# Hazardous Waste Disposal Guidelines

**Purdue University Chemical Management Committee**
**Radiological and Environmental Management**
**Adopted April 1990**
**Revised March 12, 2022**

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# Chapter 1: Introduction

## 1.1 Purpose

Purdue University is committed to providing a healthy and safe work environment for the campus community. The Purdue University Hazardous Waste Disposal Guidelines (HWDG) establishes a formal written program for the safe and compliant collection, storage, and disposal of hazardous waste. The term “hazardous waste” refers to any material designated as a hazardous waste by the Environmental Protection Agency (EPA). Hazardous waste may include, but is not limited to, undesired or outdated chemicals, spent chemical solutions, chemically contaminated debris or media, electronics devices, fluorescent lamps, and batteries. Determining if a chemical waste meets the regulatory definition of a hazardous waste can be difficult and requires specific training. Therefore, it is Purdue’s policy that all staff assumes that all chemical wastes are hazardous and must be managed by the Radiological and Environmental Management Department. Because of the technical nature of hazardous waste determination, the terms “chemical waste” and “hazardous waste” are used synonymously throughout this document.

Hazardous waste regulations are strictly enforced by both the EPA and the Indiana Department of Environmental Management (IDEM). Purdue University is a large quantity generator of hazardous waste and operates a permitted treatment, storage, and disposal facility. As such, Purdue University is subject to the most stringent hazardous waste management regulations. The disposal of hazardous waste requires a system of policies and procedures to protect human health and the environment, and to ensure compliance with governmental regulations. It is essential that each individual that generates hazardous waste at Purdue University comply with the rules, policies, and procedures detailed in this document.

## 1.2 Scope

The HWDG applies to all laboratories, shops, maintenance areas, or other Purdue facilities that use, store, or handle chemical waste. The HWDG describes the proper use and handling procedures to be followed by all faculty, staff, and other personnel working with chemical waste in all settings at Purdue University.

The HWDG was prepared in accordance with the requirements of the EPA’s Resource Conservation and Recovery Act (Title 40 of the Code of Federal Regulations) and the Indiana Administrative Code administered by the IDEM (329 Indiana Administrative Code 3.1).

## 1.3 Employee Rights and Responsibilities

Employees and other personnel who work at Purdue University have the right to be informed about the potential health hazards of the chemicals in their work areas and to be properly trained to work safely with these substances, including hazardous wastes. Purdue’s

commitment to comply with all applicable environmental health and safety regulations as well as the protection of human health and the environment can only happen when everyone takes responsibility for their own hazardous waste. All employees that handle hazardous waste must be trained on the procedures detailed in this document. The area supervisor (e.g., principal investigator, shop supervisor) is ultimately responsible for managing the hazardous waste program in their lab, shop, or maintenance area in a safe and compliant manner. It is also the area supervisor's responsibility to ensure that all area employees receive proper instruction and training on hazardous waste handling procedures and that all training is documented.

## 1.4 Radiological & Environmental Management

Radiological and Environmental Management (REM) serves as the environmental health and safety department for Purdue University. REM's primary role is to assist in monitoring regulatory compliance with various federal, state, and organizational regulations involving environmental health and safety issues. One of the primary services that REM provides is hazardous waste collection for the West Lafayette Campus. The primary responsibility of REM's Hazardous Materials Management Section (REM HMM) is to pick up, transport, process, and dispose of all hazardous waste in a safe and environmentally responsible manner. Careful consideration is given to the disposal of every single container that is picked up and processed by the REM HMM, with the highest priority given to environmental stewardship. More detailed information regarding the services provided by the REM HMM can be found at: https://www.purdue.edu/ehps/rem/about/hmm.html, or by calling (765) 49-40121.

## 1.5 Chemical and Laboratory Safety Committee

Purdue University has established the Chemical and Laboratory Safety Committee (CLSC) with the responsibility to promote safe and proper chemical management at all Purdue campuses and related facilities. Chemical management includes, but is not limited to, the procurement and safe handling, use, storage, and disposal of chemicals. The CLSC reviews campus safety programs and makes recommendations to the Provost as appropriate. The CLSC consists of members appointed from the faculty and staff of the major research, teaching, and service areas where chemicals are handled or used. Although REM facilitates the content of the HWDG, it is ultimately the responsibility of the CLSC to approve changes and updates to the HWDG.

# Chapter 2: Hazardous Waste Defined

## 2.1 Regulatory Authority

The EPA's Resource Conservation and Recovery Act (RCRA) passed by the United States Congress in 1976, mandates the proper identification, labeling, handling, storage, and disposal of hazardous waste for protection of human health and the environment. In addition to federal regulations, the state of Indiana also regulates hazardous waste. IDEM administers the hazardous waste compliance program in Indiana. This combination of federal and state regulations governs the management of hazardous waste from the point of generation to the point of final disposition, also known as "cradle to grave management".


The Purdue University West Lafayette Campus is inspected on an annual basis by the EPA for compliance with hazardous waste regulations. Not only does the EPA inspect the REM managed treatment, storage, and disposal facility where all waste from campus locations is stored and processed, the EPA also inspects hazardous waste collection areas (e.g., laboratories, shops, maintenance areas) on campus. The EPA can, and often does fine colleges and universities for being out of compliance with hazardous waste regulations so it is critical that all hazardous waste be managed in accordance with the procedures detailed in this document.

## 2.2 Hazardous Waste Determination

For a material to be classified as a hazardous waste, it must first be a "solid waste". The EPA defines a solid waste as garbage, refuse, sludge, industrial waste, or other discarded materials. Solid waste is a regulatory term that is very broad and includes both non-hazardous and hazardous waste but is not limited to wastes that are physically solid. Many solid wastes are liquid, semisolid, or gas; solid waste is only a regulatory term. There are two criteria to determine if solid waste is hazardous waste. First, determine if solid waste exhibits one or more of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. Second, determine if the solid waste is listed by the EPA as a hazardous waste.

### 2.2.1 Characteristic Hazardous Waste

Characteristic hazardous waste is solid waste that is ignitable, corrosive, reactive, and/or toxic. The specific criteria for the characteristics of ignitability, corrosivity, and reactivity are listed in Table 2.1. A waste is considered to exhibit the characteristic of toxicity if it is in concentrations greater than the regulatory thresholds listed in Table 2.2.

**Table 2.1 – Criteria and Characteristics of Ignitability, Corrosivity, and Reactivity**

| EPA Waste Code | Criteria |
|---|---|
| **Ignitability (D001)** | **A solid waste that meets *any* of the following criteria:**<br>1. A liquid that has a flash point of less than 140o F as determined by a Pensky-Martens closed cup tester using ASTM method D-93-16a or a Setaflash device via ASTM D 3278-96(2011)<br>2. A solid, under standard temperature and pressure, that can cause fire through friction, absorption of moisture, or spontaneous chemical changes and burn vigorously and persistently that it creates a hazard.<br>3. An ignitable compressed gas as defined by the Department of Transportation in 49 CFR 173.300; or,<br>4. An oxidizer as defined by the Department of Transportation in 49 CFR 173.151. |
| **Corrosivity (D002)** | A solid waste that meets *any* of the following criteria:<br>1. An aqueous liquid that has a pH of 2 or less or 12.5 or more; or,<br>2. A liquid that corrodes steel at a rate of 6.35 mm or more per year as determined by the National Association of Corrosion Engineers. |
| **Reactivity (D003)** | **A solid waste that meets *any* of the following criteria:**<br>1. Instability and readiness to undergo violent change.<br>2. Violent reactions when mixed with water.<br>3. Formation of potentially explosive mixtures when mixed with water.<br>4. Generation of toxic fumes in quantities sufficient to present a danger to human health or the environment when mixed with water.<br>5. Cyanide or sulfide waste which generate toxic fumes when exposed to acidic conditions.<br>6. Ease of detonation or explosive reaction when exposed to pressure or heat; or<br>**7.** Ease of detonation or explosive decomposition or reaction at standard temperature and pressure. |

**Table 2.2 – Criteria and Characteristics of Toxicity**

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

### 2.2.2 Listed Hazardous Waste

Wastes may be hazardous if the EPA specifically lists them. There are four EPA lists for hazardous waste:

1. F list
2. K list
3. P list
4. U list

The **F** list includes wastes from nonspecific sources. At Purdue, the most common F listed waste is waste generated from the use of organic solvents. This includes waste mixtures of organic solvents and debris and/or media contaminated with organic solvents. Table 2.3 lists the most common **F** listed wastes found at Purdue University.

**Table 2.3 – Listed Hazardous Wastes from Non-Specific Sources (F001 – F005)**

| EPA Waste Code | Waste Listing |
|---|---|
| **F001** (Spent solvents used in degreasing) | 1,1,1-trichloroethane, carbon tetrachloride, chlorinated fluorocarbons, methylene chloride, trichloroethylene |
| **F002** (Spent solvents) | 1,1,1-trichloroethane, 1,1,2-trichloro-1,1,2-trifluoroethane, 1,1,2-trichloroethane, chlorobenzene, methylene chloride, o-dichlorobenzene, tetrachloroethylene, trichlorofluoromethane |
| **F003** (Spent solvents) | Acetone, cyclohexanone, ethyl acetate, ethyl ether, methanol, methyl isobutyl ketone, n-butyl alcohol, xylene |
| **F004** (Spent solvents) | Cresols, cresylic acid, nitrobenzene |
| **F005** (Spent solvents) | 2-ethoxyethanol, 2-nitropropene, benzene, carbon disulfide, isobutyl alcohol, methyl ethyl ketone, pyridine, toluene |

The **K** list includes wastes generated from specific industrial process and is not typically applicable at a university setting.

The **P** list (Appendix A) and the **U** list (Appendix B) include pure or commercial grade formulations of specific unused chemicals. Chemicals on the **P** list are considered acutely toxic and chemicals on the **U** list are considered toxic. Chemicals on both the **P** and **U** lists can also display other characteristics, such as ignitability, corrosivity, and/or reactivity.

## 2.3 Trade Products

Many common trade products such as fuels and cleaners have EPA regulated materials included in their chemical makeup and it is not always evident that the product is hazardous by only looking at the product label. For this reason, it is essential that the SDS be reviewed before using and/or disposing of any trade product waste. All trade products must be submitted to REM for proper disposal (procedures are detailed in Chapter 5). Table 2.4 lists a few common trade products that contain EPA-regulated materials and must be managed as hazardous waste.

**Table 2.4 – Common Trade Products Containing Hazardous Chemicals**

| | | |
|---|---|---|
| Aromatic Hydrocarbons | Jet Fuels | Petroleum Ether |
| Creosote | Kerosene | Petroleum Naphtha |
| Degreaser Fluids | Lacquer Thinner | Photographic Chemicals |
| Diesel Fuel | Mineral Spirits | Spent Fixer & Developer |
| Duplicating Fluid | Naphtha | Stains |
| Dry Cleaning Fluids | Paints | Stoddard Solvent |
| Fuel Oil | Paint Thinner | Varsol |
| Gasoline | Petroleum Distillates | White Spirits |

# Chapter 3: Hazardous Waste Storage Requirements

## 3.1 Satellite Accumulation Areas

Hazardous waste containers generated at Purdue University are stored in satellite accumulation areas (SAA). SAAs are used to manage hazardous waste in laboratories, shops, and maintenance areas because doing so provides safe and effective means to accumulate hazardous waste before removal by REM. Additionally, SAAs provide the least restrictive regulatory option for the accumulation and storage of hazardous waste containers. The following SAA rules must be followed at all times when managing hazardous waste on campus:


- All waste must be stored in containers. Generators must supply their own waste containers. Usually, the original container of the main component of the waste can be used (e.g., 4-liter glass jar). Purdue University Stores also offers waste containers such as 20-liter carboys for sale.
- Containers must be compatible with the waste they contain. Do not use metal containers for corrosive waste or glass containers for waste containing hydrofluoric acid. For liquid waste, only use a container designed for liquids; the container must seal and not leak (no liquids in bags). Food grade containers such as milk jugs should never be used for chemical storage.
- Containers must be kept closed at all times except when adding or removing waste. Open waste containers are the most common EPA hazardous waste violation cited at colleges and universities. Not only is this a violation of EPA regulations, but open containers also allow evaporation, invite spills, and can potentially cause employee exposure to a hazardous substance. Safety funnels that close and seal can be used as a more convenient way to fill waste containers as shown in Figure 3.1.

**Figure 3.1 – Safety Funnel**

- Containers must be labeled or clearly marked with words that describe the contents of the waste and the words "Hazardous Waste". More detail regarding hazardous waste container labeling can be found in Chapter 4.
- All containers must be in reasonably good condition and not leaking. Containers must be clean and without gross chemical contamination on the outside. If a container holding hazardous waste is not in good condition, or if it begins to leak, area personnel must transfer the hazardous waste to a container that is in good condition. Alternatively, over pack the container that is leaking or in poor condition into a larger, compatible container with a tight-fitting lid. If leaks or spills occur, all evidence of leakage and spilled material must be cleaned up immediately. Collect all spilled materials and debris used in the cleanup process as hazardous waste. Contact REM at (765) 494-0121 if assistance with spill cleanup is needed. If the hazardous waste spill creates an emergency situation, contact the Purdue University Fire Department by calling **911**. More detail regarding emergency procedures can be found in Chapter 9.
- Containers must be stored at or near the point of generation and under the control of the generator of the waste. Waste must remain in the same room that is generated in. Establish an area to accumulate hazardous waste. This area can be a bench top, fume hood that is being used for storage (should not be a process fume hood), or a cabinet. Store containers upright and securely. Do not place containers in areas such as hallways, doorways, sinks, or next to moving equipment where the chance of spills is likely. Never store waste containers in public areas such as classrooms or reception areas. Figure 3.2 shows a typical compliant SAA collection ready for REM pickup.

