, capped and returned to the original gas supplier. Non-returnable cylinders such as lecture bottles and disposable cylinders should be referred to IUPUI EHS for disposal. Indicate on the cylinder whether it is at atmospheric pressure, or if it is above 1 atmosphere of pressure.

### **Controlled Substances**

Controlled substances are regulated by the US Drug Enforcement Agency (DEA) on Schedules I-V. These materials require registration with the DEA, careful inventory protocols, and documentation of on-site destruction. If for any reason controlled substances cannot be witness-destroyed on site by the original registrant, arrangements need to be made in advance with IUPUI EHS. EHS will coordinate with the registrant or registrant's departmental representative (in case of abandoned materials or deceased registrant), IU Police and the local DEA office to receive controlled substances for on-site destruction or disposal. See the [IU Controlled Substances Program for Research \(Non-Practitioners\)](#).

### **2, 4-Dinitrophenol**

This chemical (2, 4-DNP or  $\alpha$ -Dinitrophenol) poses an explosive hazard when it becomes dry. It must be wetted to at least 15% water for shipment. Thus, this chemical should never be stored in a desiccator or under any other conditions that would allow for the material to dry out such as storing it for an extended period of time. Unwanted 2, 4-DNP should be disposed of in a timely manner. Do not touch 2, 4-dinitrophenol that appears old or dried out. You must contact IUPUI EHS, and we will come evaluate the material. **See also:** [Explosive or Shock-Sensitive Compounds](#).

### **Electronic Equipment**

Electronic equipment (E-waste) includes electrical or battery operated devices, or appliances such as computers or lab equipment, that often contain toxic heavy metals. E-waste should never be thrown in the general trash, compactors or dumpster, but are to be referred to IUPUI Surplus Property for recycling. The Surplus Property policy for computers can be found at [www.surplus.iupui.edu/cpus.asp](http://www.surplus.iupui.edu/cpus.asp).

Before sending E-waste to surplus, remove any accessory items such as light bulbs, batteries, thermometers, etc. from equipment. Also ensure that all chemical containers, specimens, etc. have been removed from laboratory equipment. Dispose items according to this waste Guide. Ensure E-waste previously used for biological, chemical or radioactive purposes is fully decontaminated, and deface or remove any hazard markings.

Refrigerators and freezers must be drained of refrigerant before prior to surplus pick-up. You must call (317) 278-1900 to request this service, which is provided by Campus Facilities Services (CFS). Note that CFS does charge a fee to recover their recycling and disposal charges. **See also:** [Surplus Property Items](#).

## Empty Containers

Empty chemical containers cannot be recycled by normal means. However, some empty containers can be re-used to hold waste. Otherwise, empty containers from inert, non-hazardous reagents should be placed into a glass waste box or trash bin.

Chemicals that have been deemed acutely toxic by the Environmental Protection Agency (EPA) are assigned to a list of regulated hazardous wastes known as the P-list. P-listed waste containers are regulated as a hazardous waste, even when empty. **All P-Listed containers must be disposed through Environmental Health and Safety as chemical waste.** P-listed chemicals are defined as commercially available pure grades, any technical grades of the chemical, or all commercial formulations with a P-listed chemical as its sole active ingredient.

Spent, used or mixed wastes containing P-listed materials are no longer considered P-listed waste. Diluting P-listed chemicals by adding water or other chemicals to circumvent disposal as a hazardous waste is strictly prohibited by law. The following table provides additional guidance for managing empty containers.

### *Empty Container Management Guidance Table*

Contamination Type	Residue Amount	Container Type	Handling Procedure
Chemical or Pharmaceutical	Minimal/ None	Glass	Pour out all free liquid. Remove all hazard warning labels. Put in sealed box. Dispose of box in regular trash.
	Minimal/ None	Plastic	Pour out all free liquid. Remove all hazard warning labels. Put in sealed box. Dispose of box in regular trash.
	Gross Contamination	All	<a href="#">Dispose with IUPUI EHS.</a>
<a href="#">Acutely Hazardous (P-Listed) Waste</a>	Any	All	<a href="#">Dispose with IUPUI EHS.</a>
Biological	Any	All	Dispose according to the <a href="#">Biosafety Manual</a> .
Gas	Any	Returnable Cylinder	Arrange return directly to vendor.
Gas	Any	Non-Returnable	<a href="#">Dispose with IUPUI EHS.</a>
Gas/Pressurized liquid	Any	Sure-Pack	<a href="#">Dispose with IUPUI EHS.</a>
Gas/Pressurized liquid	None	Sure-Pack	Purge according to manufacturer's guidelines and remove valve, mark as empty, and give to IUPUI EHS.

Aerosols	Any	Aerosol can	<a href="#">Dispose with IUPUI EHS.</a>
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### Ethidium Bromide

Ethidium bromide is a strong mutagen that in pure form is also highly toxic by inhalation. Ethidium bromide and preparations including stocks and gels are collected by IUPUI EHS for disposal as chemical waste. Detailed guidance on Ethidium Bromide handling and disposal can be found [here](#).

### Explosive or Shock-Sensitive Chemicals

A number of relatively common chemicals can become unstable and pose an explosion hazard when dried out, stored improperly or stored for extended periods. These materials require special handling. By adhering to IUPUI EHS approved practices, the threat inherent to these materials can effectively be controlled. IUPUI EHS asks that each department carefully review and adhere to the practices listed for each of the following: [2, 4-Dinitrophenol](#), [Peroxide Formers](#), [Picric Acid](#), and [Sodium Azide](#).

Unstable, reactive or peroxide-forming chemicals that are improperly stored, mixed with incompatible materials or otherwise mishandled can pose serious risks, including fire or explosion. Due to the high-hazard nature of these materials, IUPUI EHS must contract special services for stabilization, transportation and disposal at an extremely high cost. IUPUI EHS reserves the right to charge back for specialized high-hazard waste management services per container (See [Section 6.4](#)). If you have potentially explosive or shock-sensitive chemicals for disposal, contact IUPUI EHS for assistance.

### Fluorescent Light Bulbs (Laboratory)

Mercury containing lamps such as compact fluorescent, UV or projector lamps should be referred to EHS. Broken mercury lamps are considered hazardous waste. If broken on a non-carpeted floor, the lamp should immediately be swept up with a **broom and dust pan**, collected into an airtight plastic bag, labeled, and referred to EHS for disposal. If a mercury lamp is broken in a carpeted area, use the IUPUI Emergency Procedures Handbook flipchart to report it as a chemical spill. **Never** use a regular vacuum cleaner or shop-vac to clean up broken mercury lamps. **See also:** [Universal Waste](#) for campus maintenance operation protocols.

### General Trash

Non-recyclable, non-hazardous general refuse (trash) should be placed in designated area trashcans or dumpsters. Liquids and semi-liquids are prohibited from disposal in campus dumpsters and compactors. Broken glass must be placed into a rigid cardboard box and clearly marked with the words "BROKEN GLASS".

Treated biological waste containers must have indicator tape placed on them in order to confirm they were autoclaved prior to disposal in the general trash. Biohazard symbols must also be defaced. Dust forming materials must be containerized to eliminate release in the dumpsters and/or compactors.

### Glass Waste

Laboratory glass, whether intact or broken should be disposed in a rigid container such as a cardboard box. Boxes that contain broken glass must be marked with the words "Broken Glass" highly visible on the outside of the container. Ensure all glass bottles are empty and free of chemical residue before placing them into a glass disposal container. Glass is picked up and discarded by Building Services.

## **Glycol Solutions**

Propylene glycol can be drain disposed to the sanitary sewer in accordance with the sewer disposal guidelines found in [Section 4](#) of this Guide. Ethylene glycol must be referred to EHS for chemical disposal. Alternatively, all glycol solutions can be referred to EHS for recycling.

## **Lead**

All lead and lead compounds should be referred to IUPUI EHS for recycling or disposal. This includes lead compounds, scrap metal, lead-acid batteries, x-ray aprons, etc. Lead-based paint or paint scrapings from construction or abatement activities must also be referred to IUPUI EHS. Items or furnishings suspected of being covered with lead paint must also be referred to IUPUI EHS for evaluation.

## **Mercury**

The Mercury Elimination/Reduction Policy requires all non-essential uses of mercury be eliminated on campus unless prior authorization from the IUPUI Laboratory Safety Committee has been granted. This includes the use of mercury thermometers, mercury devices and mercury containing chemical compounds. All unapproved or waste elemental mercury, mercury devices, mercury contaminated items, and mercury compounds must be referred to IUPUI EHS for disposal.

## **Mixed Wastes**

Mixed wastes are those that pose multiple hazards including biological, chemical and/or radiological. Handling and disposal of mixed wastes can be complex due to overlapping regulatory requirements and restrictions imposed by treatment facilities. IUPUI EHS cannot dispose of waste that is radioactive, or that poses both chemical and biological hazards.

### ***Radioactive Mixed Wastes***

In general, if a mixed waste is radioactive it must be referred to the IUPUI Office of Radiation Safety for disposal, even if biological or chemical hazards are also present. All waste containers must be fully and accurately labeled, and must be disposed in accordance with all IU Office of Radiation Safety policies and procedures. More information can be found in the [Radiation Safety Procedures Manual](#).

### ***Biological and Chemical Mixed Wastes***

Wastes that contain a mixture of both biological and chemical components must be evaluated to determine if the chemical in the waste has deactivated/disinfected all biological hazards present. If not, the generator must add an adequate volume of an approved disinfectant that is chemically compatible with the waste such as ethanol, bleach, formalin, etc. The generator of such waste must certify that it has been disinfected, and communicate with IUPUI EHS the type and volume of chemical disinfectant used. More information can be found in the [IU Biosafety Manual](#).



## Nonhazardous Waste

Most chemical waste will need to be handled by IUPUI EHS. However, you might have some nonhazardous waste, listed as acceptable for sewer or trash disposal in [Attachment A](#) of this Guide; they can be flushed to the sewer with water or disposed in the regular trash.

Chemicals (liquids and solids) can be flushed to the sanitary sewer if they are:

- water soluble;
- degradable in the sanitary sewer system; *and*
- non-toxic.

**Notes:** *If you intend to sewer dispose a material is not listed in Attachment A of this Guide, contact IUPUI EHS for pre-approval.*

## Oil

Various types of oil, including vacuum pump oil, motor oil, cutting oils, etc., that is not contaminated with solvent or other chemicals, must be referred to IUPUI EHS for recycling. Any used oil that is contaminated with other chemicals must be accurately described and disposed as a chemical waste through EHS. If the oil contains PCB, the generator must indicate such on the label and as part of the chemical description on the waste pick-up request form. The concentration of PCB in parts per million (PPM) should also be listed if known. **See also:** [Polychlorinated Biphenyls](#)

## Paint

Latex paint that is still in good condition, even if the container has been opened, should be referred to Surplus Property for re-distribution or sale. Paint that is no longer useable, contains lead, or is oil based, as well as spray paint, must be referred to IUPUI EHS for chemical waste disposal. Lead-based paint chips from construction or remediation must also be referred to IUPUI EHS for disposal.

## Pesticides and Residues

Pesticides are regulated by the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). This regulation restricts the distribution, sale and use of pesticides. Certain “restricted use” pesticides can only be applied by individuals who are certified and trained. Un-used pesticides and their residues should not be thrown away or poured into the drain. All pesticides and containers with pesticide residues must be referred to IUPUI EHS for chemical waste disposal.

## Peroxide Formers

A variety of chemicals can form highly explosive peroxide compounds when exposed to air. Peroxides are sensitive to heat, friction, impact, and light and are among the most hazardous chemicals encountered in the laboratory. Care must be taken to prevent the formation of peroxides in these chemicals.

Preventing the formation of peroxides is dependent on inventory control of peroxide-forming chemicals. Most of these materials are distributed with inhibitors to drastically slow peroxide formation. These are usually effective until the container is first opened. To prevent peroxide hazards, peroxide-forming chemicals should be dated both *upon receipt and upon opening*. These materials must also be discarded as waste through IUPUI EHS within the recommended timeframes.

IUPUI EHS requirements for peroxide former waste acceptance are:

- The material must be **less than twelve months old**. This information must be marked clearly on the Waste Chemical Label.
- If the material is **greater than twelve months old but less than two years old**, check for peroxide formation by using peroxide test strips. If peroxide formation is detected, mark the test result in parts per million (PPM) on the waste chemical label, along with the date tested. Request a waste pick-up immediately. If peroxide formation is greater than 100 ppm, immediately call IUPUI EHS for technical assistance.
- If the material is **greater than 2 years old but less than 5 years old**, it should be assessed for other factors such as: duration of exposure to sunlight; volume of container; security of the seal; and exposure to changes in temperature. If you do not know the answer to any of these questions, find someone who does. **Do not open the container to check for peroxide formation**, as the material could be shock-sensitive. Call IUPUI EHS immediately for technical assistance.
- If the container is **more than five years old**, do not move the container. Post a sign reading "DANGER: possible shock-sensitive chemical" and immediately call IUPUI EHS for technical assistance.

### Safety Tips for Peroxide Formers

#### *Severe Peroxide Hazard (Discard within 3 months)*

Diisopropyl ether	Potassium amide
Divinylacetylene	Potassium metal
1,1-dichloroethylene (vinylidene dichloride)	Sodium amide

#### *High Peroxide Hazard (Discard within 6 months)*

Cumene	1,4-Dioxane
Cyclohexane	Diethyl ether
Cyclopentane	Ethylene glycol ethers
Methyl isobutyl ketone	Furan
Vinyl ethers	Tetrahydrofuran

- Avoid exposure to light or air and store in light-resistant containers.
- Refrigeration does **not** prevent peroxide formation.
- As is the case with all hazardous chemicals, order only those amounts that you need.
- Do not move or attempt to open containers of unknown age. An obvious indicator of peroxide formation is evidence of needle-like structures or crystals in the liquid. However, dangerous peroxides may be present without obvious crystal formations. Peroxide crystals may have formed on the cap and threads. Call IUPUI EHS for assistance.
- Never distill peroxide-forming solvents.
- More information on peroxide formers can be found on the IUPUI [EHS Laboratory Safety website](#). **See also:** [Explosive or Shock-Sensitive Chemicals](#)

### Pharmaceuticals

Non-controlled legend (prescription), over the counter and research drugs should be referred to EHS for disposal. **See also:** [Controlled Substances](#) for disposal of DEA scheduled materials.

