

# The University of Southern Indiana Hazardous Waste Management Plan

## **Policy Purpose:**

The Hazardous Waste Management Plan (HWMP) was developed for the University of Southern Indiana full- and part-time faculty and staff who may generate, handle or store hazardous chemical wastes.

## **Policy Statement:**

It is the policy of the University to comply with all local regulations and incorporating by reference U.S. Environmental Protection Agency (EPA) Regulations 40 CFR 260-273. This plan provides the framework for hazardous waste determinations, labeling and container management, hazardous waste storage area requirements, contingency planning, employee training and a clear definition of roles and responsibilities.

## **1.0 Introduction**

With the enactment in 1976 of the Resource Conservation and Recovery Act (RCRA), the transportation, handling, storage and disposal of solid and hazardous wastes became strictly regulated under federal, state and local laws. The Environmental Protection Agency (EPA) and the city of Evansville (and/or Vanderburgh County) have developed regulations for compliance with RCRA. Local regulations are in some instances more stringent or broader in scope than the EPA regulations.

Responsibility for compliance with hazardous waste regulations begins with the person generating the waste material and follows through to disposal. Environmental protection, regulatory requirements and escalating disposal costs underline the importance of waste generators doing their part to ensure that wastes are properly managed at The University of Southern Indiana (USI).

This Hazardous Waste Management Plan (HWMP) serves as a guide for handling hazardous wastes generated at USI. The goal of the HWMP is to handle hazardous waste in a safe, efficient and environmentally sound manner and to comply with local and federal regulations.

## **2.0 Facility Background**

Founded in 1965 as the Indiana State University at Evansville, the University of Southern Indiana (USI) is a residential, coeducational university in Evansville, Indiana. USI's campus is located in the west side of Evansville.

USI grants graduate, undergraduate and professional degrees from eight different schools including: the College of Liberal Arts; the College of Nursing and Health Professions; the Pott College of Science and Engineering; the Bower-Suhrheinrich College of Education and Human Services; the College of Business and the Indiana University Center for Medical Education.

USI employs approximately 250 workers that generate hazardous waste. The university operates on a continuous basis, twenty-four (24) hours a day, seven (7) days a week.

## **3.0 Scope & Availability of the Plan**

This plan applies to each department at The University of Southern Indiana that generates hazardous wastes. It provides directions for containing, labeling, storage, transportation, inspections, training and record keeping for hazardous waste activities.

The HWMP will be made available to all USI employees at any time either via the Office of Risk Management & Safety web site (<http://www.usi.edu/riskmgmt/HazWasteMgtP.asp>) or a copy will be placed in each laboratory generating, storing or handling hazardous waste. Employees will be advised of the availability during their training sessions. A copy of the HWMP will always be accessible in Environmental Health and Safety (812 461-

5393). Also the HWMP will be made available to the EPA or the **city of Evansville's (or Vanderburgh County?)** Hazardous Waste Division upon request for examination and copying.

#### **4.0 Chemical Hygiene Officer**

Each department that generates hazardous waste must designate an individual or individuals to be its Chemical Hygiene Officer (CHO). CHOs will be responsible for ensuring that their departments comply with hazardous waste regulations. They will be trained to do so by Environmental Health and Safety (EHS).

#### **5.0 Responsibilities**

##### *5.1 Environmental Health and Safety (EHS):*

- Maintain the HWMP, based on regulatory changes and the needs of the USI community.
- Assist in the implementation of the HWMP on campus.
- Train generators and CHOs in the proper handling and disposal of hazardous waste.
- Remove hazardous wastes from their storage areas upon notification by the CHO.
- Arrange for the transportation and disposal of hazardous waste from campus within 90 days from the accumulation start date listed on the label.
- Be the central repository for record keeping of all documents related to the accumulation, transportation, storage, treatment and disposal of hazardous wastes.
- Maintain names, job titles and job descriptions for all personnel managing and handling hazardous wastes.

##### *5.2 Department Head of Hazardous Waste Generators:*

- Designate an individual(s) to be the Chemical Hygiene Officers (CHOs).
- Ensure CHOs receive annual training.
- Ensure that no chemicals are abandoned in place.
- Ensure this plan is implemented within the department.
- Absorb any costs associated with regulatory fines arising from their operation (refer to Appendix I for August 9, 2000 Memo from the Vice President for Academic Affairs.)