**Figure 3.2 – SAA Collection**

- The waste storage volume should never exceed 55 gallons per SAA.
- Containers must be segregated by chemical compatibility during storage. For example, acids (e.g., hydrochloric acid) must be stored away from bases (e.g., sodium hydroxide) and organic acids (e.g., acetic acid) must be stored away from oxidizing acids (e.g., nitric

acid). Segregation can be achieved either by physical distance or by secondary containment as shown in Figure 3.3.

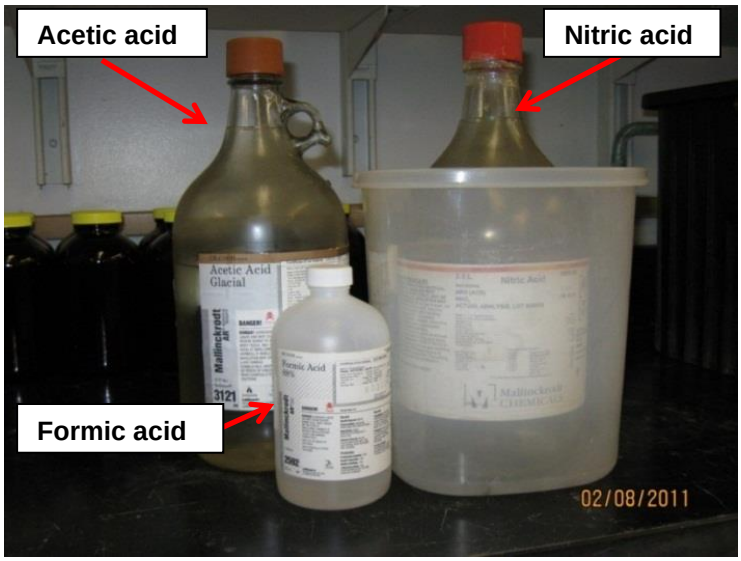



**Figure 3.3 – Hazardous Waste Segregation Using Secondary Containment**

- Avoid mixing waste streams such as acids and bases, or halogenated and non-halogenated wastes in the same waste container. Collect all highly toxic, reactive, mercury, and any exotic wastes (e.g., dioxin compounds, PCBs, controlled substances, organo-mercuric compounds) separately even if they are chemically compatible with other waste streams. Doing so can result in costly disposal fees (e.g., mixing mercury with organic solvent waste means that the entire waste stream must be treated as mercury waste).
- Identification of SAAs by signage is not required, but it is recommended as a good practice. Appendix C lists the SAA rules and can be posted in waste collection areas.

## 3.2 Liquid Chromatography Waste

Liquid chromatography (LC) is an analytical technique used to separate, identify, quantify, and purify individual components of a mixture. This technique is very common in biological and chemical research. The most common type of LC at Purdue is High Performance Liquid Chromatography (HPLC). Purdue has numerous LC instruments located in laboratories all over campus. Because organic solvents (e.g., Methanol, Acetonitrile) are commonly used in the process, most LC waste is regulated by the EPA as hazardous waste. Consequently, all containers collecting LC waste must remain closed while the LC unit is in operation. It is neither acceptable to place a waste line running from the LC unit into an open waste container nor is it acceptable to use foil or Parafilm® as a means of closure. Figure 3.4 illustrates these unacceptable LC collection practices. Purdue has received citations in the past from EPA during hazardous waste inspections, so it is of the utmost importance that LC waste be collected in a compliant manner.

| Open Waste | Open Waste | Foil | Parafilm® |
|---|---|---|---|
|  |  |  |  |

**Figure 3.4 – Improper LC Waste Collection Practices**

One of the following practices must be employed in order to comply with hazardous waste regulations for LC waste collection systems:

1. Purchase an engineered container and/or cap designed for LC waste collection. Figure 3.5 shows several examples of acceptable solutions for proper LC waste collection that can be purchased.

| Safety Cans | Ported (no threads) Cap | 4 Port (threaded) Cap | Solvent Bottle Cap |
|---|---|---|---|
|  |  |  |  |

**Figure 3.5 – Proper LC Waste Collection Options for Purchase**

2. An existing cap can be modified by the research lab for LC waste collection. To modify an existing cap, a hole can be drilled into a cap. The diameter of the hole should be similar to the diameter of the waste line; there should be a tight fit between the container opening and waste line. In addition, a hole should be drilled to accommodate any exhaust filter or air valve tube that may be required. It is recommended that either a 4-liter container or 5-gallon carboy be used for waste collection. The modified cap should be replaced with a regular, unmodified cap once the container is full and ready for REM pickup. See Figure 3.6 for examples of acceptable modified caps.

| Exhaust Filtered | 2 Line Carboy | 2 Line Glass 4 L | Exhaust Filtered |
|---|---|---|---|
|  |  |  |  |

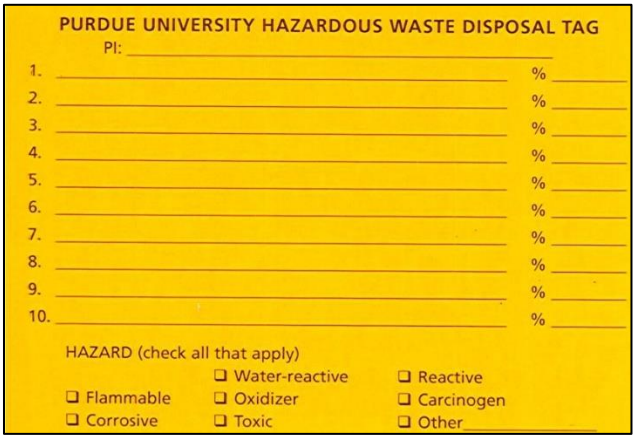
**Figure 3.6 – Proper LC Waste Collection with Modified Caps**

# Chapter 4: Hazardous Waste Labeling

All chemical constituents in hazardous waste containers must be identified by knowledgeable personnel. Not only is this required by the EPA, it also ensures that waste can be properly characterized and disposed of by REM. If there is uncertainty about the composition of a waste stream resulting from an experimental process, employees must consult with the area supervisor for assistance. In most cases, careful documentation and review of all chemical products used in the experimental protocol will result in accurate waste characterization. Additionally, review safety data sheets (SDS), specifically Section 2, “Hazard Identification” and Section 13, “Disposal Considerations”, to obtain information about hazardous constituents and characteristics.

All waste must be properly labeled as soon the first drop of waste enters a waste container. Containers must be labeled and clearly marked with words that describe the contents of the waste and the words "Hazardous Waste". Chemical constituents should be listed completely in a percentage format. Listing accurate percentages is not as important as listing all the chemicals that makeup the waste. For example, $\pm$ 5% concentration is acceptable and constituents less than 1% can be listed as “trace”. The label that REM provides for proper identification of hazardous waste is shown in Figure 4.1. Be sure to check all hazards that apply at the bottom of the label. Contact REM at (765) 49-40121 to receive Hazardous Waste Disposal Tags free of charge. For pure chemicals, the manufacturer’s label is sufficient as long as it is legible and accurate.

If a chemical is found and the composition is unknown, it should be assumed to be hazardous and labeled as “Unknown hazardous chemical, awaiting proper characterization by REM”. More detail regarding unknown waste can be found below in Section 5.4.


PURDUE UNIVERSITY HAZARDOUS WASTE DISPOSAL TAG

PI: _____

1. _____ % _____
2. _____ % _____
3. _____ % _____
4. _____ % _____
5. _____ % _____
6. _____ % _____
7. _____ % _____
8. _____ % _____
9. _____ % _____
10. _____ % _____

HAZARD (check all that apply)

❑ Flammable ❑ Water-reactive ❑ Reactive
❑ Corrosive ❑ Oxidizer ❑ Carcinogen
❑ Toxic ❑ Other _____

**Figure 4.1 – Hazardous Waste Disposal Tag**

# Chapter 5: Hazardous Waste Disposal Procedures

## 5.1 REM Hazardous Waste Pickup Services

REM provides pickup services for all chemical waste generated on the West Lafayette campus. A Hazardous Materials Pickup Request Form (Appendix D) must be completed and submitted by the generator of the waste to initiate pickup services. Once the pickup request has been processed, REM HMM staff will come to the area to pick up the waste. The average turnaround time for pickups from the day the Hazardous Materials Pickup Request Form was submitted to the day that REM arrives to pick up the waste is typically 3-5 days.

The following procedures must be followed to have hazardous waste removed from campus locations:

1. Prior to pick up, all waste must be placed in the SAA within the same room where the waste was generated.
2. All waste must be placed in an appropriate container(s).
3. All containers must be capped and properly labeled.
4. Complete and submit a Hazardous Materials Pickup Request Form. Visit the REM webpage to find the online Hazardous Material Pickup Request submission form (https://www.purdue.edu/ehps/rem/about/hmm.html).

Hazardous waste containers may be rejected by REM for the following reasons:

- Room is locked and REM personnel do not have a key or a way to gain access
- Improper container or container is leaking or has been overfilled
- Improper caps/lids
- Mislabeled containers:
    - No label
    - Use of chemical formula or abbreviations
    - Label description does not match the contents of containers
    - Containers are heavily contaminated and not in good condition

## 5.2 Hazardous Materials Pickup Request Form Hints

### 5.2.1 Chemical Description:

- Spell out all chemical names. Do not use acronyms, abbreviations, or formulas.
- The chemicals must be in percent format adding up to 100%. Chemical constituents should be listed completely in a percentage format. Listing accurate percentages is not as important as listing all the chemicals that makeup the waste. For example, + 5% concentration is acceptable and constituents less than 1% can be listed as “trace”. The following is an example of a good chemical description: "Acetone 50%, Tetrahydrofuran 10%, Chloroform 20%, Acetic Acid 10%, Water 10%, Trace Silver Nitrate".

- The description on the container label must match the description written on the pickup request exactly.
- When submitting trade products, read the description of the chemical components on the label or request a SDS from the manufacturer. This information will provide you with a proper chemical description for the product. A SDS is not required to be submitted to REM with the Hazardous Materials Pickup Request Form. However, each area is responsible for providing REM with a SDS if requested to do so.

### 5.2.2 Amount of Waste in Container:

- Estimate chemical concentrations as accurately as possible; + 5% is acceptable, less than 1% can be listed as “trace”.
- Use mass units for solids and volume units for liquids.

### 5.2.3 Spent or Useable:

- The material is only useable if it is certain that the chemical is uncontaminated and can still be used for its intended use. Otherwise, it should be considered spent.
- If the material is useable, consider asking a neighboring lab or shop if they have use for the material.
- Some useable chemicals may be redistributed by REM to other campus areas for reuse.

### 5.2.4 Physical State of the Material:

- Solid, liquid and gas are the only designations that should be used.
- In general, keep solid and liquid wastes separate.
- If you have a mixture containing both solids and liquids, the rule of thumb is that if any portion of the waste flows as a liquid, call it liquid.

### 5.2.5 Special Comments or Instructions:

- Use this section located at the bottom of the Hazardous Materials Pickup Request Form to convey important information such as where the waste is located within the room or how to gain access to a room if it is always locked.
- This section can also be used to communicate any special precautions REM staff should take when handling the waste.

## 5.3 Hazardous Waste Containers

REM does not provide containers. It is the responsibility of the generator of the waste to provide containers. Usually, the original container of the main component of the waste can be used (e.g., 4-liter glass jar, 5-gallon green metal solvent can). Purdue Stores also offers waste containers such as 20-liter carboys as shown in Figure 5.1 for sale.

**Figure 5.1 – 20 Liter Carboy Container**

If requested, reusable hazardous waste storage containers of 5 gallons or larger may be returned to the generator's area. Mark the container clearly with "Return to", the building, and room number as illustrated in Figure 5.2. Containers unsuitable for reuse will be properly disposed of and not returned.

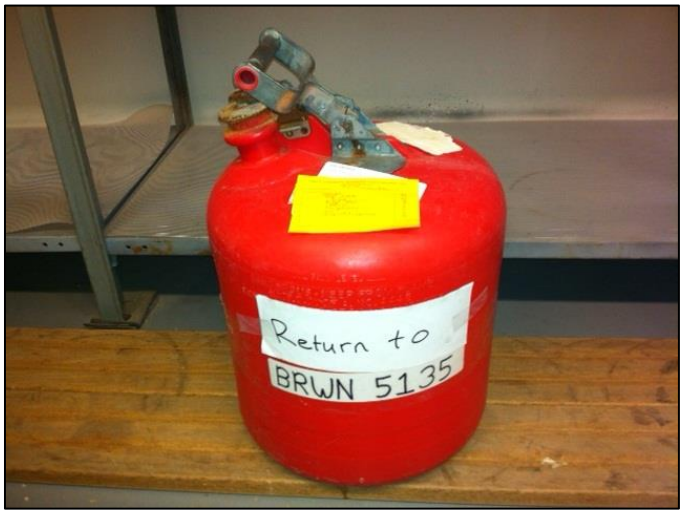



**Figure 5.2 – Reusable Hazardous Waste Container**

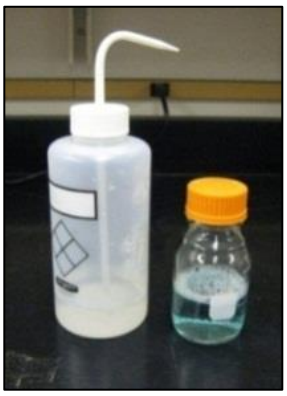
Purdue's policy for the disposal of empty containers is implemented to protect Purdue facilities and the Physical Facilities Buildings and Grounds staff when removing trash. Please remember that some chemical residues have the potential to mix with other incompatible residues in the dumpster or compactor causing a reaction or fire. In addition, sealed containers may become pressurized during compaction, which may result in residues spraying onto workers. Please keep the following procedures and information in mind when disposing of empty containers:

- Triple rinse empty containers with a solvent capable of removing the original material.
- Collect the rinsate for disposal through REM.