## Polychlorinated Biphenyls (PCBs)

PCBs are synthetic chemicals manufactured until 1979 when they were banned in the United States. PCBs can be found inside heat transfer systems, hydraulic systems, transformers and lighting ballasts manufactured before that time. EHS must collect and dispose of PCB containing fluids, equipment, research chemicals and contaminated debris. If you need to dispose of equipment that contains oil, dielectric fluid, hydraulic fluid or other potential sources of PCBs, please note the date that the equipment was taken out of service, and any information that can help EHS determine the date the equipment or fluid was manufactured. If fluid suspected of containing PCBs has leaked from equipment, follow campus emergency procedures to report a chemical spill immediately. **See also:** [Ballasts](#), [Oil](#)

## Picric acid

Picric acid, also known as trinitrophenol, is commonly used in laboratories. This compound is relatively stable in the form in which it is commercially distributed. It is ordinarily sold with greater than 10% water added to stabilize it. However, picric acid can become explosive when allowed to dry out, or when it forms certain metal salts. The following steps should be taken to safely handle and store picric acid.

- Never allow picric acid to be stored in containers with metal lids, or to come into contact with any metal.
- Add water as need to containers of picric acid to prevent the material from drying out. **Never place picric acid inside a desiccator!**
- **Never** attempt to open an old or dried out container of picric acid. This material should be referred to EHS for evaluation and disposal immediately.

If you are using other polynitroaromatic compounds, contact EHS for information on handling and storage. **See also:** [Explosive or Shock-Sensitive Chemicals](#)

## Radioactive Waste

All radioactive materials and waste must be handled and disposed in accordance with the IU Office of Radiation Safety policies and procedures. More information can be found in the [Radiation Safety Procedures Manual](#).

## Recycling

IUPUI has single-stream recycling for many items including plastics #1-7, paper, aluminum cans, steel and tin containers and cardboard. Labeled bins can be found in buildings throughout campus. More information can be found on the IUPUI Office of Sustainability's [recycling web page](#).

## Refrigerant and Equipment

Refrigerants such as Freon® must not be released into the atmosphere, and must be properly removed from equipment such as air conditioners, refrigerators and freezers prior to surplus pick-up. You must call (317) 278-1900 to request this service, which is provided by Campus Facilities Services (CFS). Note that CFS does charge a fee to recover their recycling and disposal charges.

Also, ensure that all chemical containers, specimens, etc. have been removed from refrigerators and freezers. Dispose waste chemical items according to this waste Guide. Ensure all refrigerated equipment used for biological, chemical or radioactive purposes is fully decontaminated, and deface any of hazard markings. **See also:** [Surplus Property Items](#)

## Sharps

All sharps must be stored in appropriate, rigid containers that guard against puncture and injury. Potentially infectious or biologically contaminated sharps must be treated through autoclave before discard into campus trash, which are collected by Campus Facilities Environmental Services staff. Autoclave indicator tape must be used, and the universal biohazard symbol must be defaced to confirm that the waste has been treated. Additional [disposal guidance](#) for non-infectious, chemically contaminated sharps and debris is found on the EHS website under *Environmental Management*.

### Packaging, Labeling, and Disposal of Sharps Waste

<i>Contamination Type</i>	<i>Package</i>	<i>Labeling</i>	<i>Disposal</i>
Biological	See <a href="#">IU Biosafety Manual</a> .	Deface biohazard symbols	Autoclave with indicator tape, ensure color change and dispose in trash
Chemical	Closed sealed box or plain (non-red) puncture resistant container	Waste Chemical Label with the description: Sharps contaminated with: “ _____ ”	<a href="#">Request pickup</a> by IUPUI EHS
Radiological	See <a href="#">Radiation Safety Procedures Manual</a>	See <a href="#">Radiation Safety Procedures Manual</a>	See <a href="#">Radiation Safety Procedures Manual</a>
Untamminated	Closed sealed box or plain (non-red) puncture resistant container e.g. EHS supplied 5-gallon bucket with lid	“Non-hazardous Sharps” Or “Non-hazardous Sharps – Solid Waste”	Trash or building dumpster

## Sodium Azide

Sodium azide, although not inherently unstable, may form highly explosive heavy metal azides if contaminated or used improperly. Disposal of sodium azide solutions to the sewer may lead to the formation of lead or copper azide in plumbing. Several serious explosions have occurred as a result of improper disposal of sodium azide. Care should also be taken that sodium azide is not heated rapidly or stored in containers with metal lids. **See also:** [Explosive or Shock-Sensitive Chemicals](#)

## Spill Debris

For liquid spills that meet all of the reporting exception criteria listed in [Section 8](#) of this Guide, absorb with spill pads or disposable towels (**do not** use messy absorbent powders or chemical spill neutralizers such as carbon powder, soda ash, sand or vermiculite), and place them into a sealed container or leak resistant bag. After absorption, use a small amount of soap and water to clean spill surfaces and dry thoroughly. For solids, sweep up the spill with a broom and dustpan. Collect the material into a plastic or glass container or Ziploc® bag. Do not use a shop vac or vacuum cleaner.

For non-hazardous chemical spills, place in a sealed container. Include broken chemical container, contaminated towels, etc. into the general trash for disposal. Be sure all liquid spills are fully absorbed into paper or cloth towels or spill pads.

For spills involving material that must be collected for chemical waste, refer to IUPUI EHS in a closed container labeled as "Spill debris containing..." and list a detailed composition of the debris. Include everything in the container such as broken glass or metal if present, water, paper towels, etc.

If laboratory furniture or equipment is contaminated with a chemical from an inadvertent chemical release, you must contact IUPUI EHS to evaluate decontamination or disposal options. If property is damaged by chemical spill, Campus Facilities Services must be contacted at 317-278-1900 to evaluate the need for repairs once the spill has been remediated, and if necessary, has been cleared by IUPUI EHS for re-occupancy.

### **Strong Oxidizers and Reducers**

Refer all strong oxidizers and reducers to IUPUI EHS for disposal. Keep these items separate from each other, and box separately when disposing.

#### ***Strong oxidizers:***

Chromic acid (fresh)  
Metallic chlorates  
Metallic nitrates  
Metallic perchlorates  
Metallic permanganates  
Perchloric acid

#### ***Strong reducers:***

n-Butyl lithium  
Calcium hydride  
Metallic sulfides  
Sodium hydride  
Stannous chloride

### **Surplus Property Items**

Unwanted Indiana University property such as furniture, computers, laboratory equipment, etc. must be referred to Surplus Property. **Note:** *Ensure all items are free of chemicals, residues or any other potential hazards. Deface or remove any hazard markings.* Surplus also collects electronic waste (E-waste) such as laboratory equipment, computers and printers for recycling. See [Electronic Equipment](#) for more specific information. You can arrange a pick-up at no charge for most items, read Surplus policies and procedures, and fill out the [Surplus Pickup Request Form](#).

### **Temperature Controlled Substances**

Some chemicals must be stored at constant, low temperatures to maintain their stability or integrity. These can include organic peroxides, self-reactive solids, and highly volatile compounds that must be kept cold in order to prevent thermal decomposition, fire and explosion, or container pressurization. For temperature controlled substance waste disposal:

- Keep the material in appropriate cold storage according to the manufacturer.
- Note the required temperature range needed to maintain stability of the waste and the specific location of the waste in the Comments/Questions field found at the bottom of the Waste Pick-up Request Form.
- You must store potentially flammable materials in specialized refrigerator/freezers. These materials are prohibited from storage in regular, household-type refrigerator/freezer units.

## Universal Waste

Some waste materials meet the definition of a hazardous waste, but the EPA provides an exemption for certain materials destined for recycling. However, generators of Universal Waste must still comply with rules for accumulation, including segregation of waste types, labeling, and time limits. IUPUI manages fluorescent lamps and batteries as Universal Waste. See [Attachment D](#) for printable labels.

**Note:** [Spill debris](#) from Universal Waste must be managed as a hazardous chemical waste. **See also:** [Batteries](#), [Fluorescent Light Bulbs](#)

### ***General Rules Management of Universal Waste Batteries***

These rules apply to maintenance areas where batteries may be stored before IUPUI EHS pick-up. The general requirements for Universal Waste Batteries are:

- Inspect batteries for condition issues such as corrosion, cracks or leaking. Regulations require that leaking batteries must be placed in a closed container with tight-fitting lid. Batteries with no condition issues can be placed in an open container.

**Note:** *Large lead-acid batteries found in vehicles and forklifts are not completely sealed at the top (they are “spillable”); thus they must be stored upright. Do not store spillable batteries outdoors or near floor drains. These batteries contain sulfuric acid. If a lead-acid battery tips over and spills, follow campus emergency procedures for chemical spills.*

- Label each battery or battery container with words “Universal Waste”, and a description such as “Spent Battery” or “Used Batteries”, as soon as the first battery is collected - or first goes into the container.
- Date - Each battery or container must be marked with the date that the first battery was collected and/or put into the container.
- Dispose - Each battery or container must be shipped off-site to an authorized Universal Waste handler within 12 months of the above date. To ensure compliance with this regulation, all Universal Waste batteries must be referred to IUPUI EHS for pick-up within 9 months.

### ***General Rules Management of Universal Waste Fluorescent Bulbs***

Fluorescent light bulbs come in different sizes and shapes; long, straight lamps used in ballast operated light fixtures, or compact fluorescent bulbs used in place of incandescent bulbs. All fluorescent bulbs or lamps contain a small amount of mercury. Bulbs known as “green” or “green tip” contain mercury in low enough amounts to be exempt from waste regulations. They can be distinguished from standard mercury bulbs by their green end-caps or other markings. Collecting green lamps along with regular lamps for Universal Waste recycling is encouraged, but not required.

- All bulbs must be stored in a **closed** container to protect against breakage as soon as they are collected.
- Use boxes that the bulbs came in or round fiber drums provided by the disposal vendor. Make sure to use a box or drum that is long enough to fully cover the entire length of the bulbs in the container.
- Each container must be marked with the words “Universal Waste” and a description such as “Used Bulbs” or “Used Lamps” as soon as the first bulb goes into the container.
- Each container must be marked with the date that the first bulb went into the container.

- Each container must be shipped offsite to an authorized Universal Waste handler before *one year* from the date marked on the container to avoid violation of the regulations.
- If a bulb breaks before it is placed into a container, it is no longer a Universal Waste. The debris from the cleanup of the broken bulb must be managed as hazardous waste. Refer all broken lamps to EHS for disposal in a closed container with a waste chemical label that states “Broken Mercury Bulb Debris”.

## **Unknowns**

Waste that is not labeled or accurately described in a way that allows IUPUI EHS to determine what hazards it poses and how it should be disposed is deemed an “unknown” waste. Unknowns must be analyzed by EHS to determine their basic chemical hazards through a time-consuming chemical fingerprinting process. Due to the extra time, cost and resources associated with fingerprinting unknowns, IUPUI EHS reserves the right to charge departments a cost-recovery fee *per unknown container*. All fees will be discussed with the generator and their department before they are charged.

IUPUI disposes unknown wastes once fingerprinted via a hazardous waste vendor. The vendor puts limitations on the size of unknowns. Thus, IUPUI EHS cannot receive unknown materials in containers larger than 1 gallon, or solids larger than 1 kilogram. Larger amounts must be broken down into smaller quantities by the generator.

## 6.4 Cost Recovery

Under normal circumstances, IUPUI EHS does not charge for the cost of waste handling and disposal services to academic or research groups. However, IUPUI EHS reserves the right to charge the department of waste generators who incur regulatory fines as a result of non-compliance with this Guide, or who require services that result in significant costs for IUPUI EHS or to the University as a whole such as:

- **Disposable Cylinders:** Many cylinders can be returned to the manufacturer for refill or recycling in quantities as low as 1lb. In most cases, disposable cylinders (non-returnable) with remaining pressure, product or product residue must be referred to IUPUI EHS for waste disposal. Empty cylinders can only be discarded as general refuse or scrap metal if they once contained an inert, non-toxic gas and are proven to be at atmospheric pressure by valve removal or puncture. IUPUI EHS reserves the right to charge back special handling or disposal charges incurred *per disposable cylinder* to the responsible department. Check with your department representative for returnable options before purchasing a disposable cylinder.
- **High-hazard Waste:** Unstable, reactive or peroxide-forming chemicals that are improperly stored, mixed with incompatible materials or otherwise mishandled can pose serious risks, including fire or explosion. Due to the high-hazard nature of these materials, IUB EHS must contract special services for stabilization, transportation and disposal at an extremely high cost. IUB EHS reserves the right to charge back for specialized high-hazard waste management services *per container*.
- **Laboratory Chemical Moves:** Personnel must comply with campus specific guidelines for inter and intra-building chemical moves [IU Hazardous Materials Transportation Program](#). The program provide detailed procedures for notification of IUPUI EHS, timeframes, and preparation of materials. Preparation and move assistance from IUPUI EHS personnel is also available with adequate notification for a fee that includes time and materials. Responsible departments must ensure that guidelines are followed so that all chemicals, wastes, and contaminated items are identified and managed properly *before* a lab is vacated. IUPUI EHS charges the responsible department for any unreasonable costs incurred for the cleanout of labs that do not comply with the proper procedures.
- **Mercury:** As part of the University's waste minimization effort, and due to the high cost of disposal, all non-essential uses of mercury are prohibited at Indiana University. Authorization for essential uses of mercury and/or mercury compounds must be obtained from IUPUI EHS. Details are outlined in the Mercury Reduction/Elimination Policy. Charges related to disposal and/or spill cleanup of unauthorized mercury will be referred back to the generating department.
- **Unknown Fingerprinting:** All chemical materials must be fully identified and labeled by the generator with adequate information for IUPUI EHS to determine potential hazards and a proper disposal method. Unidentified chemicals are expensive to dispose, and dangerous to emergency responders. IUPUI EHS reserves the right to charge the responsible department for *each container* of unknown material. The amount charged is determined by IUPUI EHS based on the cost of characterization and disposal.



## Section 7: IU Regional Campus Waste Management

The success of the IU Waste Management Program depends on the cooperation and conscientious efforts of everyone at Indiana University. IUEHS provides guidance and helps manage the disposal of a wide range of chemical waste from laboratories, shops, offices, etc. for off-site treatment or disposal. This section outlines the general procedures for managing waste from laboratory and non-laboratory operations on the regional campuses. Waste handling and disposal protocols for specific waste types commonly generated by both of these operations, is also included. The procedures and methods provided must be followed to ensure your health and safety as well as regulatory compliance. If you have any questions, contact IUEHS for your respective campus.

### 7.1 Regional Campus Laboratory Waste Management

The following general requirements apply to waste generated by laboratory operations. Laboratories generate a large variety of waste types. Those waste types shall be managed as hazardous waste unless otherwise specified by this Guide or IUEHS staff.

#### General Requirements

1. **Identify and label – *Note: All waste containers must be labeled!*** Containers are to be labeled at the time the first waste is added, and subsequently add constituent names as needed.

- Chemicals in original containers with intact labels do not need to be relabeled unless they are difficult to read. Small bottles may be labeled by any means which completely identifies the contents of the bottle, such as placing the small container(s) in a labeled, Ziploc® bag.
- Pre-printed, *Waste Chemical Labels* are available from IUEHS (see [Figure 7A](#)). Labs can create, print and secure custom labels to the container; as long as *all of the constituents* contained in the waste and approximate concentration of each is provided. Avoid acronyms, chemical structures or abbreviations. Provide percentages of chemicals in a mixture, including water.