##### *5.3 Generators:*

- Become familiar with the HWMP.
- Attend training provided by EHS.
- Identify or deem chemical waste as hazardous waste.
- Work with their CHO to properly label, date, segregate and store hazardous wastes.
- Develop and implement an active waste minimization program by investigating material substitution, scale reduction, chemical exchange and purchase control.

##### *5.4 Chemical Hygiene Officers (Appointed by the Department Head):*

- Attend initial and annual training in Hazardous Waste Management.
- Assist EHS to implement the HWMP.
- Establish waste storage areas in the department with the assistance of EHS.
- Assist generators to properly label, store and segregate hazardous waste.
- Post the log inspection sheet in a highly visible area near the designated storage site.
- Inspect waste storage areas weekly to ensure hazardous waste is properly labeled, stored and segregated.
- Ensure that designated waste storage areas are posted with the DANGER sign (see Appendix 2).
- Contact EHS to collect and remove hazardous waste from the waste storage areas in a timely manner.
- Notify EHS on the 60th day of the accumulation start date of the hazardous waste.
- Assist EHS to identify hazardous waste to be removed from campus within 90 days from the accumulation start date listed on the label.

#### **6.0 Requirements for Personnel Leaving the University**

The abandonment of hazardous waste without proper disposal or identification is a regulatory violation and also creates both a dangerous storage situation and an expensive disposal problem. Risk Management recommends that all researchers planning to leave campus properly identify all hazardous wastes and arrange for their disposal before departing the University. It is also recommended that department chairs and principal investigators take responsibility for ensuring that laboratory personnel properly identify all hazardous wastes and arrange for hazardous waste removal before leaving the campus.

## 7.0 Generator Status

According to regulations, "a generator is a large quantity generator if he or she generates more than one hundred (100) kg but less than one thousand (1000) kg of hazardous waste or less than one (1) kg of acutely hazardous waste in a calendar month." Since the University generates more than 100 kilograms of hazardous waste in a calendar month, USI is classified as a Large Quantity Generator. As such, the campus is permitted to accumulate hazardous waste on campus for no more than 90 days. The hazardous waste must be properly shipped from campus for disposal or treatment within 90 days from the accumulation start date.

## 8.0 Hazardous Waste Determination

The hallmark of the RCRA hazardous waste program is its cradle-to-grave approach to regulating hazardous waste from generation to ultimate disposal. Operations generating any solid waste must determine whether the waste is hazardous. Determining whether or not a waste is "hazardous" under RCRA is the first step in proper hazardous waste management. There are two basic categories of hazardous waste: (1) solid wastes that are listed as hazardous by EPA or the relevant state agency and (2) solid wastes which, while not listed, display one of four hazardous "characteristics." The city of Evansville also requires USI to conduct waste determinations on their waste streams (Appendix 3).

### *Solid Wastes*

Solid wastes are materials that are no longer used, unwanted and are set aside for disposal. Solid wastes include abandoned items, materials that are ready to be disposed or those that are ready to be recycled. Materials are solid waste if they are "abandoned" by being disposed of; burned or incinerated; or accumulated, stored or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned or incinerated. Solid wastes may be a solid, liquid or gas. EPA's regulations on waste also automatically exempt certain solid wastes from being considered hazardous. Among those subject to exemption are agricultural wastes that are returned to the ground as fertilizer, utility wastes from coal combustion, nuclear sources or domestic sewage. EPA has also adopted a conditional exemption for waste samples to be used for testing.

### *"Inherently Waste like" Materials*

Chemicals no longer suitable for use are considered "inherently waste like" materials and are subject to hazardous waste regulations. Some examples include:

- Chemicals that are no longer used, e.g., past the expiration date;
- Chemicals with obliterated labels, e.g., corroded, faded or smeared;
- Chemicals with no labels, e.g., sample vials, jars or beakers; or
- Samples that cannot be identified.

### *Hazardous Waste:*

RCRA defines a hazardous waste as a solid waste that because of its quantity; concentration; or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in serious; irreversible; or incapacitating, reversible illnesses or pose a substantial present or potential hazard to human health, safety or welfare to the environment when improperly treated, stored, transported, used or disposed of or otherwise managed.