- Identify triple-rinsed, dry, odorless, and empty containers by placing a “Safe for Disposal” label on the container (Figure 5.3). Contact REM at (765) 494-0121 to request a supply of these labels.
- Remove any cap that may cause the container to become pressurized when compacting.
- Arrange removal of these containers with the Building Services staff in your area or take these containers to the designated area beside the dumpster outside your building.
- If unable to remove residual hazardous materials from containers, submit these to REM for pickup using the Hazardous Materials Pickup Request Form.


**Figure 5.3 – Safe for Disposal Label**

## 5.4 Unknown Chemical Waste



Unknown chemicals are a serious problem in laboratories. Mysterious chemicals are often stored in labs for years before lab personnel notice the unidentified items. However, steps can be taken to assist with proper management of unknowns. Unknown chemicals must be properly identified according to hazard class before proper disposal. The hazards that should be noted include corrosive, flammable, oxidizer, reactive, toxic, and radioactive. The following subsections describe in detail how to properly manage unknown chemicals.

### 5.4.1 Labeling Unknown Chemicals

Until the unknown chemical can be properly identified by either lab staff or REM, the container should be labeled with a Hazardous Waste Disposal Tag. The following information should be written on the label: “Unknown hazardous chemical, awaiting proper characterization by REM” as illustrated in Figure 5.4.

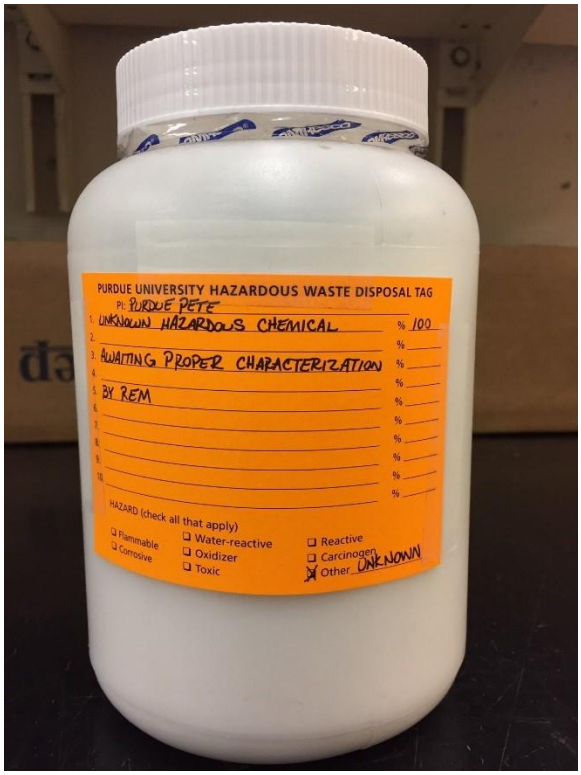



**Figure 5.4 – Unknown Waste Properly Labeled**

### 5.4.2 Identifying Unknown Chemicals

Every effort should be made by laboratory personnel to identify unknown chemicals. Here are a few steps that can be taken to help this effort:

1. Ask other laboratory personnel if they are responsible for or can help identify the unknown chemical.
2. The type of research conducted in the laboratory can be useful information for making this determination. Eliminating certain chemicals as a possibility helps narrow the problem as well. This is especially important for Mercury, PCB, or dioxin compounds because they must be managed separately from other hazardous waste.
3. For trade products, contact the manufacturer or search online to obtain an SDS. REM staff can assist you in finding an SDS.

### 5.4.3 Removing Unknown Chemicals from the Work Area

If it is not possible to identify the material, a "Hazardous Waste" label should be placed on the container as described above in Section 5.4.1 and a Hazardous Materials Pickup Request Form should be submitted which describes all of the available information (e.g., 4-liter container of clear liquid). Call REM at (765) 494-0121 if you have a question about an unknown.

### 5.4.4 Preventing Unknown Chemicals

Here are a few tips that will help prevent the generation of unknown chemicals:

- Label all chemical containers, including beakers, flasks, vials, and test tubes.
- Immediately replace labels that have fallen off or that are deteriorated.
- Label containers using chemical names. Do not use abbreviations, structure, or formulae.
- Archived research samples are often stored in boxes containing hundreds of small vials. Label the outside of the box with the chemical constituents paying special attention to regulated materials such as radioactives, organic solvents, heavy metals and other toxics. If the samples are nonhazardous, label them as such.
- Submit frequent Hazardous Materials Pickup Request Forms to reduce the amount of chemicals in your laboratory.
- Employees should dispose of all of their waste before leaving/graduating from Purdue. The lab and/or department should come up with a system to ensure that all faculty, staff, and students properly dispose of hazardous waste, including unwanted research samples, before employees leave.

## 5.5 Sharps Waste

Sharps are items capable of puncturing, cutting, or abrading the skin such as glass or plastic pipettes, broken glass, test tubes, petri dishes, razor blades, needles, and syringes with needles. Sharps waste contaminated with hazardous chemicals must be placed into puncture resistant containers (e.g., sharps container, glass or plastic container with lid) and properly labeled as detailed in Chapter 4 of the HWDG. All chemically contaminated waste should be inventoried on a Hazardous Materials Pickup Request Form (detailed above) and sent to REM for proper disposal.

Clean uncontaminated broken glassware and plastic sharps should be placed in a corrugated cardboard box or other strong disposable container. Do not exceed 20 pounds. When ready for disposal, the box should be taped shut and prominently labeled as “Sharp Objects/Glass – Discard” or similar wording. The “Safe for Disposal” label (Figure 5.3) should also be affixed to the outside of the container. Contact your Building Services department for specific non-hazardous waste disposal instructions. More detail regarding sharps, including biologically contaminated sharps, can be found at the found in the REM Sharps and Infectious Waste Handling and Disposal Guidelines (https://www.purdue.edu/ehps/rem/documents/programs/sharps.pdf).

## 5.6 Sink and Trash Disposal

No chemical waste should be poured down the drain or discarded in the trash unless it is certain that doing so does not violate hazardous waste regulations or the West Lafayette wastewater

treatment plant's discharge requirements. To ensure improper disposal does not occur, only small quantities of the materials listed in Appendix E are permitted to be disposed of down the drain (if water soluble) or discarded in the trash (if not water soluble). Information regarding solubility of ions is included in Appendix F. The materials in Appendices 5 and 6 do not include every non-hazardous substance or every material that can be disposed of via the sanitary sewer or trash. Please contact REM at (765) 494-0121 for further information regarding non-hazardous chemical waste disposal.

## 5.7 Chemical Treatments

If lab personnel are interested in performing hazardous waste treatments or neutralizations, standard operating procedures for the materials listed in Table 5.1 are available from REM. Contact REM at (765) 494-0121 for further details. However, chemical treatment and/or neutralization are not required to be performed by lab staff. The waste can be submitted on a Hazardous Materials Pickup Request Form as is and REM staff will perform the treatments.

**Table 5.1 – Chemical Treatments Listing**

| | | |
|---|---|---|
| Acid anhydrides | Boron tribromide | Hydrogen peroxide |
| Acid halides | Boron trichloride | Inorganic/organic acids |
| Aluminum bromide | Boron trifluoride | Inorganic/organic bases |
| Aluminum chloride | Bromine | Iodine |
| Benzoyl peroxide | Chlorosilanes | Magnesium choride |
| Boron tribromide | Formaldehyde solutions | Metal alkoxides |

# Chapter 6: Universal Waste and Electronic Waste Disposal Procedures

## 6.1 Universal Waste

Universal wastes are waste streams that meet the definition of a hazardous waste but are very common and can be easily recycled. Universal waste includes:

- Batteries
- Pesticides
- Mercury-containing equipment
- Light bulbs (lamps)


Because universal waste streams are so common and widely generated, the EPA has eased the regulatory burden to encourage the development of municipal and commercial recycling programs. The following subsections describe the waste collection procedures for these waste streams.

### 6.1.1 Batteries

Batteries that are regulated by the EPA as a universal waste include:

- Lead-Acid
- Nickel-Cadmium
- Lithium and Lithium Ion
- Mercury (mercuric oxide or mercury cell)
- Nickel-Metal Hydride
- Any other rechargeable battery

Universal waste batteries should be inventoried on a Hazardous Materials Pickup Request Form (detailed in Chapter 5 of this document) and sent to REM for proper recycle. Alkaline batteries are not considered universal waste because they contain no EPA regulated hazardous constituents and can legally be discarded in the trash.

### 6.1.2 Pesticides

Purdue does not manage pesticide waste as universal waste. All pesticide waste should be inventoried on a Hazardous Materials Pickup Request Form (detailed in Chapter 5 of this document) and sent to REM for proper disposal.

### 6.1.3 Mercury-Containing Equipment

Purdue does not manage mercury-containing equipment waste as universal waste. All mercury-containing equipment waste should be inventoried on a Hazardous Materials Pickup Request Form (detailed in Chapter 5 of this document) and sent to REM for proper disposal.

### 6.1.4 Light Bulbs (lamps)

Light bulbs regulated as universal waste include:

- Fluorescent
- Compact fluorescent light bulbs
- High-Intensity Discharge
- Ultraviolet
- Flood lamps

Incandescent light bulbs are not considered universal waste because they contain no EPA regulated hazardous constituents and can legally be discarded in the trash.

### 6.1.5 Electrical Ballasts (both non-PCB and PCB)

Electrical ballasts are not regulated by the EPA as hazardous waste. However, REM manages them in a similar fashion. All ballasts can be brought directly to the REM Laboratory Materials Storage Building (LMSB) (address listed below) for proper recycle; submitting a Hazardous Materials Pickup Request Form is not necessary. When bringing waste to HMMT, all personnel must sign in at the front desk and will receive further instructions.

LMSB
201 Ahlers Drive
West Lafayette, IN 47906-5991

### 6.1.6 Capacitors (both non-PCB and PCB)

Capacitors are not regulated by the EPA as a hazardous waste. However, REM manages them in a similar fashion. All capacitors can be brought directly to the REM Hazardous Materials Management Trailer (HMMT) (address listed below) for proper recycle; submitting a Hazardous Materials Pickup Request Form is not necessary. When bringing waste to HMMT, all personnel must sign in at the front desk and will receive further instructions.

LMSB
201 Ahlers Drive
West Lafayette, IN 47906-5991

## 6.2 Electronic Waste

All electronic waste (e-waste) is regulated by IDEM and must be disposed of properly. IDEM's definition of e-waste is extremely broad and includes (329 IAC 16-2-1):

- A circuit board in a computer or electronic device that holds integrated circuits and other electronic components
- An electronic component such as a diode, resistor, capacitor, or coil
- Display device such as a cathode ray tube, liquid crystal display screen, or other such display device
- A computer
- An electronic device, which is a device that has its primary functions provided by electronic circuitry and components

No e-waste should be thrown away in the trash. All e-waste must be sent to the Purdue Warehouse and Surplus where it will be processed for proper recycle. Contact the Purdue Warehouse and Surplus Store personnel at (765) 742-4414 for more detailed waste disposal instructions.

# Chapter 7: Laboratory Decommissioning

## 7.1 Introduction

Abandoned chemicals in laboratories create unsafe and non-compliant conditions. Additionally, these orphan materials are expensive and time consuming to manage. Therefore, it is imperative that principal investigators and laboratory staff take responsibility for properly decommissioning their laboratories. Before leaving your laboratory or assigned space, all unwanted chemicals, research samples, and chemical waste must be disposed following the normal hazardous material pickup request process detailed in Chapter 5 of this document. Please note that you are responsible for all materials in your area, including materials you purchased, created, or may have inherited from former laboratory occupants. The role of REM is to provide consultation and assistance with the decommissioning process. REM will ease the process as much as practicable, and then remove the materials once we receive the Hazardous Materials Pickup Request Form. If materials are abandoned by laboratory occupants, it is the department's responsibility to identify unwanted materials, prepare and submit a request for those materials.

## 7.2 Laboratory Decommissioning Procedures

The decommissioning process can be time consuming for the researcher but is necessary to maintain a safe and healthy work environment. REM has limits in capabilities of removing large volumes of materials in a short period of time. The following are recommendations to ease the process as much as possible:

- Develop a departmental, college or school policy regarding proper laboratory decommissioning procedures.
- Plan ahead. The decommissioning process can take days to weeks. If there are time-driven deadlines, contact REM as soon as possible, so we may assist you in meeting your deadlines.
- Assign an individual, the area safety committee chair for instance, to implement the laboratory decommissioning policy.
- Unwanted materials must be submitted for pickup on a Hazardous Materials Pickup Request Form.
- Submit pickup requests often.

- All materials must be properly labeled and in appropriate containers with tight fitting lids.
- Segregate and handle unknown materials as detailed in Section 5.4 of this document and submit them on a separate pickup request.
- Keep radioactive and biological materials separated from all other chemicals.
- Redistribute useable materials to other researchers in the department.
- Maintain current chemical inventories for each laboratory.
- Buy only what you need.
- Practice good laboratory hygiene.
- Contact REM at (765) 494-0121 for assistance.