#### *Waste Chemical Label information:*

- [Waste Chemical Labels](#) are available from IUEHS for your respective campus.
  - Waste Chemical Labels must state each chemical constituent present in the waste container and corresponding percentages. Waste constituents must be spelled out completely — no abbreviations, formulas or structures. Please write legibly.
  - Additional Waste Chemical Labels may be used, if necessary. Sign and date all Waste Chemical Labels used to identify the waste.
  - Affix Waste Chemical Label(s) to container(s) securely.
  - Fill in an accumulation date when the container is “full” and advise the Laboratory Safety Coordinator for your school/department. **Note:** “Full” is 90% of container capacity to allow for expansion.
2. **Ensure waste containers are appropriate and in sound condition** – Wastes managed by IUEHS are transported within buildings and on University streets. Therefore, chemical waste must be packaged in containers suitable for transportation. Acceptable waste containers for common chemicals are as follows:
- **Flammable and halogenated solvents:** Four-liter glass solvent bottles, one or five-gallon size metal cans or plastic carboys, or any original solvent container.

- **Strong acids and bases:** Glass or compatible plastic bottles up to 4 liters in volume, original bottles preferred.
- **Miscellaneous organic and inorganic reagents:** Original containers or their equivalent.

**Notes:** Contact IUEHS for approval to use waste containers larger than 5 gallons in size. All containers should be approximately 90% full and **must have tight sealing caps or lids (no Parafilm®)**. Wastes that are not packaged according to these specifications will not be managed by IUEHS until corrected.

**3. Consolidate wastes wisely** – Consolidating waste into fewer containers can seem efficient, and can save space, resources, and even cost if done properly. However, it can lead to increased costs and increased safety risks if the guidelines below are not followed:

- Do not mix incompatible materials together in the same waste container. [Attachment C](#) provides more information on compatibility.
- Oxidizers, strong acids (such as nitric and perchloric), and any water-reactive material, should never be consolidated with other waste at any concentration.
- When possible, different wastes (solids vs. liquid, solvents vs. aqueous) should be accumulated in separate waste containers. This does not preclude mixing wastes that could obviously be mixed together, such as compatible solvent waste.
- Do not mix high hazard rated materials with low hazard rated materials as wastes if the experimental procedure does not require it. Doing so may inadvertently create a large quantity of regulated hazardous waste where a much lower quantity may have existed otherwise.
- If you don't have a need to consolidate, are unsure whether or not your waste is compatible with the waste in your waste accumulation container, or your waste accumulation container is poorly labeled – don't consolidate.

**Note:** Never assume the contents of unknown or poorly labeled containers, and never consolidate unknown or unidentified wastes with other waste materials.

**4. Manage containers in accumulation areas properly** - Good management of containers in waste accumulation areas increases safety for everyone involved in handling and transporting waste chemicals. All requirements in [Attachment B](#) in addition to the following guidelines must be practiced to ensure safety and compliance.

- Ensure waste containers are appropriate and in sound condition.
- Keep containers closed at all times, unless actively adding waste.
- Do not put corrosive waste in metal containers, as the containers will corrode and leak as well as evolve flammable hydrogen gas.
- Accumulate non-solvent waste streams (acids, metals, etc.) separately from solvents. Solvents should be free of all other wastes, including aqueous wastes and water not mixed during the same procedure.
- Separate incompatible materials. Acids must be kept separate from bases and cyanides, organic material separate from oxidizers, etc. Refer to [Attachment C](#) for more information on chemical compatibility.
- Keep the outside of containers free of contamination.
- Do not over-fill containers. **Note:** Full means 90% or less to allow for expansion within the container.

- Keep ignitable waste away from ignition sources.
  - Check product Safety Data Sheets (SDS) for information on ingredients and other hazard information to ensure proper storage.
  - Do not accumulate or store waste containers outdoors.
  - Label the container immediately upon adding chemicals to the container.
  - Full or ready to dispose of wastes shall be properly maintained in the department accumulation area. IUEHS staff will assist staff and help coordinate chemical waste disposal activities on a periodic basis. Should you have waste materials that are in immediate need of disposal, please [contact IUEHS](#) for your respective campus.
3. Manage the waste in the accumulation area so that the total quantity of chemical waste (unless designated as non-hazardous by this Guide or IUEHS) remains under 55 gallons at all times. **Note:** *If you are approaching 55 gallons of waste in the accumulation area and a waste pickup is not scheduled within 72 hours, notify IUEHS immediately.*
5. **Dispose** – Once a waste accumulation container is full or a chemical has been determined to be a waste chemical, it should be placed in the designated accumulation area and presented to IUEHS for disposal as soon as reasonably possible. Advise the Laboratory Safety Coordinator for your school/department when the accumulation container or waste chemical is placed in the designated accumulation area (provide information on container type, its contents and the quantity of material). Please keep in mind time limits provided for some waste types in [Section 7.3](#) and [Table 7A](#) below. Storing waste past these time limits can result in regulatory citations for the University.

Each regional campus maintains its own generator status with the Indiana Department of Environmental Management. [Table 7A](#) summarizes restrictions/limitations/time limits for various generator statuses. Contact IUEHS for more information about the generator status for your respective campus and any restrictions/limitations/time limits that may apply. IUEHS personnel will frequently check-in with Laboratory Safety Coordinators to facilitate compliance.

- Dispose of waste in a timely manner. IUEHS offers ample opportunities for disposal. Safety and compliance is maximized when waste is disposed of on a regular basis.
- At the time you present your waste to IUEHS for disposal, make sure that it is properly packaged and labeled. IUEHS will not accept waste that is not properly packaged, labeled, and dated.

**Table 7A**  
**Hazardous Waste Generator Table**

	Hazardous Waste (HW)	Acute Hazardous Waste (AHW)	Accumulation	Time Limit
Conditionally Exempt Small Quantity Generator (CESQG)	Generates no more than 100 kg (220 lbs) of HW in a month	Generates less than 1 kg (2.2 lbs) of AHW in a month and less than 100 kg (220 lbs) of material from the cleanup of a spillage of AHW	Accumulates less than 1,000 kg (2,200 lbs) of HW, less than 1 kg (2.2 lbs) of AHW, and less than 100 kg (220 lbs) of material from the cleanup of a spillage of AHW	NONE
Small Quantity Generator (SQG)	Generates more than 100 kg (220 lbs) but less than 1,000 kg (2,200 lbs) of HW in a month	Generates less than 1 kg (2.2 lbs) of AHW in a month and less than 100 kg (220 lbs) of material from the cleanup of a spillage of AHW	Accumulates less than 6,000 kg (13,200 lbs) of HW, less than 1 kg (2.2 lbs) of AHW, and less than 100 kg (220 lbs) of material from the cleanup of a spillage of AHW	180 days
Large Quantity Generator (LQG)	Generates 1,000 kg (2,200 lbs) or more of HW in a month	Generates 1 kg (2.2 lbs) or more of AHW in a month and more than 100 kg (220 lbs) of material from the cleanup of a spillage of AHW	Accumulates 1 kg (2.2 lbs) or more of AHW and 100 kg (220 lbs) or more of material from the cleanup of a spillage of AHW	90 days

Figure 7A:

Regional Campus Waste Chemical Label

**WASTE CHEMICAL LABEL**

---

Building: \_\_\_\_\_ Contact Person: \_\_\_\_\_  
Room #: \_\_\_\_\_ Phone #: \_\_\_\_\_

<i>EHS date</i>

---

**COMPOSITION OF WASTE: (Please list ALL chemicals and % composition)**  
**DO NOT USE ACRONYMS OR ABBREVIATIONS!**

**Waste Name:** \_\_\_\_\_

<u>Chemical Name:</u>	<u>% Composition:</u>
_____	_____ %
_____	_____ %
_____	_____ %
_____	_____ %
_____	_____ %
_____	_____ %
	TOTAL: 100%

---

I certify this information is true, accurate, and in compliance with IUEHS label instructions. Also, I have made my best effort to reduce the volume and toxicity of the waste generated.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7B:

Regional Campus Hazardous Waste Label

**HAZARDOUS WASTE**

---

**ACCUMULATION**

**START DATE** \_\_\_\_\_

**CONTENTS** \_\_\_\_\_

**HANDLE WITH CARE!**  
**CONTAINS HAZARDOUS OR TOXIC WASTES**

## 7.2 Regional Campus Non-Laboratory Waste Management

Non-laboratory operations, such as facilities maintenance, information technology support, and academic or administrative offices, often generate similar types of waste. This section outlines the general requirements for managing non-lab waste materials. Additional guidance on handling and disposal of specific waste types is found in the following section ([Section 7.3](#)).

### General Requirements

1. **Identify** your waste. Section 7.3 lists common waste types at IU facilities. This information will guide you in identifying your waste and, for some wastes, in proper management of the waste. Unless the waste specific information indicates otherwise, steps 2-6 of this section must be followed for all wastes.
2. **Label and date** – Regulations require that all waste containers be labeled to identify the contents. A label must identify the contents of the waste container. The description must be specific enough that a person who does not work in the area could read it and know what the material is and what hazards to expect. Containers must be labeled as soon as the waste is identified or, in the case of an accumulation container like a bucket or a drum, as soon as the first waste is added. Additional contents information must be added as additional waste is added. IUEHS requires that you use the Waste Chemical Label. IUEHS will provide Hazardous Waste Labels, as needed.

Unless otherwise stated in this Guide, waste containers should not be dated until you are ready to present them to IUEHS. You should manage the waste in your accumulation area so that your total quantity of chemical waste (unless designated as non-hazardous by this Guide or IUEHS) remains under 55 gallons at all times.

**Note:** *If you are approaching 55 gallons of a specific waste in your accumulation area and a waste pickup is not scheduled within 72 hours, notify IUEHS immediately.*

Some wastes, such as [used oil](#), [PCB ballasts](#), and [Universal Waste](#) have special labeling requirements, and different accumulation time limits. See the next section ([Section 7.3](#)) under each specific waste type for these special rules.

3. **Consolidate wastes wisely** – Consolidating waste into fewer containers can seem efficient and can save space, resources, and even cost if done properly. However, it can lead to increased costs and safety risks if the guidelines below are not followed.
  - Accumulate different waste types in separate containers (solids vs. liquids, solvents vs. oil, oil-based paint vs. latex paint). This simplifies tracking of waste constituents in each container for labeling purposes, reduces the risk of reaction between incompatible wastes, and avoids costly generation of excess regulated hazardous waste from potential mixing of non-hazardous wastes with hazardous wastes.
  - When possible, avoid re-using plastic containers for liquid waste other than containers provided by or approved by IUEHS. Plastic breaks down over time especially when exposed to adverse weather conditions.
  - Choose an accumulation container size that fits the quantity of waste that you will generate in a reasonable amount of time.

4. **Manage containers in accumulation areas properly** – Good management of containers in waste accumulation areas increases safety for everyone involved in handling and transporting waste chemicals. All requirements in [Attachment B](#) in addition to the following are guidelines that must be practiced to ensure safety and compliance.

- Ensure waste containers are appropriate and in sound condition.
- Keep containers closed at all times, unless actively adding waste.
- Do not put corrosive waste in metal containers, as the containers will corrode and leak as well as evolve flammable hydrogen gas.
- Accumulate non-solvent waste streams (acids, metals, etc.) separately from solvents. Solvents should be free of all other wastes, including aqueous wastes and water not mixed during the same procedure.
- Separate incompatible materials. Acids must be kept separate from bases and cyanides, organic material separate from oxidizers, etc. Refer to [Attachment C](#) for more information on chemical compatibility.
- Keep the outside of containers free of contamination.
- Do not over-fill containers. **Note:** Full means 90% or less to allow for expansion within the container.
- Keep ignitable waste away from ignition sources.
- Check product Safety Data Sheets (SDS) for information on ingredients and other hazard information to ensure proper storage.
- Do not accumulate or store waste containers outdoors.
- Label the container immediately upon adding chemicals to the container.
- Full or ready to dispose of wastes shall be properly maintained in the department accumulation area. IUEHS staff will assist staff and help coordinate chemical waste disposal activities on a periodic basis. Should you have waste materials that are in immediate need of disposal, please contact IUEHS for your respective campus.

5. **Package** – Containers must be packaged properly to be accepted IUEHS.

***For containers ≤5 gallons:***

- Each container must have a properly completed, signed, and dated Waste Chemical Label attached securely.
- The Waste Chemical Label must list all of the ingredients of the waste and their percentages. The percentages must add up to 100%. No acronyms or abbreviations are to be used on the Waste Chemical Label.
- An SDS may be attached to the container along with the Waste Chemical Label if the waste is a chemical product and you do not know all of the ingredients.
- Every effort must be made to ensure that waste containers are sound and that lids are tight sealing, even if that means the waste must be repackaged. If a problem with a container cannot be resolved, the container must be placed into an individual bucket with a lid, and the outside of the bucket must be labeled the same as the container would be.

***For containers >5 gallons (drum quantities):***

- Ensure bungs are tightened and there is no bulging from pressure build-up.
- Each drum must have a properly completed Waste Chemical Label unless otherwise indicated in this Guide or by IUEHS.
- If the waste pickup area cannot be accessed with a drum cart, or is only accessible by stairs, waste must be stored in 5 gallon containers or smaller so that they can be carried out.

- 6. Dispose** – Once a waste accumulation container is full or a chemical has been determined to be a waste chemical, it should be placed in the designated accumulation area and presented to IUEHS for disposal as soon as reasonably possible. Advise IUEHS for your respective campus when the accumulation container or waste chemical is placed in the designated accumulation area (provide information on container type, its contents and the quantity of material). Please keep in mind time limits provided for some waste types in [Section 7.3](#) and [Table 7A](#). Storing waste past these time limits can result in regulatory citations for the University.

Each regional campus maintains its own generator status with the Indiana Department of Environmental Management. [Table 7A](#) summarizes restrictions/limitations/time limits for various generator statuses. Contact IUEHS for more information about the generator status for your respective campus and any restrictions/limitations/time limits that may apply.

- Dispose of waste in a timely manner. IUEHS offers ample opportunities for disposal. Safety and compliance is maximized when waste is disposed of on a regular basis.
- At the time you present your waste to IUEHS for disposal, make sure that it is properly packaged and labeled. IUEHS will not accept waste that is not properly packaged, labeled, and dated.



## 7.3 Regional Campus Management of Specific Waste Types

### Acids or Bases (Laboratory operations only)

This section explains the disposal options for solutions of acids and bases from laboratories. It is best to dispose of concentrated solutions of acids or bases with IUEHS due to the difficulty of neutralization. Use only disposable containers for waste that will not be neutralized because these containers will not be returned to you. Wastes that have been pre-approved by IUEHS for neutralization following the [neutralization procedures](#) outlined in Section 4.1 are listed in [Attachment A](#). If a material that you want to neutralize is not listed in Attachment A, contact IUEHS for approval.