# Chapter 8: Waste Minimization

## 8.1 Introduction

Waste minimization is any action that reduces the amount and/or toxicity of hazardous wastes before they are shipped off-site for disposal. The U.S. Congress mandates through RCRA, that large quantity generators of hazardous waste such as Purdue University have an active waste minimization program. There is clear intent in RCRA, the Clean Air Act, and the Pollution Prevention Act is to practice source reduction and recycling as preferred environmental management approaches over the treatment, disposal, or release of harmful chemicals to the environment. The EPA's hierarchy of waste minimization is source reduction, reuse, recycle, and dispose.

## 8.2 Source Reduction and Reuse

The most desirable method of waste minimization is source reduction, which reduces the impact of chemical wastes on the environment to the greatest extent. This activity reduces or eliminates the generation of chemical waste at the source. The following tips can help reduce the use of chemicals in an area:

- Substitute hazardous materials with less toxic or non-hazardous compounds, such as using non-mercury alternatives for thermometers, gas bubblers, and other devices.
- Micro-scale analytical techniques and experimentation should be used where practicable.
- Purchase only in quantities necessary for immediate use. Large portions of the hazardous waste generated at Purdue are unused chemicals in their original containers.
- Designate a single person to be responsible for purchasing chemicals.
- Maintain current chemical inventories and review inventories before purchasing additional chemicals.
- Establish a departmental redistribution system for usable chemicals.
- Purchase compressed gas cylinders or lecture bottles only from manufactures that will accept the empty cylinders back.

## 8.3 Recycling

Waste materials are recycled when they are used for another purpose, treated and reused in the same process, or reclaimed for another process. Used oil, batteries, mercury, fluorescent light bulbs, rechargeable batteries, electronic ballasts and capacitors, precious metals, and electronic wastes are all managed for off-site recycling by REM and/or the Purdue Warehouse and Surplus Store. Chapter 6 of this document discusses the recycling procedures for these waste streams in detail.

When feasible, install solvent distillation systems to recycle organic solvents for reuse. This can be done when ultra-pure solvents are not required such as for classroom experiments or when solvents are being used as cleaning agents. Contact REM at (765) 49-40121 for further information regarding solvents distillation systems.

## 8.4 Treatment

The primary responsibility of REM HMM is to pick up, transport, process, and dispose of all hazardous waste in a safe and environmentally responsible manner. Careful consideration is given to the disposal of every single container that is picked up and processed by REM HMM staff, with the highest priority given to environmental stewardship.

# Chapter 9: Chemical Spills

## 9.1 Introduction

Chemical spills in the work area can pose a significant risk to human health and the environment. All personnel that work with chemicals must be trained on how to properly respond to chemical spills in order to minimize risk. In general, chemical spills can be placed into one of two categories: non-emergency chemical spills, or emergency chemical spills.

## 9.2 Non-Emergency Chemical Spill Procedures

Non-emergency chemical spills are generally defined as less than 1 liter, do not involve a highly toxic or reactive material, do not present a significant fire or environmental hazard, and are not in a public area such as a hallway. These spills can be cleaned up by properly trained lab personnel using conventional PPE (e.g., safety glasses/goggles, lab coat, gloves) and the area spill kit. In general, when a non-emergency spill occurs, the area around the spill should be isolated, everyone in immediate area should be made aware of the spill, and the spilled material should be absorbed and collected using either pads or some other absorbent material such as oil dry or kitty litter. Decontamination of the spill area should be conducted using an appropriate solvent (soap and water is often the most effective). Proper PPE should be worn at all times and only personnel that have been trained on the Non-Emergency Spill Cleanup SOP should conduct the cleanup. Additionally, review the SDS(s) (specifically Section 6, “Accidental Release Measures”) to obtain chemical-specific cleanup information.

## 9.3 Emergency Chemical Spill Procedures

Emergency chemical spills are generally defined as greater than 1 liter, involve a highly toxic or reactive compound, present an immediate fire or environmental hazard, or require additional PPE (e.g., respirator) and specialized training to properly cleanup. The following procedures should be followed in the event of an emergency chemical spill:

- Cease all activities and immediately evacuate the affected area (make sure that all personnel in the area are aware of the spill and evacuate as well).
- If chemical exposure has occurred to the skin or eyes, the affected personnel should be taken to the nearest safety shower and eyewash station.
- **Dial 911**, which will initiate both the Purdue Police and Purdue Fire Department response, if the situation is, or could become an emergency (e.g., chemical exposure has occurred, a fire or explosion has occurred).

- The fire alarm should be pulled, which will initiate building evacuation, if any of the following occurs:
    - A fire and/or explosion has occurred (or there is a threat of fire and/or explosion).
    - The large spill (which is either highly toxic or presents an immediate fire or environmental hazard) is in a public area such as a hallway.
    - Toxic vapors are leaving the area where the spill has occurred, such as seeping from the laboratory into the hallway or neighboring rooms.
    - You are unsure of the hazards and feel that the spill could be harmful to building occupants.
- Ensure that no one else is allowed to enter the area until the spill has been properly cleaned up by the Purdue Fire Department.

## 9.4 Chemical Spill Kits

Each area where hazardous chemicals are stored should have a spill response kit available for use. Spill kits can either be purchased from a vendor or created by area personnel, but each spill kit should be equipped to handle small spills of the most common hazards in the particular area. The kit should be equipped with response and cleanup materials such as:

- Absorbent materials such as pads, booms, oil dry or kitty litter, booms, or pillows
- Neutralizing agents (e.g., Neutrasorb) for acids and/or bases if high volume of acids and/or bases are stored in the laboratory
- Containers such as drums, buckets, and/or bags to containerize spilled material and contaminate debris generated during the cleanup process
- PPE such as chemical-resistant gloves, safety glasses and/or goggles, lab coat or apron, chemical-resistant booties
- Caution tape or some other means to warn people of the spill

# Appendices

**Appendix A: Listed Hazardous Waste - P List**

**Appendix B: Listed Hazardous Waste - U List**

**Appendix C: Satellite Accumulation Area Rules Posting**

**Appendix D: Hazardous Materials Pickup Request Form**

**Appendix E: Non-Hazardous Materials**

**Appendix F: Non-Hazardous Materials Solubility**

**Appendix G: Summary of Changes**

# Appendix A: Listed Hazardous Waste - P List

Listed Hazardous Waste - Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof (**P** list):

| EPA Waste Code | CAS# | Chemical Name |
|---|---|---|
| P023 | 107-20-0 | Acetaldehyde, chloro- |
| P002 | 591-08-2 | Acetamide, N-(aminothioxomethyl)- |
| P057 | 640-19-7 | Acetamide, 2-fluoro- |
| P058 | 62-74-8 | Acetic acid, fluoro-, sodium salt |
| P002 | 591-08-2 | 1-Acetyl-2-thiourea |
| P003 | 107-02-8 | Acrolein |
| P070 | 116-06-3 | Aldicarb |
| P203 | 1646-88-4 | Aldicarb sulfone |
| P004 | 309-00-2 | Aldrin |
| P005 | 107-18-6 | Allyl alcohol |
| P006 | 20859-73-8 | Aluminum phosphide |
| P007 | 2763-96-4 | 5-(Aminomethyl)-3-isoxazolol |
| P008 | 504-24-5 | 4-Aminopyridine |
| P009 | 131-74-8 | Ammonium picrate |
| P119 | 7803-55-6 | Ammonium vanadate |
| P099 | 506-61-6 | Argentate(1-), bis(cyano-C)-, potassium |
| P010 | 7778-39-4 | Arsenic acid $H_3AsO_4$ |
| P012 | 1327-53-3 | Arsenic oxide $As_2O_3$ |
| P011 | 1303-28-2 | Arsenic oxide $As_2O_5$ |
| P011 | 1303-28-2 | Arsenic pentoxide |
| P012 | 1327-53-3 | Arsenic trioxide |
| P038 | 692-42-2 | Arsine, diethyl- |
| P036 | 696-28-6 | Arsonous dichloride, phenyl- |
| P054 | 151-56-4 | Aziridine |
| P067 | 75-55-8 | Aziridine, 2-methyl- |
| P013 | 542-62-1 | Barium cyanide |
| P024 | 106-47-8 | Benzenamine, 4-chloro- |
| P077 | 100-01-6 | Benzenamine, 4-nitro- |
| P028 | 100-44-7 | Benzene, (chloromethyl)- |
| P042 | 51-43-4 | 1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]- |
| P046 | 122-09-8 | Benzeneethanamine, alpha,alpha-dimethyl- |
| P014 | 108-98-5 | Benzenethiol |
| P127 | 1563-66-2 | 7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate |
| P188 | 57-64-7 | Benzoic acid, 2-hydroxy-(3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamateester |
| P001 | [1]81-81-2 | 2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3% |
| P028 | 100-44-7 | Benzyl chloride |

| EPA Waste Code | CAS# | Chemical Name |
|---|---|---|
| P015 | 7440-41-7 | Beryllium powder |
| P017 | 598-31-2 | Bromoacetone |
| P018 | 357-57-3 | Brucine |
| P045 | 39196-18-4 | 2-Butanone,3,3-dimethyl-1-(methylthio)-O-[methylamino)carbonyl] oxime |
| P021 | 592-01-8 | Calcium cyanide |
| P021 | 592-01-8 | Calcium cyanide $Ca(CN)_2$ |
| P189 | 55285-14-8 | Carbamic acid, [(dibutylamino)-thio]methyl-, 2,3-dihydro-2,2-dimethyl- 7-benzofuranyl ester |
| P191 | 644-64-4 | Carbamic acid,dimethyl-,1-[(dimethylamino)carbonyl]-5-methyl-1H- pyrazol-3-yl ester |
| P192 | 119-38-0 | Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H- pyrazol-5-yl ester. |
| P190 | 1129-41-5 | Carbamic acid, methyl-, 3-methylphenyl ester |
| P127 | 1563-66-2 | Carbofuran |
| P022 | 75-15-0 | Carbon disulfide |
| P095 | 75-44-5 | Carbonic dichloride |
| P189 | 55285-14-8 | Carbosulfan. |
| P023 | 107-20-0 | Chloroacetaldehyde |
| P024 | 106-47-8 | p-Chloroaniline |
| P026 | 5344-82-1 | 1-(o-Chlorophenyl)thiourea |
| P027 | 542-76-7 | 3-Chloropropionitrile |
| P029 | 544-92-3 | Copper cyanide |
| P029 | 544-92-3 | Copper cyanide Cu(CN) |
| P202 | 64-00-6 | m-Cumenyl methylcarbamate |
| P030 | | Cyanides (soluble cyanide salts), not otherwise specified |
| P031 | 460-19-5 | Cyanogen |
| P033 | 506-77-4 | Cyanogen chloride |
| P033 | 506-77-4 | Cyanogen chloride (CN)Cl |
| P034 | 131-89-5 | 2-Cyclohexyl-4,6-dinitrophenol |
| P016 | 542-88-1 | Dichloromethyl ether |
| P036 | 696-28-6 | Dichlorophenylarsine |
| P037 | 60-57-1 | Dieldrin |
| P038 | 692-42-2 | Diethylarsine |
| P041 | 311-45-5 | Diethyl-p-nitrophenyl phosphate |
| P040 | 297-97-2 | O,O-Diethyl O-pyrazinylphosphorothioate |
| P043 | 55-91-4 | Diisopropylfluorophosphate (DFP) |
| P004 | 309-00-2 | 1,4,5,8-Dimethanonaphthalene,1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a,-hexahydro-(1α,4α,4β,5α,8α,8β)- |
| P060 | 465-73-6 | 1,4,5,8-Dimethanonaphthalene,1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a-hexahydro-,(1α,4α,4β,5β,8β,8β)- |
| P037 | 60-57-1 | 2,7:3,6-Dimethanonaphth[2,3-b]oxirene,3,4,5,6,9,9-hexachloro- 1a,2,2a,3,6,6a,7,7a-octahydro-, (1aα,2β,2aα,3β,6β,6aα,7β, 7aα)- |
| P051 | [1]72-20-8 | 2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aα,2β,2β,3α,6α,6aβ,7β, 7aα)-, & metabolites |
| P044 | 60-51-5 | Dimethoate |
| P046 | 122-09-8 | alpha,alpha-Dimethylphenethylamine |

| EPA Waste Code | CAS# | Chemical Name |
|---|---|---|
| P191 | 644-64-4 | Dimetilan. |
| P047 | [1]534-52-1 | 4,6-Dinitro-o-cresol, & salts |
| P048 | 51-28-5 | 2,4-Dinitrophenol |
| P020 | 88-85-7 | Dinoseb |
| P085 | 152-16-9 | Diphosphoramide, octamethyl- |
| P111 | 107-49-3 | Diphosphoric acid, tetraethyl ester |
| P039 | 298-04-4 | Disulfoton |
| P049 | 541-53-7 | Dithiobiuret |
| P185 | 26419-73-8 | 1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O- [(methylamino)-carbonyl] oxime. |
| P050 | 115-29-7 | Endosulfan |
| P088 | 145-73-3 | Endothall |
| P051 | 72-20-8 | Endrin |
| P051 | 72-20-8 | Endrin, & metabolites |
| P042 | 51-43-4 | Epinephrine |
| P031 | 460-19-5 | Ethanedinitrile |
| P194 | 23135-22-0 | Ethanimidothioc acid, 2-(dimethylamino)-N-[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester |
| P066 | 16752-77-5 | Ethanimidothioic acid,N-[[(methylamino)carbonyl]oxy]-,methyl ester |
| P101 | 107-12-0 | Ethyl cyanide |
| P054 | 151-56-4 | Ethyleneimine |
| P097 | 52-85-7 | Famphur |
| P056 | 7782-41-4 | Fluorine |
| P057 | 640-19-7 | Fluoroacetamide |
| P058 | 62-74-8 | Fluoroacetic acid, sodium salt |
| P198 | 23422-53-9 | Formetanate hydrochloride. |
| P197 | 17702-57-7 | Formparanate |
| P065 | 628-86-4 | Fulminic acid, mercury(2+) salt |
| P059 | 76-44-8 | Heptachlor |
| P062 | 757-58-4 | Hexaethyl tetraphosphate |
| P116 | 79-19-6 | Hydrazinecarbothioamide |
| P068 | 60-34-4 | Hydrazine, methyl- |
| P063 | 74-90-8 | Hydrocyanic acid |
| P063 | 74-90-8 | Hydrogen cyanide |
| P096 | 7803-51-2 | Hydrogen phosphide |
| P060 | 465-73-6 | Isodrin |
| P192 | 119-38-0 | Isolan |
| P202 | 64-00-6 | 3-Isopropylphenyl N-methylcarbamate. |
| P007 | 2763-96-4 | 3(2H)-Isoxazolone, 5-(aminomethyl)- |
| P196 | 15339-36-3 | Manganese,bis(dimethylcarbamodithioato-S,S')-, |
| P196 | 15339-36-3 | Manganese dimethyldithiocarbamate |
| P092 | 62-38-4 | Mercury, (acetato-O)phenyl- |
| P065 | 628-86-4 | Mercury fulminate |
| P082 | 62-75-9 | Methanamine, N-methyl-N-nitroso- |

| EPA Waste Code | CAS# | Chemical Name |
|---|---|---|
| P064 | 624-83-9 | Methane, isocyanato- |
| P016 | 542-88-1 | Methane, oxybis[chloro- |
| P112 | 509-14-8 | Methane, tetranitro- |
| P118 | 75-70-7 | Methanethiol, trichloro- |
| P198 | 23422-53-9 | Methanimidamide, N,N-dimethyl-N'-[3-[[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride |
| P197 | 17702-57-7 | Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[(methylamino)carbonyl]oxy]phenyl]- |
| P050 | 115-29-7 | 6,9-Methano-2,4,3-benzodioxathiepin,6,7,8,9,10,10-hexachloro- 1,5,5a,6,9,9a-hexahydro-,3-oxide |
| P059 | 76-44-8 | 4,7-Methano-1H-indene,1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro- |
| P199 | 2032-65-7 | Methiocarb. |
| P066 | 16752-77-5 | Methomyl |
| P068 | 60-34-4 | Methyl hydrazine |
| P064 | 624-83-9 | Methyl isocyanate |
| P069 | 75-86-5 | 2-Methyllactonitrile |
| P071 | 298-00-0 | Methyl parathion |
| P190 | 1129-41-5 | Metolcarb. |
| P128 | 315-8-4 | Mexacarbate. |
| P072 | 86-88-4 | alpha-Naphthylthiourea |
| P073 | 13463-39-3 | Nickel carbonyl |
| P073 | 13463-39-3 | Nickel carbonyl $Ni(CO)_4$, (T-4)- |
| P074 | 557-19-7 | Nickel cyanide |
| P074 | 557-19-7 | Nickel cynaide $Ni(CN)_2$ |
| P075 | [1]54-11-5 | Nicotine, & salts |
| P076 | 10102-43-9 | Nitric oxide |
| P077 | 100-01-6 | p-Nitroaniline |
| P078 | 10102-44-0 | Nitrogen dioxide |
| P076 | 10102-43-9 | Nitrogen oxide NO |
| P078 | 10102-44-0 | Nitrogen oxide $NO_2$ |
| P081 | 55-63-0 | Nitroglycerine |
| P082 | 62-75-9 | N-Nitrosodimethylamine |
| P084 | 4549-40-0 | N-Nitrosomethylvinylamine |
| P085 | 152-16-9 | Octamethylpyrophosphoramide |
| P087 | 20816-12-0 | Osmium oxide $OsO_4$, (T-4)- |
| P087 | 20816-12-0 | Osmium tetroxide |
| P088 | 145-73-3 | 7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid |
| P194 | 23135-22-0 | Oxamyl |
| P089 | 56-38-2 | Parathion |
| P034 | 131-89-5 | Phenol, 2-cyclohexyl-4,6-dinitro- |
| P048 | 51-28-5 | Phenol, 2,4-dinitro- |
| P047 | [1]534-52-1 | Phenol, 2-methyl-4,6-dinitro-, & salts |
| P020 | 88-85-7 | Phenol, 2-(1-methylpropyl)-4,6-dinitro- |
| P009 | 131-74-8 | Phenol, 2,4,6-trinitro-, ammonium salt |
| P128 | 315-18-4 | Phenol,4-(dimethylamino)-3,5-dimethyl-,methylcarbamate (ester). |

| EPA Waste Code | CAS# | Chemical Name |
|---|---|---|
| P199 | 2032-65-7 | Phenol, (3,5-dimethyl-4-(methylthio)-,methylcarbamate |
| P202 | 64-00-6 | Phenol, 3-(1-methylethyl)-, methylcarbamate. |
| P201 | 2631-37-0 | Phenol, 3-methyl-5-(1-methylethyl)-,methyl carbamate. |
| P092 | 62-38-4 | Phenylmercury acetate |
| P093 | 103-85-5 | Phenylthiourea |
| P094 | 298-02-2 | Phorate |
| P095 | 75-44-5 | Phosgene |
| P096 | 7803-51-2 | Phosphine |
| P041 | 311-45-5 | Phosphoric acid, diethyl 4-nitrophenylester |
| P039 | 298-04-4 | Phosphorodithioic acid, ,O-diethylS-[2-(ethylthio)ethyl] ester |
| P094 | 298-02-2 | Phosphorodithioic acid, ,O-diethylS-[(ethylthio)methyl] ester |
| P044 | 60-51-5 | Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester |
| P043 | 55-91-4 | Phosphorofluoridic acid, bis(1-methylethyl) ester |
| P089 | 56-38-2 | Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester |
| P040 | 297-97-2 | Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester |
| P097 | 52-85-7 | Phosphorothioic acid,O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester |
| P071 | 298-00-0 | Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester |
| P204 | 57-47-6 | Physostigmine |
| P188 | 57-64-7 | Physostigmine salicylate |
| P110 | 78-00-2 | Plumbane, tetraethyl- |
| P098 | 151-50-8 | Potassium cyanide |
| P098 | 151-50-8 | Potassium cyanide K(CN) |
| P099 | 506-61-6 | Potassium silver cyanide |
| P201 | 2631-37-0 | Promecarb |
| P070 | 116-06-3 | Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl] oxime |
| P203 | 1646-88-4 | Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime |
| P101 | 107-12-0 | Propanenitrile |
| P027 | 542-76-7 | Propanenitrile, 3-chloro- |
| P069 | 75-86-5 | Propanenitrile, 2-hydroxy-2-methyl- |
| P081 | 55-63-0 | 1,2,3-Propanetriol, trinitrate |
| P017 | 598-31-2 | 2-Propanone, 1-bromo- |
| P102 | 107-19-7 | Propargyl alcohol |
| P003 | 107-02-8 | 2-Propenal |
| P005 | 107-18-6 | 2-Propen-1-ol |
| P067 | 75-55-8 | 1,2-Propylenimine |
| P102 | 107-19-7 | 2-Propyn-1-ol |
| P008 | 504-24-5 | 4-Pyridinamine |
| P075 | [1]54-11-5 | Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts |
| P204 | 57-47-6 | Pyrrolo[2,3-b]indol-5-ol,1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl, methylcarbamate (ester), (3aS-cis)- |
| P114 | 12039-52-0 | Selenious acid, dithallium(1+) salt |
| P103 | 630-10-4 | Selenourea |
| P104 | 506-64-9 | Silver cyanide |

| EPA Waste Code | CAS# | Chemical Name |
|---|---|---|
| P104 | 506-64-9 | Silver cyanide Ag(CN) |
| P105 | 26628-22-8 | Sodium azide |
| P106 | 143-33-9 | Sodium cyanide |
| P106 | 143-33-9 | Sodium cyanide Na(CN) |
| P108 | [1]57-24-9 | Strychnidin-10-one, & salts |
| P018 | 357-57-3 | Strychnidin-10-one, 2,3-dimethoxy- |
| P108 | [1]57-24-9 | Strychnine, & salts |
| P115 | 7446-18-6 | Sulfuric acid, dithallium(1+) salt |
| P109 | 3689-24-5 | Tetraethyldithiopyrophosphate |
| P110 | 78-00-2 | Tetraethyl lead |
| P111 | 107-49-3 | Tetraethyl pyrophosphate |
| P112 | 509-14-8 | Tetranitromethane |
| P062 | 757-58-4 | Tetraphosphoric acid, hexaethyl ester |
| P113 | 1314-32-5 | Thallic oxide |
| P113 | 1314-32-5 | Thallium oxide $Tl_2 O_3$ |
| P114 | 12039-52-0 | Thallium(I) selenite |
| P115 | 7446-18-6 | Thallium(I) sulfate |
| P109 | 3689-24-5 | Thiodiphosphoric acid, tetraethylester |
| P045 | 39196-18-4 | Thiofanox |
| P049 | 541-53-7 | Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$ |
| P014 | 108-98-5 | Thiophenol |
| P116 | 79-19-6 | Thiosemicarbazide |
| P026 | 5344-82-1 | Thiourea, (2-chlorophenyl)- |
| P072 | 86-88-4 | Thiourea, 1-naphthalenyl- |
| P093 | 103-85-5 | Thiourea, phenyl- |
| P185 | 26419-73-8 | Tirpate. |
| P123 | 8001-35-2 | Toxaphene |
| P118 | 75-70-7 | Trichloromethanethiol |
| P119 | 7803-55-6 | Vanadic acid, ammonium salt |
| P120 | 1314-62-1 | Vanadium oxide $V_2O_5$ |
| P120 | 1314-62-1 | Vanadium pentoxide |
| P084 | 4549-40-0 | Vinylamine, N-methyl-N-nitroso- |
| P001 | [1]81-81-2 | Warfarin, & salts, at concentrations greater than 0.3% |
| P205 | 137-30-4 | Zinc, bis(dimethylcarbamodithioato-S,S')- |
| P121 | 557-21-1 | Zinc cyanide |
| P121 | 557-21-1 | Zinc cyanide $Zn(CN)_2$ |
| P122 | 1314-84-7 | Zinc phosphide $Zn_3P_2$, when present at concentrations greater than 10% |
| P205 | 137-30-4 | Ziram |

# Appendix B: Listed Hazardous Waste - U List

Listed Hazardous Waste - Discarded commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products (**U** list):

| EPA Waste Code | CAS# | Chemical Name | EPA Waste Code | CAS# | Chemical Name |
|---|---|---|---|---|---|
| U001 | 75-07-0 | Acetaldehyde (I) | U034 | 75-87-6 | Acetaldehyde, trichloro- |
| U187 | 62-44-2 | Acetamide, N-(4-ethoxyphenyl) | U005 | 53-96-3 | Acetamide, N-9H-fluoren-2-yl- |
| U112 | 141-78-6 | Acetic acid, ethyl ester (I) | U144 | 301-04-2 | Acetic acid, lead salt |
| U214 | 563-68-8 | Acetic acid, thallium (1 +) salt | U232 | 93-76-5 | Acetic acid, (2,4,5,-trichlorophenoxy)- |
| U002 | 67-64-1 | Acetone (I) | U003 | 75-05-8 | Acetonitrile (I,T) |
| U004 | 98-86-2 | Acetophenone | U005 | 53-96-3 | 2-Acetylaminofluorene |
| U006 | 75-36-5 | Acetyl chloride (C,R,T) | U007 | 79-06-1 | Acrylamide |
| U008 | 79-10-7 | Acrylic acid(I) | U009 | 107-13-1 | Acrylonitrile |
| U011 | 61-82-5 | Amitrole | U012 | 62-53-3 | Aniline (I,T) |
| U014 | 492-80-8 | Auramine | U015 | 115-02-6 | Azaserine |
| U010 | 50-07-7 | Azirino(2 ,3 :3,4)pyrrolo[1,2-a]indole-4,7-dione,6-amino-8-[((aminocarbonyl)oxy) methyl]-1, 1a, 2, 8, 8a, 8b-hexahydro-8a-methoxy-5-methyl- | U157 | 50-49-5 | Benz[j]aceanthrylene, 1,2-dihydro-3-methyl- |
| U016 | 225-51-4 | 3,4-Benzacridine | U017 | 98-87-3 | Benzal chloride |
| U192 | 23950-58-5 | Benzamide, 3,5-dichloro-N-(1,1 diethyl-2-propynyl)- | U018 | 56-55-3 | Benz[a]anthracene |
| U094 | 57-97-6 | Benz[a]anthracene, 7,12-dimethyl- | U012 | 62-53-3 | Benzenamine (I,T) |
| U014 | 492-80-8 | Benzenamine, 4,4 -carbonimidoylbis[N,N-dimethyl- | U049 | 3165-93-3 | Benzenamine, 4-chloro-2-methyl |
| U093 | 60-11-7 | Benzenamine, N,N-dimethyl-4-(phenylazo)- | U328 | 95-53-4 | Benzenamine, 2-methyl- |
| U353 | 106-49-0 | Benzenamine, 4-methyl- | U158 | 101-14-4 | Benzenamine, 4,4 -methylenebis[2-chloro- |
| U222 | 636-21-5 | Benzenamine, 2-methyl-, hydrochloride | U181 | 99-55-8 | Benzenamine, 2-methyl-5-nitro- |
| U019 | 71-43-2 | Benzene | U038 | 510-15-6 | Benzeneacetic acid, 4-chloro-alpha- (4 chlorophenyl)-alpha-hydroxy, ethyl ester |
| U030 | 101-55-3 | Benzene, 1-bromo-4-phenoxy- | U035 | 305-03-3 | Benzenebutanoic acid, 4[bis(2chloroethyl)amino]- |
| U037 | 108-90-7 | Benzene, chloro- | U221 | 25376-45-8 | Benzenediamine, ar-methyl |
| U028 | 117-81-7 | 1,2-Benzenedicarboxylic acid, [bis(2-ethyl-hexyl)] ester | U069 | 84-74-2 | 1,2-Benzenedicarboxylic acid, dibutyl ester |
| U088 | 84-66-2 | 1,2-Benzenedicarboxylic acid, diethyl ester | U102 | 131-11-3 | 1,2-Benzenedicarboxylic acid, dimethyl ester |
| U107 | 117-84-0 | 1,2-Benzenedicarboxylic acid, di-n-octyl ester | U070 | 95-50-1 | Benzene, 1,2-dichloro- |
| U071 | 541-73-1 | Benzene, 1,3-dichloro- | U072 | 106-46-7 | Benzene, 1,4-dichloro- |