#### 1. Concentrated acids

- $\leq 25$  ml and approved for sewer disposal in Attachment A - Follow neutralization procedures in Section 4.1 or dispose directly with IUEHS.
- $> 25$  ml or not approved for sewer disposal – Dispose directly with IUEHS.

#### 2. Dilute acid solutions or concentrated or dilute base solutions with no toxic metals

- Approved for sewer disposal in Attachment A - Follow neutralization procedures in [Section 4.1](#) or dispose directly with IUEHS.
- Not approved for sewer disposal – Dispose directly with IUEHS.

#### 3. Dilute acid solutions or concentrated or dilute base solutions containing toxic metals

- Dispose directly with IUEHS. Many toxic metals are regulated hazardous wastes at very low concentrations and IUEHS must make that determination.

*Note: Nitric and perchloric acids are not approved for neutralization or consolidation at any concentration.*

### Aerosol Cans

Aerosol cans are pressurized and often contain flammable propellants. Even empty aerosol cans remained slightly pressurized and should not be thrown away. Refer all aerosol cans to IUEHS for chemical waste disposal. An exception to this would be non-flammable compressed air dusters, which can be discarded as general refuse (however consult the SDS for the material to ensure the air duster does not contain flammable propellants).

### Air and Water Reactive Materials

Dispose of all air and water reactive materials, such as those listed below, through IUEHS. Package any liquids separately from solids and note any special hazard and/or handling precautions on the [Waste Chemical Label](#).

Acetyl chloride	Lithium metal	Sodium metal
Bromine	Phosphorus (yellow)	Thionyl chloride
Calcium metal	Potassium metal	Trichlorosilane

## Animal Related Materials

Animal related materials such as waste food, water, bedding and animal carcasses must be handled through the appropriate animal care facility unless the materials are contaminated with hazardous chemicals. Animal-related materials that are contaminated with hazardous chemicals must be referred to IUEHS for disposal. All chemical contaminants and potential biological hazards must be communicated to IUEHS by the generator.

## Asbestos Containing Materials

Asbestos containing materials (ACM's) are commonly found in older University buildings. Examples can include floor tiles, pipe insulation, plaster and caulk. The presence of asbestos in a building does not mean that occupant health is at risk. As long as ACM's remain in good condition, exposure is unlikely.

Do not remove or disturb asbestos containing materials. If asbestos or asbestos containing materials are found, immediately report the nature and location of the material to IUEHS for evaluation. Whenever possible, isolate the asbestos containing material by restricting access to the area in which it is found.

## Aqueous Solutions of Toxic Metals

All aqueous solutions containing toxic metals must be disposed of by IUEHS. These toxic metals include:

Aluminum	Chromium	Nickel
Arsenic	Copper	Selenium
Barium	Lead	Silver
Cadmium	Mercury*	Zinc

**Note:** For any solutions containing mercury, the Waste Chemical Label must indicate whether the mercury concentration is less than or greater than 260ppm.

## Aqueous Solutions of Toxic Organic Chemicals

Keep organic wastes separate from aqueous waste so that unnecessary aqueous organic waste streams are not generated. It is more difficult and more expensive for IUEHS to dispose of combination aqueous/organic wastes.

## Ballasts

Ballasts are used in fluorescent bulb light fixtures. Ballasts from lighting maintenance activities may contain polychlorinated biphenyls (PCB). The other two types are non-PCB and electronic ballasts.

- **PCB ballasts** contain a toxic liquid and are regulated by EPA's Toxic Substance Control Act (TSCA). Only ballasts manufactured before 1979 contain PCB. All ballasts should be inspected for a marking that states in some way that the ballast does not contain PCB. If no such wording is located, the ballast(s) must be referred to IUEHS for disposal. Non-PCB ballasts can be discarded as trash or scrap metal. **See also:** [Polychlorinated Biphenyls](#)
- **Non-PCB ballasts** can be discarded as general refuse or salvaged for scrap metal if an outlet is available. IUEHS does not manage or dispose of these.
- **Electronic ballasts** contain a Ni-Cad battery that must be removed. Refer the battery to Facilities/Physical Plant for disposal. Discard the ballast as general refuse or salvage metal scrap. IUEHS does not manage or dispose of these.

## Batteries

Most batteries are regulated by the Environmental Protection Agency as [Universal Waste](#), which are special regulations for hazardous waste batteries designated for recycling. However, University operations that sporadically generate spent batteries from laptops, cell phones, or other electronic devices should segregate batteries by type. Most batteries are marked with a symbol or abbreviation that indicates battery type. Manage batteries in the following manner:

- **Alkaline** – Unfortunately there is limited net value to recycling alkaline batteries. These are not regulated, and can be discarded in the general refuse (trash). Some regional campus facilities have collection containers where these can be deposited for disposal separate from general refuse (trash).

For the following battery types, tape the terminals and dispose through IUEHS or Facility Services/Physical Plant (FS/PP), as appropriate, for your respective campus.

- **Lead-acid**
- **Lithium**
- **Nickel-cadmium**
- **Nickel-metal hydride**
- **Mercury**

If collecting batteries for recycling in a container over a period of time, follow [Universal Waste](#) rules for labeling and accumulation time limits.

## Biological Materials

Biological materials, including unfixed human or animal tissue, must be treated according to approved protocols (either autoclave or chemical disinfectant) before disposal. Autoclave indicator tape must be used and the universal biohazard symbol must be defaced to confirm that the waste has been treated. Biological materials and fixed tissues that are chemically treated or otherwise mixed with chemicals must be referred to IUEHS for waste disposal. More information can be found in the [IU Biosafety Manual](#).

## Cardboard

Cardboard recycling at the regional campuses is part of the larger recycling effort coordinated by FS/PP and/or sustainability committees.

Cardboard that is grossly contaminated with chemical(s) that exhibit flammable, corrosive, reactive and/or toxic characteristics must be placed in a sealed container and disposed through IUEHS following the general procedures in [Section 7.1](#) or [7.2](#), as appropriate.

## Chemical Waste

Since IUEHS determines which chemicals are regulated as hazardous waste, all unwanted chemicals must be managed as hazardous waste when discarded unless specific instructions in this Guide or IUEHS personnel state otherwise (see [Annex 1](#)). Departments that generate hazardous chemical waste must follow Satellite Accumulation Area Requirements ([Attachment B](#)). All IUEHS general requirements for waste management must also be followed. Discard chemical waste often to avoid deterioration of containers and labels.

### ***Laboratory Operations***

Follow all general requirements in [Section 7.1](#) for any chemicals or chemical wastes to be discarded, and check this section (Section 7.3) for any additional requirements for specific waste types.

### ***Non-Laboratory Operations***

Non-laboratory chemical waste may be generated by maintenance, custodial, landscaping, or other facilities operations. Common examples include:

- Aerosols and cylinders such as propane tanks;
- Cleaning compounds (many are corrosive);
- Pesticides with toxic ingredients;
- Mercury and mercury debris;
- Paints (oil based), solvents, stains and adhesives;
- Pool or water treatment chemicals;
- Fuels and fuel/oil mixtures; and
- Spill debris from hazardous chemical spills.

Follow all general requirements in [Section 7.2](#) for any of the above materials or any other chemical product to be discarded, and check this section (Section 7.3) for any additional requirements for specific waste types.

### **Chemically Contaminated Items (CCIs)**

Chemically contaminated items (CCIs) such as disposable lab ware, gloves, bench top coverings, pipets, test tubes, aprons, etc. can be put into the normal trash if they are not reactive, ignitable, infectious, or radioactive; the contaminant is not highly toxic; and the material will not cause a nuisance or physical hazard when placed in the trash. If your CCI contaminant is not listed in [Attachment A](#) and you are unsure whether normal trash is an appropriate disposal route for your CCIs, contact IUEHS for approval prior to disposal.

If your CCIs cannot be placed in the normal trash for one of the above reasons, package them in a 5-gallon plastic bag which can be placed conveniently inside a 5-gallon plastic bucket. The bag should be at least 2ml thick. Close the bag with a rubber band, twist tie, or by tying the top when it is full, and label the [Waste Chemical Label](#) as "chemically contaminated items" or "CCIs" and list all chemical contaminants. Call IUEHS if you have any questions.

**Note:** All PCB contaminated materials at  $\geq 50$  ppm must be packaged separately, and referred to IUEHS for disposal with the PCB concentration clearly indicated on the [Waste Chemical Label](#).

### **Compressed Gases**

Compressed gas cylinders that are no longer wanted should be disposed in a timely manner to prevent deterioration. Leased cylinders should be closed, capped and returned to the original gas supplier. Non-returnable cylinders such as lecture bottles and disposable cylinders should be referred to IUEHS for disposal. Indicate on the cylinder whether it is at atmospheric pressure, or if it is above 1 atmosphere of pressure.

## Controlled Substances

Controlled substances are regulated by the US Drug Enforcement Agency (DEA) on Schedules I-V. These materials require registration with the DEA, careful inventory protocols, and documentation of on-site destruction. If for any reason controlled substances cannot be witness-destroyed on site by the original registrant, arrangements need to be made in advance with IUEHS. IUEHS will coordinate with the registrant or registrant's departmental representative (in case of abandoned materials or deceased registrant), IU Police and the local DEA office for controlled substances on-site destruction or disposal. See the [IU Controlled Substances Program for Research \(Non-Practitioners\)](#).

## 2, 4-Dinitrophenol

This chemical (2, 4-DNP or  $\alpha$ -Dinitrophenol) poses an explosive hazard when it becomes dry. It must be wetted to at least 15% water for shipment. Thus, this chemical must never be stored in a desiccator or under any other conditions that would allow for the material to dry out such as storing it for an extended period of time. Unwanted 2, 4-DNP must be disposed of in a timely manner. Do not touch 2, 4-dinitrophenol that appears old or dried out. You must contact IUEHS, and we will come evaluate the material. **See also:** [Explosive or Shock-Sensitive Compounds](#).

## Electronic Equipment

Electronic waste (E-waste) contains toxic metals in components like screens and circuitry, but is exempt from hazardous waste regulations as long as the equipment is intact. If equipment is crushed and leaking, contact IUEHS for guidance. Most e-waste is currently managed at the regional campuses by Indiana University Information Technology Services (UIITS). Examples of common e-waste at regional campuses include:

- Computer monitors,
- Printers,
- Mobile phones,
- Video equipment,
- Speakers, and
- Laptops.

## Empty Containers

Bottles and containers are considered "empty" when you have removed all contents possible by normal means (pouring, scooping, etc.). There may still be some residue clinging to the inside walls of the container, but these may be placed in the normal trash. Punch a hole in 5-gallon metal containers or safety cans that are no longer needed, and place directly in the normal trash dumpster. This will prevent their reuse.

## Empty Container Management Guidance Table

Contamination Type	Residue Amount	Container Type	Handling Procedure
Hazardous/ Chemical/ Pharmaceutical	Minimal/ None	Glass	Pour out all free liquid. Remove lid. Allow residue to dissipate under hood. Remove all hazard warning labels. Put in sealed box. Dispose of box in regular trash.
	Minimal/ None	Plastic	Pour out all free liquid. Remove lid. Allow residue to dissipate under hood. Remove all hazard warning labels. Put in sealed box. Dispose of box in regular trash.
	Gross Contamination	All	Label and dispose with IUEHS.
Acutely Hazardous (P-Listed) Waste	Any	All	Label and dispose with IUEHS.
Biological	Any	All	Dispose as biological waste. See <a href="#">IU Biosafety Manual</a> for more information.
Gas	Any	Returnable Cylinder	Arrange return to vendor. See <a href="#">Compressed Gas Cylinder Safety Program</a> for more information.
Gas	Any	Non-Returnable Cylinder	Label and dispose with IUEHS. See <a href="#">Compressed Gas Cylinder Safety Program</a> for more information.
Gas/Pressurized liquid	Any	Sure-Pack	Label and dispose with IUEHS
Gas/Pressurized liquid	None	Sure-Pack	Purge according to manufacturer's guidelines and remove valve, mark as empty, refer to IUEHS.
Aerosols	Any	Aerosol can	Label and dispose with IUEHS.

## **Ethidium Bromide**

Ethidium bromide is a strong mutagen that in pure form is also highly toxic by inhalation. Ethidium bromide and preparations including stocks and gels are managed by IUEHS for disposal as chemical waste.

## **Explosive or Shock-Sensitive Chemicals**

A number of relatively common chemicals can become unstable and pose an explosion hazard when dried out, stored improperly or stored for extended periods. These materials require special handling. By adhering to IUEHS approved practices, the threat inherent to these materials can effectively be controlled. IUEHS asks that each department carefully review and adhere to the practices listed for each of the following: [2, 4-Dinitrophenol](#), [Peroxide Formers](#), [Picric Acid](#) and [Sodium Azide](#).

Unstable, reactive or peroxide-forming chemicals that are improperly stored, mixed with incompatible materials or otherwise mishandled can pose serious risks, including fire or explosion. Due to the high-hazard nature of these materials, IUEHS must contract special services for stabilization, transportation and disposal at an extremely high cost. If you have potentially explosive or shock-sensitive chemicals for disposal, contact IUEHS for assistance.

## **Fluorescent Light Bulbs (Laboratory)**

Mercury containing lamps such as compact fluorescent, UV or projector lamps may be referred to IUEHS for disposal. Broken mercury lamps are considered hazardous waste. If broken on a non-carpeted floor, the lamp should immediately be swept up with a broom and dust pan, collected into an airtight plastic bag, labeled, and referred to IUEHS for disposal.

## **General Refuse (Trash)**

Non-recyclable, non-hazardous refuse (trash) should be placed in designated area trashcans or dumpsters. Liquids and semi-liquids are prohibited from disposal in regional campus dumpsters and compactors. Broken glass must be placed into a rigid cardboard box and clearly marked with the words "BROKEN GLASS".

Treated biological waste containers must have indicator tape placed on them in order to confirm they were autoclaved prior to disposal in the general trash. Biohazard symbols must also be defaced. Dust forming materials must be containerized to eliminate release in the dumpsters and/or compactors.

## **Glass Waste**

Laboratory glass, whether intact or broken should be disposed in a rigid container such as a cardboard box. Boxes that contain broken glass must be marked with the words "Broken Glass" highly visible on the outside of the container. Ensure all glass bottles are empty and free of chemical residue before placing them into a glass disposal container.

## **Glycol Solutions**

Propylene glycol can be drain disposed to the sanitary sewer in accordance with the sewer disposal guidelines found in [Section 4](#) of this Guide. Ethylene glycol must be referred to IUEHS for chemical waste disposal.

## Lead

Lead has many uses, and is common at IU. The main activity for which lead is encountered by non-laboratory personnel is building renovations that require removal of lead paint.

Lead paint removal projects can generate both stripping solution waste and lead paint debris. Contact IUEHS for more information on handling and disposal.

## Mercury

IUEHS collects and recycles free-flowing metallic mercury. Package it in a tightly sealed and leak-free container. Place broken mercury thermometers in a one-gallon over-pack or a secured plastic bag and refer to IUEHS for proper management.

*Note: There are alternatives to mercury thermometers, and they should be used whenever possible. In addition, if you use mercury it is imperative that you have a mercury spill kit available.*

## Mixed Wastes

Mixed wastes are those that pose multiple hazards including biological, chemical and/or radiological. Handling and disposal of mixed wastes can be complex due to overlapping regulatory requirements and restrictions imposed by treatment facilities. IUEHS cannot dispose of waste that is radioactive, or that poses both chemical and biological hazards.

### *Radioactive Mixed Wastes*

In general, if a mixed waste is radioactive it must be referred to the Radiation Safety for disposal, even if biological or chemical hazards are also present. All waste containers must be fully and accurately labeled, and must be disposed in accordance with all Radiation Safety policies and procedures.

### *Biological and Chemical Mixed Wastes*

Wastes that contain a mixture of both biological and chemical components must be evaluated to determine if the chemical in the waste has deactivated/disinfected all biological hazards present. If not, the generator must add an adequate volume of an approved disinfectant that is chemically compatible with the waste such as ethanol, bleach, formalin, etc. The generator of such waste must certify that it has been disinfected, and communicate with IUEHS the type and volume of chemical disinfectant used. More information can be found in the [IU Biosafety Manual](#).

## Nonhazardous Waste

### *Laboratory Operations*

Most chemical waste is handled by IUEHS. However, you might have some nonhazardous waste listed as acceptable for sewer or trash disposal in [Attachment A](#) of this Guide.

Chemicals (liquids and solids) can be flushed to the sanitary sewer if they are:

- water soluble,
- degradable in the sanitary sewer system, **and**
- non-toxic.

Solid chemicals or spill clean-ups that are not water soluble, but are non-toxic, and do not present any other safety hazard or nuisance, can be disposed in the regular trash. All chemicals poured into the sewer must be followed by at least 20 parts water.



**Notes:** If you intend to dispose of more than one liter of a non-hazardous liquid or 5 pounds of solid, or if the material is not listed in [Attachment A](#) of this Guide, contact IUEHS prior to disposal for approval.

### ***Non-Laboratory Operations***

Some materials are not hazardous, but still cannot be disposed directly into the trash because of landfill restrictions. The most common restriction encountered is that liquids and semi-liquids are not allowed to be landfilled. Many oils, latex paint, and other water-based materials are non-hazardous and could be landfilled if they were solid, but cannot be when they are liquid.

Spill debris from non-hazardous wastes can be discarded in the trash, as long as all free liquid is absorbed. Minimal amounts of liquid in otherwise empty containers of non-hazardous wastes can be absorbed with kitty litter or other suitable absorbent material and disposed in the trash also.

Common examples of non-hazardous chemical waste include:

- Antifreeze and other glycols;
- Latex paint;
- Non-toxic pesticides (such as dormant oil), fertilizers and plant food;
- Oils (non-PCB) and cutting fluid; and
- Water-based coatings, detergents and surfactants.

### **Oil**

Various types of oil, including vacuum pump oil, motor oil, cutting oils, etc., that is not contaminated with solvent or other chemicals, must be referred to IUEHS or FS/PP, as appropriate for your respective campus for recycling. Any used oil that is contaminated with other chemicals must be accurately described and disposed as a chemical waste through IUEHS. If the oil contains PCB, the generator must indicate such on the label and as part of the chemical description on the Waste Chemical Label. The concentration of PCB in parts per million (PPM) should also be listed if known. **See also:** [Polychlorinated Byphenyls](#) and [Vacuum Pump Oil](#).

### **Paint and Paint Products**

Latex paint that is still in good condition, even if the container has been opened, should be redistributed if no longer wanted/needed. If a new recipient department is not found, latex paint can be solidified and disposed of in the general refuse (trash). Paint that contains lead, is oil based, or in an aerosol can (spray paint), must be referred to IUEHS for waste chemical disposal. Lead-based paint chips from construction or remediation must also be referred to IUEHS for disposal. **See also:** [Lead](#).

### **Peroxide Formers**

A variety of chemicals can form highly explosive peroxide compounds when exposed to air. Peroxides are sensitive to heat, friction, impact, and light and are among the most hazardous chemicals encountered in the laboratory. Care must be taken to prevent the formation of peroxides in these chemicals.

Preventing the formation of peroxides is dependent on inventory control of peroxide-forming chemicals. Most of these materials are distributed with inhibitors to drastically slow peroxide formation. These are usually effective until the container is first opened. To prevent peroxide hazards, peroxidizing-forming chemicals must be dated both *upon receipt and upon opening*. These materials must also be discarded as waste through IUEHS within the timeframes listed below.

IUEHS requirements for peroxide former waste acceptance are:

- The material must be **less than twelve months old**. This information must be marked clearly on the Waste Chemical Label.
- If the material is **greater than twelve months old but less than two years old**, check for peroxide formation by using peroxide test strips. If peroxide formation is detected, mark the test result in parts per million (PPM) on the Waste Chemical Label, along with the date tested. Request a waste pick-up immediately. If peroxide formation is greater than 100 ppm, immediately call IUEHS for technical assistance.
- If the material is **greater than 2 years old but less than 5 years old**, it should be assessed for other factors such as: duration of exposure to sunlight; volume of container; security of the seal; and exposure to changes in temperature. If you do not know the answer to any of these questions, find someone who does. **Do not open the container to check for peroxide formation**, as the material could be shock-sensitive. Call IUEHS immediately for technical assistance.
- If the container is **more than five years old**, do not move the container. Post a sign reading "DANGER: possible shock-sensitive chemical" and immediately call IUEHS for technical assistance.

### *Safety Tips for Peroxide Formers*

- Date peroxide formers when received and when first opened. In general, discard according to time limitations suggested by the manufacturer. For severe and high peroxide formation hazardous chemicals, the storage limitations are:

#### *Severe Peroxide Hazard (Discard within 3 months)*

Diisopropyl ether	Potassium amide
Divinylacetylene	Potassium metal
1,1-dichloroethylene (vinylidene dichloride)	Sodium amide

#### *High Peroxide Hazard (Discard within 6 months)*

Cumene	1,4-Dioxane
Cyclohexane	Diethyl ether
Cyclopentane	Ethylene glycol ethers
Methyl isobutyl ketone	Furan
Vinyl ethers	Tetrahydrofuran

- Avoid exposure to light or air. Store in light-resistant containers.
- Refrigeration does **not** prevent peroxide formation.
- As is the case with all hazardous chemicals, order only those amounts that you need.
- Do not move or attempt to open containers of unknown age. An obvious indicator of peroxide formation is evidence of needle-like structures or crystals in the liquid. However, dangerous peroxides may be present without obvious crystal formations. Peroxide crystals may have formed on the cap and threads. Call IUEHS for assistance.
- Never distill peroxide-forming solvents.

See also: [Explosive or Shock Sensitive Chemicals](#).

## Pesticides and Residues

Pesticides are regulated by the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). This regulation restricts the distribution, sale and use of pesticides. Certain “restricted use” pesticides can only be applied by individuals who are certified and trained. Un-used toxic pesticides and their residues should not be thrown away or poured into the drain. All toxic pesticides and containers with pesticide residues must be referred to IUEHS for waste chemical disposal.

## Pharmaceuticals

Non-controlled legend (prescription), over the counter and research drugs should be referred to IUEHS for disposal. See also: [Controlled Substances](#) for disposal of DEA scheduled materials.

## Picric acid

Picric acid, also known as trinitrophenol, is commonly used in laboratories. This compound is relatively stable in the form in which it is commercially distributed. It is ordinarily sold with 10% water added to stabilize it. However, picric acid can become explosive when allowed to dry out, or when it forms certain metal salts. The following steps should be taken to safely handle and store picric acid.

- Never allow picric acid to be stored in containers with metal lids, or to come into contact with any metal.
- Add water as needed to containers of picric acid to prevent the material from drying out. **Never place picric acid inside a desiccator!**
- **Never** attempt to open an old or dried out container of picric acid. This material must be referred to IUEHS for evaluation and disposal immediately.

If you are using other polynitroaromatic compounds, contact IUEHS for information on handling and storage. See also: [Explosive and Shock-Sensitive Chemicals](#).

## Polychlorinated Biphenyls (PCBs)

PCBs are synthetic chemicals manufactured until 1979 when they were banned in the United States. PCBs can be found inside heat transfer systems, hydraulic systems, transformers and lighting ballasts manufactured before that time. IUEHS manages and disposes of PCB containing fluids, equipment, research chemicals and contaminated debris. If you need to dispose of equipment that contains oil, dielectric fluid, hydraulic fluid or other potential sources of PCBs, please note the date that the equipment was taken out of service, and any information that can help IUEHS determine the date the equipment or fluid was manufactured. If fluid suspected of containing PCBs has leaked from equipment, follow campus emergency procedures to report a chemical spill immediately. See also: [Ballasts](#) and [Oil](#).

## Radioactive Waste

All radioactive materials and waste must be handled and disposed in accordance with the Radiation Safety policies and procedures.

## Recycling

Regional campuses have single-stream recycling for many items including plastics, paper, aluminum cans, steel and tin containers and cardboard. Labeled bins can be found in buildings throughout campuses.

Contact FS/PP or the sustainability committee for your respective campus for more information on recycling efforts.

## Refrigerant and Equipment

Refrigerants such as Freon® must not be released into the atmosphere and must be properly removed from equipment such as air conditioners, refrigerators and freezers prior to disposal.

Also, ensure that all chemical containers, specimens, etc. have been removed from refrigerators and freezers. Dispose waste chemical items according to this Guide. Ensure all refrigerated equipment used for biological, chemical or radioactive purposes is fully decontaminated and deface any of hazard markings before making arrangements for pick-up.

## Sharps

All sharps must be stored in appropriate, rigid containers that guard against puncture and injury. Potentially infectious or biologically contaminated sharps must be treated through autoclave before discarding into campus trash. Autoclave indicator tape must be used and the universal biohazard symbol must be defaced to confirm that the waste has been treated.

### Packaging, Labeling, and Disposal of Sharps Waste

<i>Contamination Type</i>	<i>Package</i>	<i>Labeling</i>	<i>Disposal</i>
Biological	See <a href="#">IU Biosafety Manual</a>	Deface biohazard symbols	Autoclave with indicator tape, ensure color change and dispose in trash  Or Chemically disinfect and dispose in trash
Chemical	Closed sealed box or plain (non-red) puncture resistant container	Waste Chemical Label with the description: Sharps contaminated with: “ _____ ”	Refer to IUEHS for disposal
Radiological	See <a href="#">Radiation Safety Procedures Manual</a>	See <a href="#">Radiation Safety Procedures Manual</a>	See <a href="#">Radiation Safety Procedures Manual</a>
Untamminated	Closed sealed box or plain (non-red) puncture resistant container	“Non-hazardous Sharps”  Or “Non-hazardous Sharps – Solid Waste”	Trash or building dumpster

## Sodium Azide

Sodium Azide, although not inherently unstable, may form highly explosive heavy metal azides if contaminated or used improperly. Disposal of sodium azide solutions to the sewer may lead to the formation of lead or copper azide in plumbing. Several serious explosions have occurred as a result of

improper disposal of sodium azide. Care should also be taken that sodium azide is not heated rapidly or stored in containers with metal lids. **See also:** [Explosive and Shock-Sensitive Chemicals](#).

## Solvent-Contaminated Wipes

Wipes and rags contaminated with solvents are subject to hazardous waste exemptions in certain circumstances. Wipes and rags contaminated with common solvents like turpentine and mineral spirits may be disposed in the regular trash as long as they are not dripping liquid.

**Note:** *Waste wipes and rags that contain solvents, oil based paints or oils should be placed in a covered metal container and taken to a dumpster at the end of each day to minimize odors and accumulation of combustibles.*

Wipes and rags contaminated with one or more of these solvents:

- |                       |  |
|-----------------------|--|
| - Acetone             | - Isobutyl alcohol                                       |
| - Benzene             | - Methanol   |
| - n-Butanol           | - Methyl ethyl ketone                                    |
| - Chlorobenzene       | - Methyl isobutyl ketone                                 |
| - Creosols            | - Methylene chloride                                     |
| - Cyclohexanone       | - Tetrachloroethylene                                    |
| - 1,2-Dichlorobenzene | - Toluene  |
| - Ethyl acetate       | - 1,1,2- Trichloroethane                                 |
| - Ethyl benzene       | - Trichloroethylene ( <i>*For reusable wipes only.</i> ) |
| - 2-Ethoxyethanol     | - Xylenes  |

must be collected and accumulated according to the following guidelines:

- They must be accumulated in your area in non-leaking containers that are closed at all times except when wipes and rags are being added.
- The accumulation containers must be labeled with the words “excluded solvent-contaminated wipes” or with other words that accurately describe the container contents.
- The containers must be shipped off-site for disposal within 180 days of the date that the first wipe or rag was placed in the drum. To ensure that this time limit is being heeded, IUEHS requires the containers to be dated when the first material is added, and for the containers to be transferred to IUEHS or to a reusable wipe/rag laundry service within 5 months.
- Wipes and rags must not contain free liquids when they are offered for disposal.
- If you use a laundry service for reusable wipes or rags, you must maintain the following information and make it available to IUEHS for inspection:
  - Name and address of the laundry service.
  - Shipment records showing that the 180-day accumulation time limit is being met.
  - A description of the process that you use to make sure that the wipes or rags contain no free liquids when shipped off-site.

## Spill Debris

For liquid spills that meet all of the reporting exception criteria listed in [Section 8](#) of this Guide, absorb with spill pads or disposable towels and place them into a sealed container or leak resistant bag. After absorption, use a small amount of soap and water to clean spill surfaces and dry thoroughly. For solids, sweep up the spill with a broom and dustpan. Collect the material into a plastic or glass container or Ziploc® bag. Do not use a shop vac or vacuum cleaner.

For inert, non-hazardous chemical spills, place in a sealed container, including the broken chemical container, contaminated towels, etc. for general trash disposal. Be sure all liquid spills are fully absorbed into paper or cloth towels or spill pads.

For spills involving material that must be managed by IUEHS, the debris must be in a closed container labeled as “Spill debris containing...” and a detailed list of the contents. Include everything in the container such as broken glass or metal if present, water, paper towels, etc.

## Strong Oxidizers and Reducers

Refer all strong oxidizers and reducers to IUEHS for disposal. Keep these items separate from each other, and box separately when disposing.