| EPA Waste Code | CAS# | Chemical Name | EPA Waste Code | CAS# | Chemical Name |
|---|---|---|---|---|---|
| U060 | 72-54-8 | Benzene, 1,1 -(2,2-dichloro-ethylidene) bis[4-chloro- | U017 | 98-87-3 | Benzene, (dichloromethyl)- |
| U223 | 26471-62-5 | Benzene, 1,3 diisocyanatomethyl- (R,T) | U239 | 1330-20-7 | Benzene, dimethyl- (I,T) |
| U201 | 108-46-3 | 1,3-Benzenediol | U127 | 118-74-1 | Benzene, hexachloro- |
| U056 | 110-82-7 | Benzene, hexahydro- (I) | U220 | 108-88-3 | Benzene, methyl- |
| U105 | 121-14-2 | Benzene, 1-methyl-2,4-dinitro- | U106 | 606-20-2 | Benzene, 2-methyl-1,3-dinitro- |
| U055 | 98-82-8 | Benzene, (1-methylethyl)- (I) | U169 | 98-95-3 | Benzene, nitro- (I,T) |
| U183 | 608-93-5 | Benzene, pentachloro- | U185 | 82-68-8 | Benzene, pentachloronitro- |
| U020 | 98-09-9 | Benzenesulfonic acid chloride (C,R) | U020 | 98-09-9 | Benzenesulfonyl chloride (C,R) |
| U207 | 95-94-3 | Benzene, 1,2,4,5-tetrachloro- | U061 | 50-29-3 | Benzene, 1,1 -(2,2,2-trichloroethylidene)bis[4-chloro- |
| U247 | 72-43-5 | Benzene, 1,1 -(2,2,2-trichloroethylidene)[4 -methoxy- | U023 | 98-07-7 | Benzene, (trichloromethyl)- (C,R,T) |
| U234 | 99-35-4 | Benzene, 1,3,5-trinitro- (R,T) | U021 | 92-87-5 | Benzidine |
| U202 | [1]81-07-2 | 1,2-Benzisothiazol-3-(2H)-one,1,1 dioxide and salts | U203 | 94-59-7 | 1,3-Benzodioxole, 5-(2-propenyl)- |
| U141 | 120-58-1 | 1,3-Benzodioxole, 5-(1-propenyl)- | U090 | 94-58-6 | 1,3-Benzodioxole, 5-propyl- |
| U064 | 189-55-9 | Benzo[rst] pentaphene | U022 | 50-32-8 | Benzo[a]pyrene |
| U197 | 106-51-4 | p-Benzoquinone | U023 | 98-07-7 | Benzotrichloride (C,R,T) |
| U085 | 1464-53-5 | 2,2'-Bioxirane (I,T) | U021 | 92-87-5 | [1,1' -Biphenyl]-4,4' -diamine |
| U073 | 91-94-1 | [1,1' -Biphenyl]-4,4' -diamine, 3,3' -dichloro- | U091 | 119-90-4 | [1,1' -Biphenyl]-4,4' -diamine, 3,3' -dimethoxy- |
| U095 | 119-93-7 | [1,1' -Biphenyl]-4,4' -diamine, 3,3' -dimethyl- | U027 | 39638-32-9 | Bis(2-chloroisopropyl) ether |
| U024 | 111-91-1 | Bis(2-chloromethoxy) ethane | U028 | 117-81-7 | Bis(2-ethylhexyl) phthalate |
| U225 | 75-25-2 | Bromoform | U030 | 101-55-3 | 4-Bromophenyl phenyl ether |
| U128 | 87-68-3 | 1,3-Butadiene, 1,1,2,3,4,4-hexachloro- | U172 | 924-16-3 | 1-Butanamine, N-butyl-N-nitroso |
| U031 | 71-36-3 | 1-Butanol (I) | U159 | 78-93-3 | 2-Butanone (I,T) |
| U160 | 1338-23-4 | 2-Butanone peroxide (R,T) | U053 | 4170-30-3 | 2-Butenal |
| U074 | 764-41-0 | 2-Butene, 1,4-dichloro- (I,T) | U143 | 303-34-4 | 2-Butenoic acid, 2-methyl-, 7-[(2,3-dihydroxy- 2-(1-methoxyethyl)- 3-methyl-1-oxobutoxy)methyl]- 2,3,5,7a-tetrahydro-1- pyrrolizin-1- yl ester, [1S-[1alpha(Z),7(2S,3R),7aalpha]]- |
| U031 | 71-36-3 | n-Butyl alchohol (I) | U136 | 75-60-5 | Cacodylic acid |
| U032 | 13765-19-0 | Calcium chromate | U238 | 51-79-6 | Carbamic acid, ethyl ester |
| U178 | 615-53-2 | Carbamic acid, methylnitroso, ethyl ester | U097 | 79-44-7 | Carbamic chloride, dimethyl- |
| U114 | [1]111-54-6 | Carbamodithioic acid, 1,2-ethanediylbis-, salts and esters | U062 | 2303-16-4 | Carbamothioic acid, bis(1-methylethyl)- S-(2,3-dichloro-2-propenyl) ester |
| U215 | 6533-73-9 | Carbonic acid, dithallium (1+) salt | U033 | 353-50-4 | Carbonic difluoride |

| EPA Waste Code | CAS# | Chemical Name | EPA Waste Code | CAS# | Chemical Name |
|---|---|---|---|---|---|
| U156 | 79-22-1 | Carbonochloridic acid, methyl ester (I,T) | U033 | 353-50-4 | Carbon oxyfluoride (R,T) |
| U211 | 56-23-5 | Carbon tetrachloride | U034 | 75-87-6 | Chloral |
| U035 | 30503-3 | Chlorambucil | U036 | 12789-03-6 | Chlordane |
| U026 | 494-03-1 | Chlornaphazine | U037 | 108-90-7 | Chlorobenzene |
| U039 | 59-50-7 | p-Chloro-m-cresol | U041 | 106-89-8 | 1-Chloro-2,3 epoxypropane |
| U042 | 110-75-8 | 2-Chloroethyl vinyl ether | U044 | 67-66-3 | Chloroform |
| U046 | 107-30-2 | Chloromethyl methyl ether | U047 | 91-58-7 | beta-Chloronaphthalene |
| U048 | 95-57-8 | o-Chlorophenol | U049 | 3165-93-3 | 4-Chloro-o-toluidine, hydrochloride |
| U032 | 13765-19-0 | Chromic acid, calcium salt | U050 | 218-01-9 | Chrysene |
| U051 | 8021-39-4 | Creosote | U052 | 1319-77-3 | Cresols (Cresylic acid) |
| U053 | 4170-30-3 | Crotonaldehyde | U055 | 98-82-8 | Cumene (I) |
| U246 | 506-68-3 | Cyanogen bromide | U197 | 106-51-4 | 2,5-Cyclohexadiene-1,4-dione |
| U056 | 110-82-7 | Cyclohexane (I) | U057 | 108-94-1 | Cyclohexanone (I) |
| U130 | 77-47-4 | 1,3-Cyclopentadiene, 1,2,3,4,5,5-hexa-chloro- | U058 | 50-18-0 | Cyclophosphamide |
| U240 | [1]94-75-7 | 2,4-D, salts and esters | U059 2 | 0830-81-3 | Daunomycin |
| U060 | 72-54-8 | DDD | U061 | 50-29-3 | DDT |
| U062 | 2303-16-4 | Diallate | U063 | 53-70-3 | Dibenz[a,h]anthracene |
| U064 | 189-55-9 | Dibenzo[s,i]pyrene | U066 | 96-12-8 | 1,2-Dibromo-3-chloropropane |
| U069 | 84-74-2 | Dibutyl phthalate | U070 | 95-50-1 | o-Dichlorobenzene |
| U071 | 541-73-1 | m-Dichlorobenzene | U072 | 106-46-7 | p-Dichlorobenzene |
| U073 | 91-94-1 | 3,3'-Dichlorobenzidine | U074 | 764-41-0 | 1,4-Dichloro-2-butene (I,T) |
| U075 | 75-71-8 | Dichlorodifluoromethane | U078 | 75-35-4 | 1,1-Dichloroethylene |
| U079 | 156-60-5 | 1,2-Dichloroethylene | U025 | 111-44-1 | Dichloroethyl ether |
| U081 | 120-83-2 | 2,4-Dichlorophenol | U082 | 87-65-0 | 2,6-Dichlorophenol |
| U240 | [1]94-75-7 | 2,4-Dichlorophenoxyacetic acid, salts and esters | U083 | 78-87-5 | 1,2-Dichloropropane |
| U084 | 542-75-6 | 1,3-Dichloropropene | U085 | 1464-53-5 | 1,2:3,4-Diepoxybutane (I,T) |
| U108 | 123-91-1 | 1,4-Diethyleneoxide | U086 | 1615-80-1 | N,N-Diethylhydrazine |
| U087 | 3288-58-2 | O,O-Diethyl-S-methyl-dithiophosphate | U088 | 84-66-2 | Diethyl phthalate |
| U089 | 56-53-1 | Diethylstilbestrol | U090 | 94-58-6 | Dihydrosafrole |
| U091 | 119-90-4 | 3,3'-Dimethoxybenzidine | U092 | 124-40-3 | Dimethylamine (I) |
| U093 | 60-11-7 | Dimethylaminoazobenzene | U094 | 57-97-6 | 7,12-Dimethylbenz [a]anthracene |
| U095 | 119-93-7 | 3,3'-Dimethylbenzidine | U096 | 80-15-9 | alpha,alpha-Dimethylbenzylhydroperoxide (R) |
| U097 | 79-44-7 | Dimethylcarbamoyl chloride | U098 | 57-14-7 | 1,1-Dimethylhydrazine |
| U099 | 540-73-8 | 1,2-Dimethylhydrazine | U101 | 105-67-9 | 2,4-Dimethylphenol |
| U102 | 131-11-3 | Dimethyl phthalate | U103 | 77-78-1 | Dimethyl sulfate |
| U105 | 121-14-2 | 2,4-Dinitrotoluene | U106 | 606-20-2 | 2,6-Dinitrotoluene |
| U107 | 117-84-0 | Di-n octyl phthalate | U108 | 123-91-1 | 1,4-Dioxane |
| U109 | 122-66-7 | 1,2-Diphenylhydrazine | U110 | 142-84-7 | Dipropylamine (I) |