### *Strong oxidizers:*

Chromic acid (fresh)  
Metallic chlorates  
Metallic nitrates  
Metallic perchlorates  
Metallic permanganates  
Perchloric acid

### *Strong reducers:*

n-Butyl lithium  
Calcium hydride  
Metallic sulfides  
Sodium hydride  
Stannous chloride

## Temperature Controlled Substances

Some chemicals must be stored at constant, low temperatures to maintain their stability or integrity. These can include organic peroxides, self-reactive solids, and highly volatile compounds that must be kept cold in order to prevent thermal decomposition, fire and explosion, or container pressurization. For temperature controlled substance waste disposal:

- Keep the material in appropriate cold storage according to the manufacturer.
- Note the required temperature range needed to maintain stability of the waste and the specific location of the waste when contacting IUEHS for disposal.
- You must store potentially flammable materials in specialized refrigerator/freezers. These materials are prohibited from storage in regular, household-type refrigerator/freezer units.

## Universal Waste

Some waste materials meet the definition of a hazardous waste, but the EPA provides an exemption for certain materials destined for recycling. However, generators of Universal Waste must still comply with rules for accumulation, including segregation of waste types, labeling, and time limits. IU manages fluorescent lamps and batteries as Universal Waste. See [Attachment D](#) for printable labels. **Note: Spill debris from Universal Waste must be managed as a hazardous chemical waste. See also: [Batteries](#) and [Fluorescent Light Bulbs](#).**

### ***General Rules for Management of Universal Waste Batteries***

These rules apply to maintenance areas where batteries may be stored before proper recycling/disposal. The general requirements for Universal Waste Batteries are:

- Inspect batteries for condition issues such as corrosion, cracks or leaking. Regulations require that leaking batteries must be placed in a closed container with tight-fitting lid. Batteries with no condition issues can be placed in an open container.

**Note:** *Large lead-acid batteries found in vehicles and forklifts are not completely sealed at the top (they are “spillable”); thus they must be stored upright. Do not store spillable batteries outdoors or near floor drains. These batteries contain sulfuric acid. If a lead-acid battery tips over and spills, follow campus emergency procedures for chemical spills.*

- Label each battery or battery container with words “Universal Waste”, and a description such as “Spent Battery” or “Used Batteries”, as soon as the first battery is collected - or first goes into the container.
- Date - Each battery or container must be marked with the date that the first battery was collected and/or put into the container.
- Dispose - Each battery or container must be shipped off-site to an authorized Universal Waste handler within 12 months of the above date. To ensure compliance with this regulation, all Universal Waste batteries must be referred to FS/PP or IUEHS as appropriate for your respective campus.

### ***General Rules for Management of Universal Waste Fluorescent Bulbs***

Fluorescent light bulbs come in different sizes and shapes; long, straight lamps used in ballast operated light fixtures, or compact fluorescent bulbs used in place of incandescent bulbs. All fluorescent bulbs or lamps contain a small amount of mercury. Bulbs known as “green” or “green tip” contain mercury in low enough amounts to be exempt from waste regulations. They can be distinguished from standard mercury bulbs by their green end-caps or other markings. Collecting green lamps along with regular lamps for Universal Waste recycling is encouraged, but not required.

- All bulbs must be stored in a **closed** container to protect against breakage as soon as they are collected.
- Use boxes that the bulbs came in or round fiber drums provided by the disposal vendor. Make sure to use a box or drum that is long enough to fully cover the entire length of the bulbs in the container.
- Each container must be marked with the words “Universal Waste” and a description such as “Used Bulbs” or “Used Lamps” as soon as the first bulb goes into the container.
- Each container must be marked with the date that the first bulb went into the container.
- Each container must be shipped offsite to an authorized Universal Waste handler within 12 months of the above date to avoid violation of the regulations.
- If a bulb breaks before it is placed into a container, it is no longer a Universal Waste. The debris from the cleanup of the broken bulb must be managed as hazardous waste. Refer all broken lamps to IUEHS for disposal in a closed container with a Waste Chemical Label that states “Broken Mercury Bulb Debris”.

## Unknowns

Unlabeled or poorly labeled containers of chemicals or products in areas where hazardous materials are used or stored represent serious legal and safety problems for the University. They must be assumed hazardous unless evidence or certification to the contrary can be obtained.

Without an accurate description, it is difficult to characterize the hazards presented and dispose of the material legally and safely. Disposal companies will not accept chemical waste without an analysis or specifically defined characterization of hazards.

It is the responsibility of the person generating a waste to accurately keep track of the contents of containers so that the material can be described adequately for the disposal vendor when it is discarded. If proper labeling and records on containers are not maintained and an adequate description cannot be provided; or if the disposal company requires further analysis, it will result in a more costly disposal for the University, and ultimately to you as the generating campus/department/individual.

## Vacuum Pump Oil

Uncontaminated vacuum pump oil should be referred to FS/PP or IUEHS as appropriate for your respective campus. Contaminated vacuum pump oil should be marked or labeled as a waste chemical with the words "Used Pump Oil" and, if known, "contaminated with (list all known chemical contaminants)". Contaminated pump oil must be referred to IUEHS for disposal as a waste chemical. **See also:** [Oil](#).



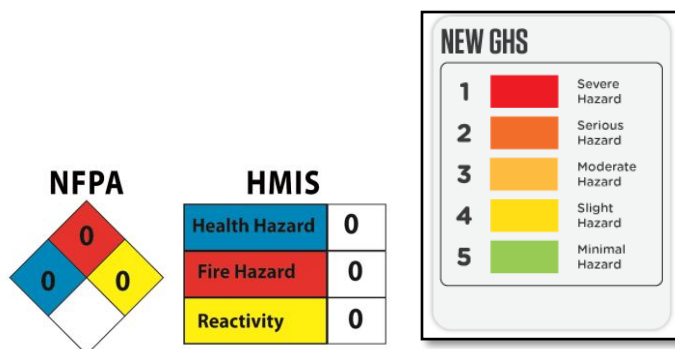
## Section 8: Spill Response Procedures

It is essential that all personnel who work around chemicals know how to respond in the event of an accidental chemical spill. IUEHS has developed the [Biological, Chemical, Radiological Spill Reporting and Response Program](#) to provide guidance in these situations.

In accordance with the [Biological, Chemical, Radiological Spill Reporting and Response Program](#), **all chemical spills** must be reported to IUEHS. **Do not** attempt to clean up spills involving chemicals that are flammable, toxic, corrosive or reactive as indicated on the label or SDS; or that cause eye or respiratory tract irritation; or chemicals that emit strong, or noxious odors or fumes.

The following spills are exempted from the reporting requirements provided that **ALL** of the following conditions are met:

1. Personnel directly involved in the spill have immediate access to the Hazardous Materials Information System (HMIS) rating for the chemical and the chemical has a rating of 0 or 1 for health, fire and reactivity and Globally Harmonized System (GHS) health, fire and reactivity ratings of 5 or 4.



2. The amount spilled is less than one (1) pint (~500 milliliters), if liquid, or one (1) pound (~500 grams), if solid, unless it is lubricating oil or latex paint, then the amount spilled may not exceed 1 gallon (~4 liters).
3. The material does not possess a noxious, nauseating or otherwise irritating odor or property.
4. The released material is contained on an impervious surface and has not and is not immediately threatening to contaminate soil, groundwater or surface water.

It is the responsibility of the spiller to ensure that spills involving small quantities of chemicals are cleaned up immediately, stored and disposed of properly. Regularly occurring leaks or spills are not exempted from the reporting requirements.

A spill kit capable of cleaning up exempted quantities of spilled material is to be kept on-site. In some circumstances, IUEHS may authorize trained onsite personnel to clean up a spill that does not meet the exceptions above.

Procedures for spills of biological and radioactive materials are addressed in the [IU Biosafety Manual](#) and the [Radiation Safety Manual](#) respectively.

## Attachment A: Disposal Options for Specific Chemicals

This table provides information on hazard and disposal options for common chemicals encountered in Indiana University laboratories, and applies to all campus locations. The first column lists the chemical name and percent concentration by volume, when applicable. The second column indicates whether the chemical poses a hazard that requires special handling for disposal. Follow the in-lab reduction methods outlined in [Section 4](#) for acid-base neutralization and sewer disposal in the *Disposal Option* column. Water-soluble solids are marked “SEWER ACCEPTABLE” when sewer disposal is preferable over trash. However, these materials are also acceptable for trash, as long as they are in sound, closed containers. Insoluble solids should always be disposed in the trash, and are marked as “TRASH ACCEPTABLE”. **Do not put liquids in the trash.**

If disposal option states “EHS”, that chemical must be disposed through your campus waste collection program. IUEHS will collect any chemical waste for off-site disposal or recycling as needed. The last column indicates whether or not chemically contaminated items (CCI’s) contaminated with that specific chemical can be disposed in the regular trash. This includes spill debris.

**Note:** *If you intend to dispose of more than one liter (liquids) or five pounds (solids) of any one of these chemicals, call IUEHS for your respective campus for further evaluation.*

CHEMICAL NAME, % CONCENTRATION	HAZARD?	DISPOSAL OPTION	CCI TO TRASH?
Acetaldehyde	YES	EHS	NO
Acetic Acid, >10%	YES	EHS	NO
Acetic Acid, <10%	YES	SEWER ACCEPTABLE	YES
Acetic Anhydride	YES	EHS	NO
Acetone	YES	EHS	NO
Acetonitrile	YES	EHS	NO
Acetyl Chloride	YES	EHS	NO
Acrolein	YES	EHS	NO
Acrylamide	YES	EHS	NO
Acrylonitrile	YES	EHS	NO
Agar	NO	SEWER ACCEPTABLE	YES
Albumin	NO	SEWER ACCEPTABLE	YES
Alfatoxins	YES	EHS	NO
Aluminum ammonium sulfate	NO	SEWER ACCEPTABLE	YES
Aluminum oxide	NO	TRASH ACCEPTABLE	YES
Aluminum potassium sulfate	NO	SEWER ACCEPTABLE	YES

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
<b>Aluminum chloride</b>	YES	EHS	NO
<b>Amino acids</b>	NO	SEWER ACCEPTABLE	YES
<b>Ammonium acetate</b>	NO	SEWER ACCEPTABLE	YES
<b>Ammonium bicarbonate</b>	YES	EHS	NO
<b>Ammonium carbonate</b>	YES	EHS	NO
<b>Ammonium chloride</b>	NO	SEWER ACCEPTABLE	YES
<b>Ammonium citrate</b>	NO	SEWER ACCEPTABLE	YES
<b>Ammonium hydroxide</b>	YES	ACID/BASE NEUTRALIZATION	NO
<b>Ammonium lactate</b>	YES	EHS	NO
<b>Ammonium nitrate</b>	YES	EHS	NO
<b>Ammonium oxalate</b>	YES	EHS	NO
<b>Ammonium persulfate</b>	YES	EHS	NO
<b>Ammonium phosphate Monobasic</b>	NO	SEWER ACCEPTABLE	YES
<b>Ammonium phosphate Dibasic</b>	NO	SEWER ACCEPTABLE	YES
<b>Ammonium sulfamate</b>	YES	EHS	NO
<b>Ammonium sulfate</b>	NO	SEWER ACCEPTABLE	YES
<b>Ammonium sulfide solution</b>	YES	EHS	NO
<b>Amyl acetate</b>	YES	EHS	NO
<b>Amyl Alcohol</b>	YES	EHS	NO
<b>Aniline</b>	YES	EHS	NO
<b>Antimony salts and compounds</b>	YES	EHS	NO
<b>Antineoplastic drugs</b>	YES	EHS	NO
<b>Arsenic salts and compounds</b>	YES	EHS	NO
<b>Ascorbic acid</b>	NO	SEWER ACCEPTABLE	YES
<b>Barium salts and compounds</b>	YES	EHS	NO
<b>Basic fuschin</b>	YES	EHS	NO
<b>Benz(a) Anthracene</b>	YES	EHS	NO
<b>Benzene</b>	YES	EHS	NO

CHEMICAL NAME, % CONCENTRATION	HAZARD?	DISPOSAL OPTION	CCI TO TRASH?
Benzidine and based dyes	YES	EHS	NO
Benzoic acid	YES	EHS	NO
Benzoyl peroxide	YES	EHS	NO
Beryllium salts and compounds	YES	EHS	NO
Boric acid	YES	EHS	NO
Bouin's solution	YES	EHS	NO
Bromine	YES	EHS	NO
Bromoacetic acid	YES	EHS	NO
Bromophenol blue	NO	EHS	NO
Butanol	YES	EHS	NO
2-Butanone	YES	EHS	NO
Butyl acetate	YES	EHS	NO
Butyl methacrylate	YES	EHS	NO
Butylamine	YES	EHS	NO
Butyric acid	YES	EHS	NO
Cacodylic acid	YES	EHS	NO
Cadmium salts and compounds	YES	EHS	NO
Calcium borate	NO	SEWER ACCEPTABLE	YES
Calcium carbonate	NO	SEWER ACCEPTABLE	YES
Calcium chloride	NO	SEWER ACCEPTABLE	YES
Calcium citrate	NO	SEWER ACCEPTABLE	YES
Calcium hydride	YES	EHS	NO
Calcium hypochlorite	YES	EHS	NO
Calcium lactate	NO	SEWER ACCEPTABLE	YES
Calcium nitrate	YES	EHS	NO
Calcium nitrite	YES	EHS	NO
Calcium oxide	YES	EHS	NO
Calcium phosphate	YES	EHS	NO
Calcium sulfate	NO	SEWER ACCPETABLE	YES

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
<b>Carbon disulfide</b>	YES	EHS	NO
<b>Carbon Tetrachloride</b>	YES	EHS	NO
<b>Casamino acid</b>	NO	SEWER ACCEPTABLE	YES
<b>Chlorinated solvents</b>	YES	EHS	NO
<b>Chloroacetic acid</b>	YES	EHS	NO
<b>Chloroform</b>	YES	EHS	NO
<b>Chromic acid</b>	YES	EHS	NO
<b>Chromium salts and compounds</b>	YES	EHS	NO
<b>Chromium trioxide</b>	YES	EHS	NO
<b>Citric acid</b>	NO	SEWER ACCEPTABLE	YES
<b>Cobalt chloride</b>	YES	EHS	NO
<b>Cobalt Oxide</b>	YES	EHS	NO
<b>Collodion</b>	YES	EHS	NO
<b>Copper salts and compounds</b>	YES	EHS	NO
<b>Cresol</b>	YES	EHS	NO
<b>Crystal violet</b>	YES	EHS	NO
<b>Cyanides</b>	YES	EHS	NO
<b>Cyanogen bromide</b>	YES	EHS	NO
<b>Cyclohexane</b>	YES	EHS	NO
<b>Cyclohexanone</b>	YES	EHS	NO
<b>Cyclohexene</b>	YES	EHS	NO
<b>Dextrose</b>	NO	SEWER ACCEPTABLE	YES
<b>3,3'-diaminobenzidine</b>	YES	EHS	NO
<b>o-Dianisidine</b>	YES	EHS	NO
<b>Diazomethane</b>	YES	EHS	NO
<b>Dibutyl phthalate</b>	YES	EHS	NO
<b>Dichlorodimethylsilane</b>	YES	EHS	NO
<b>Dichloromethane</b>	YES	EHS	NO
<b>Ethanolamine</b>	YES	EHS	NO