| EPA Waste Code | CAS# | Chemical Name | EPA Waste Code | CAS# | Chemical Name |
|---|---|---|---|---|---|
| U111 | 621-64-7 | Di-n-propylnitrosamine | U001 | 75-07-0 | Ethanal (I) |
| U174 | 55-18-5 | Ethanamine, N-ethyl-N-nitroso- | U155 | 91-80-5 | 1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'- (2-thienylmethyl)- |
| U067 | 106-93-4 | Ethane, 1,2-dibromo- | U076 | 75-34-3 | Ethane, 1,1-diichloro- |
| U077 | 107-06-2 | Ethane, 1,2-dichloro- | U131 | 67-72-1 | Ethane, hexachloro- |
| U024 | 111-91-1 | Ethane, 1,1' -[methylenebis(oxy)]bis[2-chloro- | U117 | 60-29-7 | Ethane, 1,1-oxybis- (1) |
| U025 | 111-44-4 | Ethane, 1,1-oxybis[2-chloro- | U184 | 76-01-7 | Ethane, pentachloro- |
| U208 | 630-20-6 | Ethane, 1,1,1,2-tetrachloro- | U209 | 79-34-5 | Ethane, 1,1,2,2-tetrachloro- |
| U218 | 62-55-5 | Ethanethioamide | U227 | 110-80-5 | Ethanol, 2-ethoxy |
| U359 | 79-00-5 | Ethane, 1,1,2-trichloro- | U173 | 1116-54-7 | Ethanol, 2,2'-(nitrosoimino)bis- |
| U004 | 98-86-2 | Ethanone, 1-phenyl- | U043 | 75-01-4 | Ethene, chloro- |
| U042 | 110-75-8 | Ethene, (2-chloroethoxy)- | U078 | 75-35-4 | Ethene, 1,1-dichloro- |
| U079 | 156-60-5 | Ethene, 1,2-dichloro- | U210 | 127-18-4 | Ethene, tetrachloro- |
| U228 | 79-01-6 | Ethene, trichloro | U112 | 141-78-6 | Ethyl acetate (I) |
| U113 | 140-88-5 | Ethyl acrylate (I) | U238 | 51-79-6 | Ethyl carbamate |
| U038 | 510-15-6 | Ethyl 4,4'-dichlorobenzilate | U114 | [1]111-54-6 | Ethylenebis(dithiocarbamic acid), salts and esters |
| U067 | 106-93-4 | Ethylene dibromide | U077 | 107-06-2 | Ethylene dichloride |
| U359 | 110-80-5 | Ethylene glycol monoethyl ether | U115 | 75-21-8 | Ethylene oxide (I,T) |
| U116 | 96-45-7 | Ethylene thiourea | U117 | 60-29-7 | Ethyl ether (I) |
| U076 | 75-34-3 | Ethylidene dichloride | U118 | 97-63-2 | Ethyl methacrylate |
| U119 | 62-50-0 | Ethylmethanesulfonate | U120 | 206-44-0 | Fluoranthene |
| U122 | 50-00-0 | Formaldehyde | U123 | 64-18-6 | Formic acid (C,T) |
| U124 | 110-00-9 | Furan (I) | U125 | 98-01-1 | 2-Furancarboxaldehyde (I) |
| U147 | 108-31-6 | 2,5-Furandione | U213 | 109-99-9 | Furan, tetrahydro- (I) |
| U125 | 98-01-1 | Furfural (I) | U124 | 110-00-9 | Furfuran (I) |
| U206 | 18883-66-4 | D-GIucopyranose, 2-deoxy-2(3-methyl-3-nitrosoureido) | U126 | 765-34-4 | Glycidylaldehyde |
| U163 | 70-25-7 | Guanidine, N-methyl-N'-nitro-N-nitroso- | U127 | 18-74-1 | Hexachlorobenzene |
| U128 | 87-68-3 | Hexachlorobutadiene | U129 | 58-88-9 | Hexachlorocyclohexane (gamma isomer) |
| U130 | 77-47-4 | Hexachlorocyclopentadiene | U131 | 67-72-1 | Hexachloroethane |
| U132 | 70-30-4 | Hexachlorophene | U243 | 1888-71-7 | Hexachloropropene |
| U133 | 302-01-2 | Hydrazine (R,T) | U086 | 1615-80-1 | Hydrazine, 1,2-dimethyl- - |
| U098 | 57-14-7 | Hydrazine, 1,1-dimethyl- | U099 | 540-73-8 | Hydrazine, 1,2-diethyl |
| U109 | 122-66-7 | Hydrazine, 1,2-diphenyl- | U134 | 7664-39-3 | Hydrofluoric acid (C,T) |
| U134 | 7664-39-3 | Hydrogen fluoride (C,T) | U135 | 7783-06-4 | Hydrogen sulfide |
| U096 | 80-15-9 | Hydroperoxide, 1-methyl-1-phenylethyl- (R) | U136 | 75-60-5 | Hydroxydimethylarsine oxide |
| U116 | 96-45-7 | 2-Imidazolidinethione | U137 | 193-39-5 | Indeno[1,2,3-cd]pyrene |
| U139 | 9004-66-4 | Iron dextran | U190 | 85-44-9 | 1,3-isobenzofurandione |
| U140 | 78-83-1 | Isobutyl alcohol (I,T) | U141 | 120-58-1 | Isosafrole |

| EPA Waste Code | CAS# | Chemical Name | EPA Waste Code | CAS# | Chemical Name |
|---|---|---|---|---|---|
| U142 | 143-50-0 | Kepone | U143 | 303-34-4 | Lasiocarpine |
| U144 | 301-04-2 | Lead acetate | U146 | 1335-32-6 | Lead, bis(acetato-O)tetrahydroxytri- |
| U145 | 7446-27-7 | Lead phosphate | U146 | 1335-32-6 | Lead subacetate |
| U129 | 58-89-9 | Lindane | U147 | 108-31-6 | Maleic anhydride |
| U148 | 123-33-1 | Maleic hydrazide | U149 | 109-77-3 | Malononitrile |
| U150 | 148-82-3 | Melphalan | U151 | 7439-97-6 | Mercury |
| U152 | 126-98-7 | Methacrylonitrile (I,T) | U092 | 124-40-3 | Methanamine, N-methyl- (I) |
| U029 | 74-83-9 | Methane, bromo- | U045 | 74-87-3 | Methane, chloro-(I,T) |
| U046 | 107-30-2 | Methane, chloromethoxy- | U068 | 74-95-3 | Methane, dibromo- |
| U080 | 75-09-2 | Methane, dichloro- | U075 | 75-71-8 | Methane, dichlorodifluoro- |
| U138 | 74-88-4 | Methane, iodo- | U119 | 62-50-0 | Methanesulfonic acid, ethyl ester |
| U211 | 56-23-5 | Methane, tetrachloro- | U153 | 74-93-1 | Methanethiol (I,T) |
| U225 | 75-25-2 | Methane, tribromo- | U044 | 67-66-3 | Methane, trichloro- |
| U121 | 75-69-4 | Methane, trichlorofluoro- | U123 | 64-18-6 | Methanoic acid (C,T) |
| U154 | 67-56-1 | Methanol (I) | U155 | 91-80-5 | Methapyrilene |
| U142 | 143-50-0 | 1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1, 1a,3,3a,4,5,5,5a,5b,6- decachloro-octahydro- | U247 | 72-43-5 | Methoxychlor |
| U154 | 67-56-1 | Methyl alcohol (I) | U029 | 74-83-9 | Methyl bromide |
| U186 | 504-60-9 | 1-Methylbutadiene (I) | U045 | 74-87-3 | Methyl chloride (I,T) |
| U156 | 79-22-1 | Methylchlorocarbonate (I,T) | U226 | 71-55-6 | Methylchloroform |
| U157 | 56-49-5 | 3-Methylcholanthrene | U158 | 101-14-4 | 4,4'-Methylenebis(2-chloroaniline) |
| U068 | 74-95-3 | Methylene bromide | U080 | 75-09-2 | Methylene chloride |
| U159 | 78-93-3 | Methyl ethyl ketone (MEK)(I,T) | U160 | 1338-23-4 | Methyl ethyl ketone peroxide (R,T) |
| U138 | 74-88-4 | Methyl iodide | U161 | 108-10-1 | Methyl isobutyl ketone (I) |
| U162 | 80-62-6 | Methyl methacrylate (I,T) | U163 | 70-25-7 | N-Methyl-N'-nitro-N-nitrosoguanidine |
| U161 | 108-10-1 | 4-Methyl-2-pentanone (I) | U164 | 56-04-2 | Methylthiouracil |
| U010 | 50-07-7 | Mitomycin C | U059 | 20830-81-3 | 5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[(3-amino- 2,3,6-trideoxy alpha-L-lyxo-hexopyranosyl)oxy]- 7,8,9,10-tetrahydro- 6,8,11-trihydroxy-1-methoxy- |
| U165 | 91-20-3 | Naphthalene | U047 | 91-58-7 | Naphthalene, 2-chloro- |
| U166 | 130-15-4 | 1,4-Naphthalenedione | U236 | 72-57-1 | 2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'- dimethyl-(1,1'-biphenyl)- 4,4'diyl)]-bis (azo) bis(5-amino-4-hydroxy)-, tetrasodium salt |
| U166 | 130-15-4 | 1,4-Naphthoquinone | U167 | 134-32-7 | alpha-Naphthylamine |
| U168 | 91-59-8 | beta-Naphthylamine | U026 | 494-03-1 | 2-Naphthylamine, N,N' -bis(2-chloroethyl)- |
| U167 | 134-32-7 | 1 -Naphthylenamine | U168 | 91-59-8 | 2-Naphthylenamine |

| EPA Waste Code | CAS# | Chemical Name | EPA Waste Code | CAS# | Chemical Name |
|---|---|---|---|---|---|
| U217 | 10102-45-1 | Nitric acid, thallium(1 + ) salt | U169 | 98-95-3 | Nitrobenzene (I,T) |
| U170 | 100-02-7 | p-Nitrophenol | U171 | 79-46-9 | 2-Nitropropane (I,T) |
| U172 | 924-16-3 | N-Nitrosodi-n-butylamine | U173 | 1116-54-7 | N-Nitrosodiethanolamine |
| U174 | 55-18-5 | N-Nitrosodiethylamine | U176 | 759-73-9 | N-Nitroso-N ethylurea |
| U177 | 684-93-5 | N-Nitroso-N-methylurea | U178 | 615-53-2 | N-Nitroso-N-methylurethane |
| U179 | 100-75-4 | N-Nitrosopiperidine | U180 | 930-55-2 | N-Nitrosopyrrolidine |
| U181 | 99-55-8 | 5-Nitro-o-toluidine | U193 | 1120-71-4 | 1,2 Oxathiolane, 2,2-dioxide |
| U058 | 50-18-0 | 2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2- chloroethyl) tetrahydro-, 2-oxide | U115 | 75-21-8 | Oxirane (I,T) |
| U126 | 765-34-4 | Oxiranecarboxyaldehyde | U041 | 106-89-8 | Oxirane, (chloromethyl)- |
| U182 | 123-63-7 | Paraldehyde | U183 | 608-93-5 | Pentachlorobenzene |
| U184 | 76-01-7 | Pentachloroethane | U185 | 82-68-8 | Pentachloronitrobenzene (PCNB) |
| U242 | 87-86-5 | Pentachlorophenol | U186 | 504-60-9 | 1,3-Pentadiene (I) |
| U187 | 62-44-2 | Phenacetin | U188 | 108-95-2 | Phenol |
| U048 | 95-57-8 | Phenol, 2-chloro- | U039 | 59-50-7 | Phenol, 4-chloro-3-methyl- |
| U081 | 120-83-2 | Phenol, 2,4-dichloro- | U082 | 87-65-0 | Phenol, 2,6-dichloro- |
| U089 | 56-53-1 | Phenol, 4,4' -(1,2-diethyl-1,2-ethenediyl)bis-,(E)- | U101 | 105-67-9 | Phenol, 2,4-dimethyl- |
| U052 | 1319-77-3 | Phenol, methyl- | U132 | 70-30-4 | Phenol, 2,2' -methylenebis[3,4,6-trichloro- |
| U170 | 100-02-7 | Phenol, 4-nitro- | U242 | 87-86-5 | Phenol, pentachloro- |
| U212 | 58-90-2 | Phenol, 2,3,4,6-tetrachloro- | U230 | 95-94-4 | Phenol, 2,4,5-trichloro- |
| U231 | 88-06-2 | Phenol, 2,4,6-trichloro- | U150 | 148-82-3 | L-Phenylalanine, 4[bis(2-chloroethyl) amino]- |
| U145 | 7446-27-7 | Phosphoric acid, lead salt | U087 | 3288-58-2 | Phosphorodithioic acid, O,O-diethyl-, S-methyl ester |
| U189 | 108-95-2 | Phosphorus sulfide (R) | U190 | 85-44-9 | Phthalic anhydride |
| U191 | 109-06-8 | 2-Picoline | U179 | 100-75-4 | Piperidine, 1-nitroso- |
| U192 | 23950-58-5 | Pronamide | U194 | 107-10-8 | 1-Propanamine (I,T) |
| U111 | 621-64-7 | 1-Propanamine, N-nitroso-N-propyl- | U110 | 142-84-7 | 1-Propanamine, N-propyl- (I) |
| U066 | 96-12-8 | Propane, 1,2-dibromo-3-chloro- | U149 | 109-77-3 | Propanedinitrile |
| U171 | 79-46-9 | Propane, 2-nitro-(I,T) | U027 | 39638-32-9 | Propane, 2,2' -oxybis[2-chloro- |
| U193 | 1120-71-4 | 1,3-Propane sultone | U235 | 126-72-7 | 1-Propanol, 2,3-dibromo-, phosphate (3:1) |
| U140 | 78-83-1 | 1-Propanol, 2-methyl- (I,T) | U002 | 67-64-1 | 2-Propanone (I) |
| U084 | 542-75-6 | 1-Propane, 1,3-dichloro- | U152 | 126-98-7 | 2-Propanenitrile, 2-methyl- (I,T) |
| U007 | 79-06-1 | 2-Propenamide | U243 | 1888-71-7 | 1-Propene, hexachloro- |
| U009 | 107-13-1 | 2-Propenenitrile | U008 | 79-10-7 | 2-Propenoic acid (I) |
| U113 | 140-88-5 | 2-Propenoic acid, ethyl ester (I) | U118 | 97-63-2 | 2-Propenoic acid, 2-methyl-, ethyl ester |
| U162 | 80-66-2 | 2-Propenoic acid, 2-methyl-, methyl ester(I,T) | U233 | 93-72-1 | Propionic acid, 2-(2,4,5-trichlorophenoxy)- |

| EPA Waste Code | CAS# | Chemical Name | EPA Waste Code | CAS# | Chemical Name |
|---|---|---|---|---|---|
| U194 | 107-10-8 | n-Propylamine (I,T) | U083 | 78-87-5 | Propylene dichloride |
| U148 | 123-33-1 | 3,6-Pyridazinedione, 1,2-dihydro | U196 | 110-86-1 | Pyridine |
| U191 | 109-06-8 | Pyridine, 2-methyl- | U237 | 66-75-1 | 2,4(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]- |
| U164 | 56-04-2 | 4-(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo- | U180 | 930-55-2 | Pyrrolidine, 1-nitroso- |
| U200 | 50-55-5 | Reserpine | U201 | 108-46-3 | Resorcinol |
| U202 | [1]81-07-2 | Saccharin and salts | U203 | 94-59-7 | Safrole |
| U204 | 7783-00-8 | Selenious acid | U204 | 7783-00-8 | Selenium dioxide |
| U205 | 7446-34-6 | Selenium sulfide (R,T) | U015 | 115-02-6 | L-Serine, diazoacetate (ester) |
| U233 | 93-72-1 | Silvex | U206 | 18883-66-4 | Streptozotocin |
| U103 | 77-78-1 | Sulfuric acid, dimethyl ester | U189 | 1314-80-3 | Sulfur phosphide (R) |
| U232 | 93-76-5 | 2,4,5-T | U207 | 95-94-3 | 1,2,4,5-Tetrachlorobenzene |
| U208 | 630-20-6 | 1,1,1,2-Tetrachloroethane | U209 | 79-34-5 | 1,1,2,2-Tetrachloroethane |
| U210 | 127-18-4 | Tetrachloroethylene | U212 | 58-90-2 | 2,3,4,6-Tetrachlorophenol |
| U213 | 109-99-9 | Tetrahydrofuran (I) | U214 | 15843-14-8 | Thallium(I) acetate |
| U215 | 6533-73-9 | Thallium(I) carbonate | U216 | 7791-12-0 | Thallium chloride |
| U217 | 10102-45-1 | Thallium(I) nitrate | U218 | 62-55-5 | Thioacetamide |
| U153 | 74-93-1 | Thiomethanol (I,T) | U244 | 137-26-8 | Thioperoxydicarbonic diamide, tetramethyl- |
| U219 | 62-56-6 | Thiourea | U244 | 137-26-8 | Thiuram |
| U220 | 108-88-3 | Toluene | U221 | 25376-45-8 | Toluenediamine |
| U223 | 26471-62-5 | Toluene diisocyanate (R,T) | U328 | 95-53-4 | o-Toluidine |
| U353 | 106-49-0 | p-Toluidine | U222 | 636-21-5 | o-Toluidine hydrochlorlde |
| U011 | 61-82-5 | 1H-1,2,4- Triazol-3-amine | U226 | 71-55-6 | 1,1,1 -Trichloroethane |
| U227 | 79-00-5 | 1,1,2-Trichtoroethane | U228 | 79-01-6 | Trichloroethylene |
| U121 | 75-69-4 | Trichloromonofluoromethane | U230 | 95-95-4 | 2,4,5-Trichlorophenol |
| U231 | 88-06-2 | 2,4,6-Trichlorophenol | U234 | 99-35-4 | sym-Trinitrobenzene (R,T) |
| U182 | 123-63-7 | 1,3,5- Trioxane, 2,4,6- trimethyl- | U235 | 126-72-7 | Tris(2,3-dibromopropyl) phosphate |
| U236 | 72-57-1 | Trypan blue | U237 | 66-75-1 | Uracil mustard |
| U176 | 759-73-9 | Urea, N-ethyl-N-nitroso- | U177 | 684-93-5 | Urea, N-methyl-N-nitroso- |
| U043 | 75-01-4 | Vinyl chloride | U248 | [1]81-81-2 | Warfarin, when present at concentrations of 0.3% or less |
| U239 | 1330-20-7 | Xylene (I) | U200 | 50-55-5 | Yohimban-16 carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyt) oxy]-, methyl ester |
| U249 | 1314-84-7 | Zinc phosphide, when present at concentrations of 10% or less | | | |

# Appendix C: Satellite Accumulation Area Rules Posting

**PURDUE UNIVERSITY**

## HAZARDOUS WASTE STORAGE REQUIREMENTS

- All waste must be stored in containers.
- Containers must be kept closed at all times except when adding or removing waste.


- Containers must be labeled or clearly marked with words that describe the contents of the waste and the words "Hazardous Waste".
- Containers must be in good shape and not leaking and must be compatible with the waste they contain.
- Containers must be stored at or near the point of generation and under the control of the generator of the waste.
- The waste storage volume should never exceed 55 gallons per waste collection area.
- Containers must be segregated by chemical compatibility during storage.

**Contact the REM Hazardous Materials Management Section with questions: (765) 49-40121**

# Appendix D: Hazardous Materials Pickup Request Form

HMM-001

## Hazardous Material Pickup Request

**(May also be sent to REM, LMSB via Campus Mail or Fax 49-61106)**

**PI:** _____ **PI Telephone #:** _____

**Requested By:** _____ **Date:** _____

**Telephone #:** _____ **E-Mail:** _____

**Building:** _____ **Room/Shop:** _____ Haz. Mat. Location

**Department:** _____ **Dept. Code:** _____

**When filling out this form remember the following:**

1. All mixture materials must be submitted in a percentage format. Each Container's percentage must add up to 100% (**See Example Below**).
2. Chemical descriptions on this form must match the container label.
   - Always include as much information as possible.
   - Only submit known mixtures or chemicals.
   - Absolutely no chemical formulae, abbreviations acronyms or structures.
3. When submitting trade products:
   - It is your responsibility to provide the product information.
   - An accurate chemical description of the product must accompany the form (i.e. an MSDS).
4. Make sure all writing is legible.
5. Forms completed improperly can cause severe delays in pickup times.

**Example Pickup Line:**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Acetone 50%, Benzene 10%, Dichloromethane 20%, Acetic Acid 10%, Water 10%, Trace Silver | 5 | 5 gal. | 5 gal. | S | L |

**I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.**

| Item # | Chemical Description (List Each Container) | Number of Containers | Container Size | Amount in Container | Spent/ Usable | Solid/ Liquid/ Gas |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

**Special Comments or Instructions:**

1

# Appendix E: Non-Hazardous Materials

| | | |
|---|---|---|
| Actin | Acetylsalicylic acid | Adenosine |
| Alanine | Albumin | Alconox |
| Alginic acid | Aminoacetic acid | Aluminum sulfate |
| Amino acid | Ammonium bicarbonate | Ammonium bitrate |
| Ammonium carbonate | Ammonium chloride | Ammonium sulfate |
| Ammonium phosphate | Amylopectin | Arabinose |
| Arginine | Asparagine | Aspartic acid |
| Ascorbic acid | Beef extract | Bees wax |
| Bentonite | Benzoic acid | Bitumen |
| Boric acid | Broth nutrients | Calcium acetate |
| Calcium carbonate | Calcium chloride | Calcium fluoride |
| Calcium gluconate | Calcium phosphate | Calcium sulfate |
| Carnitine | Casein | Chlorophyll |
| Choline | Choline chloride | Corticotropin |
| Creatinine | Cysteine | Cytosine |
| Dextran | Dextrose | Diathymosulfone |
| Drierite | EDTA | Epsom salts |
| Ferric chloride | Ferric sulfate | Ferritin |
| Ferrous ammonium sulfate | Fructose | Fullers earth |
| Galactose | Gelatin | Glutamic acid |
| Glutamine | Glutaric acid | Glutathione |
| Glycerin | Glycylglycine | Guanosine |
| Gypsum | Hemoglobin | Histidine |
| Hydroxyproline | Insulin | Iron oxide |
| Isoleucine | Kaolin | Keratin |
| Lactic acid | Lactose | Lanolin |
| Lecithin | Leucine | Lithium carbonate |
| Lithium chloride | Lithium sulfate | Litmus |
| Magnesium carbonate | Magnesium phosphate | Magnesium sulfate |
| Malt Extract | Maltose | Manganese acetate |
| Manganese chloride | Manganese sulfate | Mannitol |
| Methionine | Molecular sieves | Naphthoflavone |
| Oleic acid | Ovalbumin | Pancreatin |
| Papain | Paraffin | Pepsin |
| Peptone | Phenylalanine | Phthalic acid |
| Plastics | Polymers (solid) | Potassium acetate |
| Potassium acid phosphate | Potassium bicarbonate | Potassium bisulfate |
| Potassium borate | Potassium bromide | Potassium carbonate |
| Potassium chloride | Potassium citrate | Potassium hydrogen phthalate |
| Potassium iodide | Potassium phosphate | Potassium pyrosulfate |
| Potassium sulfate | Potassium sulfite | Potassium tartrate |
| Pumice | Riboflavin | Riboflavin-5-phosphate |
| Serine | Silicon carbide | Silicon dioxide |
| Sodium acetate | Sodium ammonium phosphate | Sodium benzoate |
| Sodium bicarbonate | Sodium bisulfate | Sodium bisulfite |
| Sodium borate | Sodium carbonate | Sodium chloride |
| Sodium citrate | Sodium dodecyl sulfate | Sodium fluoride |
| Sodium formate | Sodium iodide | Sodium lactate |
| Sodium phosphate | Sodium salicylate | Sodium sulfate |
| Sodium sulfite | Sorbitol | Sorbose |
| Succinic acid | Sucrose | Sugars |
| Tartaric acid | Thiamine hydrochloride | Tocopherol |
| Trypsin | Tryptophan | Tyrosine |
| Urea | Uricase | Valine |
| Xanthine | Yeast extract | **CONTINUED ON NEXT PAGE** |

To ensure improper disposal does not occur, only small quantities of the materials listed in in the table below can be disposed down the drain if water soluble or discarded in the trash. This list does not include every non-hazardous substance or every material that can be disposed of via the sanitary sewer or trash. Please contact REM at (765) 494-0121 for further information regarding non-hazardous waste disposal.

# Appendix F: Non-Hazardous Materials Solubility

The following table contains anion and cation combinations, which are safe for disposal via the sanitary sewer (if soluble) or via the trash (if insoluble) subject to the conditions stated. Materials that create acid or basic aqueous solutions will require neutralization to a pH of 5-9 prior to disposal to sanitary sewer. Reactive items should not be trashed.

| | Acid[5,6] ($H^+$) | Aluminum ($Al^{3+}$) | Ammonium ($NH^{4+}$) | Calcium ($Ca^{2+}$) | Ferric[7] ($Fe^{3+}$) | Ferrous[8] ($Fe^{2+}$) | Lithium ($Li^+$) | Magnesium ($Mg^{2+}$) | Manganous[9] ($Mn^{2+}$) | Potassium ($K^+$) | Sodium ($Na^+$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Acetate** | C | SS | S | S | S | VS | VS | VS | S | VS | VS |
| **Benzoate** | S | SS | S | S | I | S | SS | S | S | S | VS |
| **Borate[1] ($B_4O_7^{2-}$)** | S | I | S | SS | | | S | SS | I | S | S |
| **Bromide ($Br^-$)** | C | R | VS | VS | S | VS | VS | VS | VS | VS | VS |
| **Carbonate ($CO_3^{2-}$)** | S | I | VS | I | I | SS | S | I | I | VS | S |
| **Chloride ($Cl^-$)** | C | R | S | VS | VS | VS | VS | S | VS | S | S |
| **Citrate** | S | S | VS | S | S | SS | VS | SS | SS | VS | VS |
| **Formate** | C | S | VS | S | S | S | S | S | S | VS | VS |
| **Gluconate** | VS | | S | SS | | S | | S | | VS | S |
| **Hydroxide[2] ($OH^-$)** | VS | I | C | SS | I | I | C | I | I | C | C |
| **Iodide ($I^-$)** | C | R | VS | VS | S | S | VS | VS | VS | VS | VS |
| **Lactate** | S | S | VS | S | S | S | S | S | SS | S | VS |
| **Phosphate[3] ($PO_4^{3-}$)** | C | I | S | I | I | I | I | I | SS | VS | VS |
| **Salicylate** | S | I | VS | S | | | VS | S | | VS | VS |
| **Silicate** | I | I | S | I | I | I | I | I | I | S | S |
| **Sulfate[4] ($SO_4^{2-}$)** | C | S | VS | I | S | S | S | VS | VS | S | S |
| **Sulfite[4] ($SO_3^{2-}$)** | C | | S | I | | SS | S | SS | | VS | S |
| **Tartrate[4]** | S | SS | S | SS | S | SS | S | SS | SS | VS | S |

**Key**

C = Caution! These acids and bases can generate a lot of heat or be violent when neutralized or diluted. This is especially true for concentrated solutions.

I = Insoluble, these may be marked as non-hazardous and placed in trash. [Approximate Solubility < 0.01g per 100g Water]

R = Caution! These anhydrous aluminum salts react violently with water. Reactive items should not be trashed.

S = Soluble (also miscible for liquids) [Approximate Solubility 1.0 to 60g per 100g Water]

SS = Slightly Soluble [Approximate Solubility 0.01 to 1.0g per 100g Water]

VS = Very Soluble [Approximate Solubility > 60g per 100g Water]

1 = Also known as tetrabonate. Boric acid, $H_3BO_3$, Magnesium Borate, $Mg(BO_2)_2$.

2 = All bases must be neutralized before sink disposal.

3 = Includes monobasic, dibasic, and tribasic phosphates. Solubility generally decreases with increasing basicity.

4 = Also known as hydrogen carbonate, hydrogen sulfate, hydrogen sulfite, and hydrogen tartrate.

5 = All acids must be neutralized before sink disposal.

6 = Except for Hydrobromic, Hydrochloric, Hydriodic, Phosphoric, Sulfuric, Sulfurous acids and water, acid names in the table are derived by dropping “ate” from the end of the anion name and adding “ic acid.”

7 = Ferric, also known as Iron (III).

8 = Ferrous, also known as Iron (II).

# Appendix G: Summary of Changes

## March 12, 2022

- Corrected formatting irregularities.
- Corrected punctuation errors.

## August 31, 2021

Changed section 6.1 picture to show compliance.

## July 12, 2021

1. Updated Purdue University branding
2. Changed font to Arial
3. Updated Table 2.1 – Criteria and Characteristics of Ignitability, Corrosivity, and Reactivity on page 4.
4. Added sentence “Be sure to check all hazards that apply at the bottom of the label.” near the end of the second paragraph on page 13
5. Updated Figure 4.1 – Hazardous Waste Disposal Tag on page 13
6. Updated Figure 5.4 – Unknown Waste Properly Labeled with a better-quality photograph.
7. Added Appendix G: Summary of Changes to end of document.