CHEMICAL NAME, % CONCENTRATION	HAZARD?	DISPOSAL OPTION	CCI TO TRASH?
Diethyl ether	YES	EHS	NO
Diethyl sulfate	YES	EHS	NO
Diethyl amine	YES	EHS	NO
3,3'-Dimethoxybenzidine	YES	EHS	NO
Dimethyl phthalate	YES	EHS	NO
Dimethyl sulfate	YES	EHS	NO
Dimethyl sulfoxide	YES	EHS	NO
Dimethylaminobenzene	YES	EHS	NO
N,N-Dimethyl aniline	YES	EHS	NO
Dimethylformamide	YES	EHS	NO
Dimethyl hydrazine	YES	EHS	NO
Drierite	NO	TRASH ACCEPTABLE	YES
Epichlorohydrin	YES	EHS	NO
Epoxy resins	YES	EHS	NO
Ethanol	YES	EHS	NO
Ethanolamine	YES	EHS	NO
Ethidium bromide	YES	EHS	NO
2-Ethoxyethanol	YES	EHS	NO
Ethyl acetate	YES	EHS	NO
Ethyl methanesulfonate	YES	EHS	NO
Ethylamine	YES	EHS	NO
Ethyl dibromide	YES	EHS	NO
Ethylene glycol	NO	SEWER ACCEPTABLE	YES
Ethylene oxide	YES	EHS	NO
Ethylenediamine tetracetic acid (EDTA)	YES	EHS	NO
Ferric Chloride	YES	EHS	NO
Ferric oxide	NO	SEWER ACCEPTABLE	YES
Ferrous ammonium sulfate	YES	EHS	NO
Ferrous oxide	NO	SEWER ACCEPTABLE	YES

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
<b>Ferrous sulfate</b>	YES	EHS	NO
<b>Formaldehyde, &gt;/=37% solution</b>	YES	EHS	NO
<b>Formaldehyde, &lt;/=10% solution</b>	YES	SEWER ACCEPTABLE	YES
<b>Formamide</b>	YES	EHS	NO
<b>Formic acid</b>	YES	EHS	NO
<b>Galactose</b>	NO	SEWER ACCEPTABLE	YES
<b>Gasoline</b>	YES	EHS	NO
<b>Gelatin</b>	NO	SEWER ACCEPTABLE	YES
<b>Glucose</b>	NO	SEWER ACCEPTABLE	YES
<b>Gluteraldehyde</b>	YES	EHS	NO
<b>Glycerol</b>	NO	SEWER ACCEPTABLE	YES
<b>Glycine</b>	NO	SEWER ACCEPTABLE	YES
<b>Graphite powder</b>	YES	EHS	NO
<b>Gum arabic</b>	NO	SEWER ACCEPTABLE	YES
<b>Gum guaiac</b>	NO	SEWER ACCEPTABLE	YES
<b>Hematoxylin</b>	NO	SEWER ACCEPTABLE	YES
<b>Heptane</b>	YES	EHS	NO
<b>Hexane</b>	YES	EHS	NO
<b>Hexanol</b>	YES	EHS	NO
<b>Hydrazine</b>	YES	EHS	NO
<b>Hydrobromic acid</b>	YES	EHS	NO
<b>Hydrochloric acid</b>	YES	ACID-BASE NEUTRALIZATION	NO
<b>Hydrofluoric acid</b>	YES	EHS	NO
<b>Hydrogen Peroxide</b>	YES	EHS	NO
<b>Hydroxylamine hydrochloride</b>	YES	EHS	NO
<b>Iodine</b>	YES	EHS	NO
<b>Isooctane</b>	YES	EHS	NO
<b>Isopropyl Ether</b>	YES	EHS	NO
<b>Kerosene</b>	YES	EHS	NO

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
Lactic Acid	YES	EHS	NO
Lacquer thinner	YES	EHS	NO
Lactose	NO	SEWER ACCEPTABLE	YES
Laser dyes	NO	EHS	NO
Lead, salts and compounds	YES	EHS	YES
Lithium aluminum hydride	YES	EHS	NO
Lithium carbonate	YES	EHS	NO
Lithium chloride	YES	EHS	NO
Lithium sulfate	YES	EHS	NO
Lutidine	YES	EHS	NO
Magnesium borate	NO	SEWER ACCEPTABLE	YES
Magnesium carbonate	NO	TRASH ACCEPTABLE	YES
Magnesium chloride	NO	SEWER ACCEPTABLE	YES
Magnesium citrate	YES	EHS	NO
Magnesium lactate	NO	SEWER ACCEPTABLE	YES
Magnesium oxide	NO	SEWER ACCEPTABLE	YES
Magnesium perchlorate	YES	EHS	NO
Magnesium phosphate	NO	SEWER ACCEPTABLE	YES
Magnesium sulfate	NO	SEWER ACCEPTABLE	YES
Malt extract	NO	SEWER ACCEPTABLE	YES
Maltose	NO	SEWER ACCEPTABLE	YES
Manganese acetate	YES	EHS	NO
Manganese chloride	YES	EHS	NO
Manganese sulfate	NO	SEWER ACCEPTABLE	YES
Mercaptans, any	YES	EHS	NO
Mercury, salts & compounds	YES	EHS	NO
Mercury metal	YES	EHS	NO
Methanol	YES	EHS	NO
2-Methoxyethanol	YES	EHS	NO



<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
<b>Methyl acetate</b>	YES	EHS	NO
<b>Methyl ethyl ketone</b>	YES	EHS	NO
<b>Methyl isobutyl ketone</b>	YES	EHS	NO
<b>Methyl methacrylate</b>	YES	EHS	NO
<b>Methyl methanesulfonate</b>	YES	EHS	NO
<b>Methyl red</b>	YES	EHS	NO
<b>Methyl salicylate</b>	NO	SEWER/TRASH ACCEPTABLE	YES
<b>Methylamine</b>	YES	EHS	NO
<b>2-Methylbutane</b>	YES	EHS	NO
<b>Methylene blue</b>	NO	EHS	NO
<b>Methylene chloride</b>	YES	EHS	NO
<b>Mineral oil</b>	YES	EHS	NO
<b>Naphthalene</b>	YES	EHS	NO
<b>Nickel, salts and compounds</b>	YES	EHS	NO
<b>Nitric acid</b>	YES	EHS	NO
<b>Nitrobenzene</b>	YES	EHS	NO
<b>Nitromethane</b>	YES	EHS	NO
<b>Nitrosamides</b>	YES	EHS	NO
<b>Nitrosamines</b>	YES	EHS	NO
<b>Oil</b>	NO	EHS	YES
<b>Osmium tetroxide</b>	YES	EHS	NO
<b>Oxalic acid</b>	YES	EHS	NO
<b>Paint, acrylic</b>	YES	EHS	YES
<b>Paint, latex</b>	YES	EHS	YES
<b>Paint, oil based</b>	YES	EHS	NO
<b>Paint solvents</b>	YES	EHS	NO
<b>Paraffin</b>	NO	TRASH ACCEPTABLE	YES
<b>Paraformaldehyde solid</b>	YES	EHS	NO
<b>Paraformaldehyde solution &gt;5%</b>	YES	EHS	NO

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
<b>Paraformaldehyde solution &lt;5%</b>	NO	SEWER ACCEPTABLE	YES
<b>Pentachlorophenol</b>	YES	EHS	NO
<b>Pentane</b>	YES	EHS	NO
<b>Pepsin</b>	YES	EHS	NO
<b>Peptone</b>	NO	SEWER ACCEPTABLE	YES
<b>Perchloric acid</b>	YES	EHS	NO
<b>Periodic acid</b>	YES	EHS	NO
<b>Petroleum ether</b>	YES	EHS	NO
<b>Petroleum jelly</b>	NO	TRASH ACCEPTABLE	YES
<b>Phenol</b>	YES	EHS	NO
<b>Phenyl hydrazine</b>	YES	EHS	NO
<b>Phorbol esters</b>	YES	EHS	NO
<b>Phosphomolybdic acid</b>	YES	EHS	NO
<b>Phosphoric acid</b>	YES	EHS	NO
<b>Phosphorus pentoxide</b>	YES	EHS	NO
<b>Phosphorus, red or yellow</b>	YES	EHS	NO
<b>Photographic fixer</b>	YES	EHS	NO
<b>Photographic developer</b>	YES	EHS	NO
<b>Picric acid</b>	YES	EHS	NO
<b>Potassium acetate</b>	YES	EHS	NO
<b>Potassium bicarbonate</b>	NO	SEWER ACCEPTABLE	YES
<b>Potassium bisulfate</b>	YES	EHS	NO
<b>Potassium bitartrate</b>	NO	SEWER ACCEPTABLE	YES
<b>Potassium bromide</b>	YES	EHS	NO
<b>Potassium carbonate</b>	YES	EHS	NO
<b>Potassium chloride</b>	NO	SEWER ACCEPTABLE	YES
<b>Potassium citrate</b>	NO	SEWER ACCEPTABLE	YES
<b>Potassium chromate</b>	YES	EHS	NO
<b>Potassium cyanate</b>	YES	EHS	NO

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
Potassium cyanide	YES	EHS	NO
Potassium bichromate	YES	EHS	NO
Potassium ferricyanide	YES	EHS	NO
Potassium ferrocyanide	YES	EHS	NO
Potassium fluoride	YES	EHS	NO
Potassium hydroxide	YES	EHS	NO
Potassium iodate	YES	EHS	NO
Potassium iodide	NO	SEWER ACCEPTABLE	YES
Potassium nitrate	YES	EHS	NO
Potassium nitrite	YES	EHS	NO
Potassium oxalate	YES	EHS	NO
Potassium permanganate	YES	EHS	NO
Potassium persulfate	YES	EHS	NO
Potassium phosphate	YES	EHS	NO
Potassium sodium tartrate	NO	SEWER ACCEPTABLE	YES
Potassium sulfate	YES	EHS	NO
Potassium sulfite	NO	SEWER ACCEPTABLE	YES
Potassium thiocyanate	YES	EHS	NO
Potassium metal	YES	EHS	NO
Propanethiol	YES	EHS	NO
Propanol	YES	EHS	NO
Propionaldehyde	YES	EHS	NO
Propionic acid	YES	EHS	NO
Propylamine	YES	EHS	NO
Propylene glycol	NO	SEWER ACCEPTABLE	YES
Propylene oxide	YES	EHS	NO
Pumice	NO	TRASH ACCEPTABLE	YES
Pyridine	YES	EHS	NO
Selenium, salts and compounds	YES	EHS	NO

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
Silver nitrate	YES	EHS	NO
Silver, salts and compounds	YES	EHS	NO
Sodium acetate	NO	SEWER ACCEPTABLE	YES
Sodium ammonium phosphate	NO	SEWER ACCEPTABLE	YES
Sodium arsenate	YES	EHS	NO
Sodium azide	YES	EHS	NO
Sodium benzoate	YES	EHS	NO
Sodium bicarbonate	NO	SEWER ACCEPTABLE	YES
Sodium bisulfate	YES	EHS	NO
Sodium bisulfite	YES	EHS	NO
Sodium borate	YES	EHS	NO
Sodium bromide	YES	EHS	NO
Sodium cacodylate	YES	EHS	NO
Sodium carbonate	YES	EHS	NO
Sodium chloride	NO	SEWER ACCEPTABLE	YES
Sodium chromate	YES	EHS	NO
Sodium citrate	NO	SEWER ACCEPTABLE	YES
Sodium cyanate	YES	EHS	NO
Sodium cyanide	YES	EHS	NO
Sodium dichromate	YES	EHS	NO
Sodium dodecyl sulfate (SDS)	NO	SEWER ACCEPTABLE	YES
Sodium fluoride	YES	EHS	NO
Sodium hydroxide	YES	ACID/BASE NEUTRALIZATION	NO
Sodium iodide	YES	EHS	NO
Sodium lactate	NO	SEWER ACCEPTABLE	YES
Sodium metal	YES	EHS	NO
Sodium methoxide	YES	EHS	NO
Sodium nitrate	YES	EHS	NO
Sodium nitrite	YES	EHS	NO

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
Sodium oxalate	YES	EHS	NO
Sodium perchlorate	YES	EHS	NO
Sodium phosphate	NO	SEWER ACCEPTABLE	YES
Sodium pyrophosphate	YES	EHS	NO
Sodium salicylate	YES	EHS	NO
Sodium succinate	YES	EHS	NO
Sodium sulfate	YES	EHS	NO
Sodium sulfite	NO	SEWER ACCEPTABLE	YES
Sodium sulfide	YES	EHS	NO
Sodium tartrate	NO	SEWER ACCEPTABLE	YES
Sodium thiocyanate	YES	EHS	NO
Sodium thiosulfate	YES	EHS	NO
Sodium tungstate	YES	EHS	NO
Stannic chloride	YES	EHS	NO
Stannic oxide	YES	EHS	NO
Stannous oxide	YES	EHS	NO
Starch	NO	TRASH ACCEPTABLE	YES
Strontium carbonate	NO	SEWER ACCEPTABLE	YES
Strontium phosphate	NO	SEWER ACCEPTABLE	YES
Strontium sulfate	NO	SEWER ACCEPTABLE	YES
Sucrose	NO	SEWER ACCEPTABLE	YES
Sugars	NO	SEWER ACCEPTABLE	YES
Sugar alcohols	NO	SEWER ACCEPTABLE	YES
Sulfuric acid	YES	EHS	NO
Talcum powder	NO	TRASH ACCEPTABLE	YES
Tetrachloroethylene	YES	EHS	NO
Tetrahydrofuran	YES	EHS	NO
Tetramethylethyldiamine	YES	EHS	NO
Thallium, salts and compounds	YES	EHS	NO

<b>CHEMICAL NAME, % CONCENTRATION</b>	<b>HAZARD?</b>	<b>DISPOSAL OPTION</b>	<b>CCI TO TRASH?</b>
<b>Thionyl chloride</b>	YES	EHS	NO
<b>Thymol</b>	YES	EHS	NO
<b>Titanium dioxide</b>	NO	TRASH ACCEPTABLE	YES
<b>Toluene</b>	YES	EHS	NO
<b>o-Toluidine</b>	YES	EHS	NO
<b>Trichloroacetic acid</b>	YES	EHS	NO
<b>1,1,1-Trichloroethane</b>	YES	EHS	NO
<b>Trichloroethylene</b>	YES	EHS	NO
<b>Trichlorosilane</b>	YES	EHS	NO
<b>Triethanolamine</b>	YES	EHS	NO
<b>Triethylamine</b>	YES	EHS	NO
<b>Trifluoroacetic acid</b>	YES	EHS	NO
<b>Trimethylchlorosilane</b>	YES	EHS	NO
<b>Trypticase</b>	YES	EHS	NO
<b>Trizma base</b>	YES	EHS	NO
<b>Uracil mustard</b>	YES	EHS	NO
<b>Urea</b>	NO	SEWER ACCEPTABLE	YES
<b>Valeric acid</b>	YES	EHS	NO
<b>Xylene</b>	YES	EHS	NO
<b>Yeast extract</b>	NO	SEWER ACCEPTABLE	YES
<b>Zinc cyanide</b>	YES	EHS	NO
<b>Zinc oxide</b>	NO	TRASH ACCEPTABLE	YES

## Attachment B: Satellite Accumulation Area Requirements

Print this page and post in your area for reference:

### SATELLITE ACCUMULATION AREA REQUIREMENTS

- Make sure that all waste containers and drums are in good condition and working properly. There should be no holes, leaks, or missing/extra parts that prevent secure closure.
- Label all containers and drums of hazardous waste with the words that **fully** identify the material and its hazards to everyone entering the work area.
- Separate incompatible wastes as much as possible. Examples: acids away from caustics, ammonia away from bleach, and oxidizers away from organics. Keep flammables away from ignition sources.
- Close all hazardous waste containers and drums when you are not adding waste to them even if when stepping away for a short time.
- Keep all hazardous waste containers and drums in the same location or area where waste is generated, and under control of the generator of the waste until it is picked up by IU EHS or an approved/authorized vendor.
- Date chemical waste drums when they become *full* on the waste tag or label. This is when hazardous waste officially begins accumulating, thus it is the “accumulation start date”.
- Date Universal Waste and PCB waste at the moment the *first waste is placed into a container*. Note this is the opposite of the requirement for hazardous (chemical) waste.
- Follow good housekeeping practices. Keep a clean work area and clean up spills immediately when they occur.
- Take your waste to a scheduled waste collection (IU Bloomington campus) or request a waste-pick up when your waste container(s) are full. If 55 gallons in total waste volume is reached, the waste must be removed within 3 business days. Do not exceed 55 gallons of waste in an SAA.

## Attachment C: Chemical Compatibility Charts

# CHEMICAL COMPATIBILITY

Chemicals in Columns A and B should be kept separate. Oxidizing agents include the types of compounds listed in the entry for alkali and alkali earth metals.

COLUMN A	COLUMN B
ACIDS	BASES
ALKALI AND ALKALINE EARTH METALS: Carbides Hydrides Hydroxides Oxides Peroxides	WATER ACIDS HALOGENATED ORGANIC COMPOUNDS OXIDIZING AGENTS: Chromates, dichromates Halogens Halogenating agents Hydrogen peroxide and peroxides Nitric acid, nitrates Perchlorates and chlorates Permanganates Persulfates
INORGANIC AZIDES	ACIDS HEAVY METALS AND THEIR SALTS OXIDIZING AGENTS
INORGANIC CYANIDES	ACIDS STRONG BASES
INORGANIC NITRATES	ACIDS METALS NITRITES SULFUR
INORGANIC NITRITES	ACIDS OXIDIZING AGENTS
INORGANIC SULFIDES	ACIDS
ORGANIC COMPOUNDS: Organic acyl halides Organic anhydrides Organic halogen compounds Organic nitro compounds	ALUMINUM METAL OXIDIZING AGENTS ORGANIC HYDROXY COMPOUNDS STRONG BASES
POWDERED METALS	ACIDS OXIDIZING AGENTS



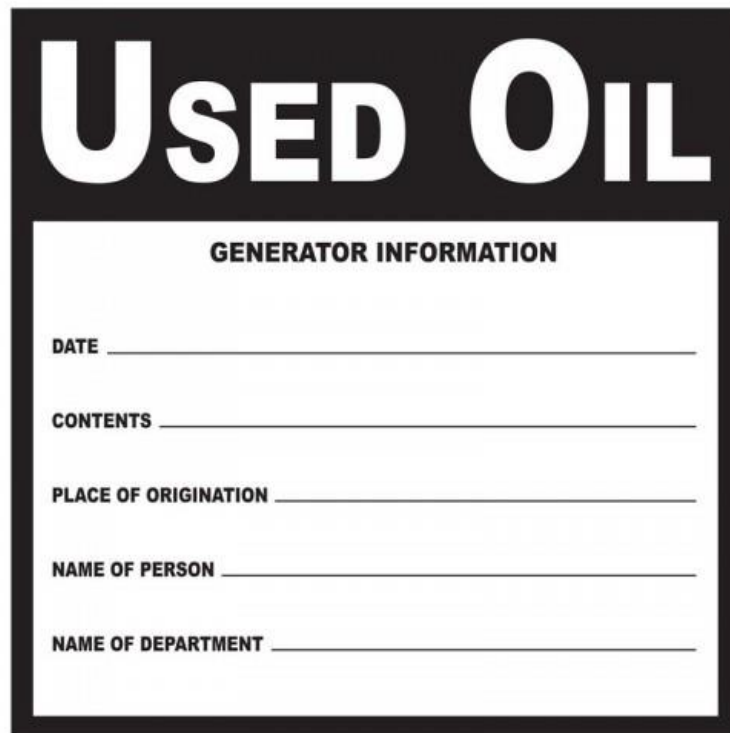
## SPECIFIC CHEMICAL INCOMPATIBILITIES

COLUMN A	COLUMN B
ACETYLENE AND MONOSUBSTITUTED ACETYLENE (R-C CH)	HALOGENS METALS AND THEIR SALTS
AMMONIA AND AMMONIUM HYDROXIDE	HALOGENS HALOGENATING AGENTS SILVER MERCURY
CARBON, ACTIVATED	OXIDIZING AGENTS
HYDROGEN PEROXIDE	METALS AND THEIR SALTS
MERCURY AND IT'S AMALGAMS	AMMONIA AND AMMONIUM HYDROXIDE
NITRIC ACID	METALS SULFURIC ACID SULFIDES NITRITES AND OTHER REDUCING AGENTS CHROMIC ACID AND CHROMATES PERMANGANATES
OXALIC ACID	SILVER MERCURY
PHOSPHORUS (YELLOW)	OXYGEN OXIDIZING AGENTS STRONG BASES
PHOSPHORUS PENTOXIDE	WATER HALOGENATING AGENTS
SULFURIC ACID	METALS CHLORATES PERCHLORATES PERMANGANATES NITRIC ACID

## Attachment D: Label Examples by Waste Type

PCB waste, Universal Waste and Used Oil all have unique labels that are required by regulations. All other waste containers, including drums, should be labeled with completed Waste Chemical Label or Tag. Examples by waste type are provided in this Attachment, and can be printed and affixed to containers. Or, labels can be ordered from a commercial label vendor.

The following pages contain printable labels for *Spent PCB Ballasts*, *Universal Waste Lamps* and *Universal Waste Batteries*. The PCB ballast container labels are compatible with 3 1/3" x 4" shipping labels (6 per page) template in Microsoft® Office Word. The Universal Waste labels are compatible with 2" x 4" shipping labels (10 per page) in Microsoft® Office Word. Additional options are provided with Avery® 5165 compatible labels (5 per page). If you are having trouble obtaining labels, contact IUEHS at your respective campus. Drum quantities of Used Oil should be labeled as "Used Oil"



A black and white label template for Used Oil. The top half features the words "USED OIL" in large, bold, white capital letters on a black background. Below this, the text "GENERATOR INFORMATION" is centered in bold. The bottom half of the label is white and contains five lines of text, each followed by a horizontal line for input: "DATE", "CONTENTS", "PLACE OF ORIGIN", "NAME OF PERSON", and "NAME OF DEPARTMENT".

PCB containing ballasts and contaminated oil or debris with greater than 50 parts per million PCBs should be also labeled with the words "Caution: Contains PCBs" as shown here:



**SPENT**

**BALLASTS**

(>50PPM PCBs)

**OUT OF SERVICE DATE:**

\_\_\_/\_\_\_/\_\_\_

**SPENT**

**BALLASTS**

(>50PPM PCBs)

**OUT OF SERVICE DATE:**

\_\_\_/\_\_\_/\_\_\_

**SPENT**

**BALLASTS**

(>50PPM PCBs)

**OUT OF SERVICE DATE:**

\_\_\_/\_\_\_/\_\_\_

**SPENT**

**BALLASTS**

(>50PPM PCBs)

**OUT OF SERVICE DATE:**

\_\_\_/\_\_\_/\_\_\_

**SPENT**

**BALLASTS**

(>50PPM PCBs)

**OUT OF SERVICE DATE:**

\_\_\_/\_\_\_/\_\_\_

**SPENT**

**BALLASTS**

(>50PPM PCBs)

**OUT OF SERVICE DATE:**

\_\_\_/\_\_\_/\_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
LAMPS**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

**UNIVERSAL WASTE  
BATTERIES**

ACCUMULATION START DATE:  
\_\_\_ / \_\_\_ / \_\_\_

# UNIVERSAL WASTE BULBS

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BULBS

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BULBS

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BULBS

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BULBS

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BATTERIES

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BATTERIES

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BATTERIES

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BATTERIES

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

# UNIVERSAL WASTE BATTERIES

INDIANA UNIVERSITY

ACCUMULATION START DATE: \_\_\_\_\_

## Annex 1: Hazardous Waste Determinations

This section outlines how Indiana University Environmental Health and Safety (IUEHS) determines if waste is regulated by the Environmental Protection Agency (EPA) under the Resource Conservation and Recovery Act (RCRA). All chemical waste should be managed as hazardous unless otherwise indicated in this Guide, or you have been instructed by IUEHS for the respective campus that it is non-hazardous. IUEHS for the respective campus will make the regulatory determination for all waste, and manage it accordingly.

RCRA, as enforced by the EPA and Indiana Department of Environmental Management (IDEM) classifies waste as hazardous if it:

- Is a listed hazardous waste (specifically identified by an alpha-numeric code from one of four lists maintained by EPA) **or**,
- Exhibits certain hazardous characteristics (also identified with an alpha-numeric code) as determined by standardized testing procedures.

### Hazardous Waste Characteristics

There are four main characteristics that the EPA has determined parameters for identifying through testing. RCRA also established regulatory limits for the toxicity characteristic for a defined list of materials. IUEHS evaluates each incoming waste material for these characteristics, and assigns the alpha-numeric codes to the waste when appropriate. In part, these codes are used to track the nature, volume, and off-site treatment requirements of hazardous waste generated by the University.

#### Ignitability

Ignitable wastes are capable of causing or intensifying a fire during routine handling. A waste exhibits the ignitable characteristic when it is any of the following:

- A liquid with a flash point less than 140° F (60° C);
- A solid under standard temperature and pressure capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes; and when ignited, burns vigorously and persistently;
- An ignitable compressed gas; or
- An oxidizer.

#### Corrosivity

Corrosive wastes include highly acidic or highly alkaline chemicals and those that are capable of corroding metal. A waste has the characteristic of being corrosive if it is any of the following:

- Aqueous waste with pH 2.5 or less, OR pH 12.5 or greater;
- A liquid that corrodes steel at a rate greater than 6.35mm (0.25 inches) per year.

If a waste exhibits ONLY the corrosive characteristic, and is NOT a listed waste, it may be neutralized before disposal to the sanitary sewer (see Attachment A). When in doubt, or if neutralization is not feasible, IUEHS for the respective campus should manage the waste.



## Reactivity

Reactive wastes are unstable under normal conditions. A waste is regulated for the reactive characteristic if it:

- Is normally unstable and readily undergoes violent change without detonating;
- Reacts violently with water;
- Forms potentially explosive mixtures with water;
- Mixes with water to generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
- Is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
- Is capable of detonation or explosive reaction if subjected to a strong initiating source or heated under confinement;
- Is readily capable of detonation or explosive; or
- Is a forbidden explosive or a Class A or Class B explosive.

## Toxicity

Toxicity is determined by the “toxicity characteristic leachate procedure” (TCLP); a laboratory test that measures the concentration of a toxic material that could leach into ground water if the waste is improperly managed. The TCLP must be conducted on waste that contains any of the specified TCLP contaminants, unless knowledge of the waste can demonstrate the waste will not exhibit a contaminant TCLP concentration above the regulatory level set by the EPA. IUEHS assumes any waste that contains TCLP contaminants is at or above the regulatory limit, unless we have conducted sample analysis to determine that it is not. Any waste that contains these compounds must be disposed through IUEHS for the respective campus.

TCLP contaminants and their regulatory levels are found in the table on the following page.

## Listed Hazardous Waste

EPA defines some chemicals as hazardous by name or description using four lists within the RCRA regulations and can be found at <http://www.epa.gov/waste/hazard/wastetypes/listed.htm>. It is not necessary to know all of the materials on these lists because IUEHS makes the determination whether or not a waste meets the definition of hazardous. However, it ***IS*** important for to accurately describe waste for disposal so that we have all of the information necessary to make a correct waste determination.

It is also important to note that RCRA requires collection and disposal of the original, empty product containers as regulated hazardous waste for materials on one list; the “P-list” for *acutely toxic commercial products*. The P-list is found [here](#) on the EPA website.

## RCRA Characteristic Waste and Regulatory Levels

Contaminant	Regulatory Level (mg/L)	EPA Hazardous Waste Code
Arsenic	5.0	D004
Barium	100.0	D005
Benzene	0.5	D018
Cadmium	1.0	D006
Carbon Tetrachloride	0.5	D019
Chlordane	0.03	D020
Chlorobenzene	100.0	D021
Chloroform	6.0	D022
Chromium	5.0	D007
o-Cresol	200.0	D023
m-Cresol	200.0	D024
p-Cresol	200.0	D025
Cresols	200.0	D026
2,4-D	10.0	D016
1,4-Dichlorobenzene	7.5	D027
1,2-Dichloroethane	0.5	D028
1,1-Dichloroethylene	0.7	D029
2,4-Dinitrotoluene	0.13	D030
Endrin	0.02	D012
Heptachlor	0.008	D031
Hexachlorobenzene	0.13	D032
Hexachlorobutadiene	0.5	D033
Hexachloroethane	3.0	D034
Lead	5.0	D008
Lindane	0.4	D013
Mercury	0.2	D009
Methoxychlor	10.0	D014
Methyl Ethyl Ketone	200.0	D035
Nitrobenzene	2.0	D036
Pentachlorophenol	100.0	D037
Pyridine	5.0	D038
Selenium	1.0	D010
Silver	5.0	D011
Tetrachloroethylene	0.7	D039
Toxaphene	0.5	D015
Trichloroethylene	0.5	D040
2,4,5-Trichlorophenol	400.0	D041
2,4,6-Trichlorophenol	2.0	D042
2,4,5-TP (Silvex)	1.0	D017
Vinyl Chloride	0.2	D043