A solid waste is a hazardous waste if it is not excluded from regulations and it meets any of the following descriptions:

- Solid waste that exhibits one or more of the hazardous waste characteristics (termed a **characteristic**

- waste): ignitability, corrosivity, reactivity or toxicity. (See Section 8.1)
- Solid waste that is identified on any of the hazardous waste lists (termed a **listed** waste): nonspecific source wastes (F list), specific source wastes (K list), commercial chemical products (P and U lists). (See Section 8.2)
  - Solid waste that is a mixture of a solid waste and one or more listed hazardous wastes.
  - A mixture of solid waste and one or more characteristic hazardous wastes.
  - Residues derived from the treatment of listed hazardous waste.

If there is uncertainty as to whether or not a solid waste is hazardous, deem the waste hazardous and apply the HWMP.

## 8.1 Characteristics

A solid waste is a hazardous waste if it exhibits any of the following characteristics: ignitability, corrosivity, reactivity or toxicity.

### Ignitability (EPA Code D001):

A solid waste that has any of the following properties displays the characteristic of ignitability and is considered a hazardous waste:

- A liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, with a flash point below 60 °C (140 °F);
- A non-liquid, capable under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and when ignited burns so vigorously and persistently that it creates a hazard;
- An ignitable compressed gas, which includes gases that form flammable mixtures at a concentration of 13 percent or less in air; or
- An oxidizer, such as permanganate, inorganic peroxide or nitrate that readily stimulates combustion of organic materials.

### Corrosivity (EPA Code D002):

A solid waste that has any of the following properties displays the characteristic of corrosivity and is considered a hazardous waste:

- Is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, using EPA-specified or approved test methods; or
- Is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.25 inch) per year at a test temperature of 55 °C (130 °F).

### Reactivity (EPA Code D003):

A solid waste that has any of the following properties displays the characteristic of reactivity and is considered a hazardous waste:

- Is normally unstable and readily undergoes violent change without detonation;
- Reacts violently with water;
- Forms potentially explosive mixtures with water;
- When mixed with water, generates toxic gases, vapors or fumes in a quantity sufficient to present a danger
- Is a cyanide or sulfide bearing waste that generates toxic gases, vapors or fumes at a pH between 2 and 12.5;
- Is capable of detonation or explosive reaction when subject to a strong initiating source or if heated in confinement;
- Is readily capable of detonation, explosive decomposition or reaction at standard temperature and pressure; or
- Is an explosive, as defined in 49 CFR Sections 173.51, 173.53 or 173.88.

Toxicity: A waste exhibits the characteristic of toxicity when EPA-defined test procedures indicate that an extract derived from the waste contains certain toxicants. The toxicants to be tested for are listed in the table on the next page.

Maximum Concentration of Contaminants for the Toxicity Characteristics

Contaminant	Chemical Abstracts Service (CAS) Number	Regulatory Level (mg/L)
Arsenic	7440-38-2	5.0
Barium	7440-39-3	100.0
Benzene	71-43-2	0.5
Cadmium	7440-43-9	1.0
Carbon Tetrachloride	56-23-5	0.5
Chlordane	57-74-9	0.03
Chlorobenzene	108-90-7	100.0
Chloroform	67-66-3	6.0
Chromium	7440-47-3	5.0
o-Cresol	95-48-7	200.0 <sup>a</sup>
m-Cresol	108-39-4	200.0 <sup>a</sup>
p-Cresol	106-44-5	200.0 <sup>a</sup>
Cresol	...	200.0 <sup>a</sup>
2,4-D	94-75-7	10.0
1,4-Dichlorobenzene	106-46-7	7.5
1,2-Dichloroethane	107-06-2	0.5
1,1-Dichloroethylene	75-35-4	0.7
2,4-Dinitrotoluene	121-14-2	0.13 <sup>b</sup>
Endrin	72-20-8	0.02
Heptachlor (and its epoxide)	76-44-8	0.008
Hexachlorobenzene	118-74-1	0.13 <sup>b</sup>
Hexachlorbutadiene	87-68-3	0.5
Hexachloroethane	67-72-1	3.0
Lead	7439-92-1	5.0
Lindane	58-89-9	0.4
Mercury	7439-97-6	0.2
Methoxychlor	72-43-5	10.0
Methyl ethyl ketone	78-93-3	200.0
Nitrobenzene	98-95-3	2.0
Pentachlorophenol	87-86-5	100.0
Pyridine	110-86-1	5.0 <sup>b</sup>
Selenium	7782-49-2	1.0
Silver	7440-22-4	5.0
Tetrachloroethylene	127-18-4	0.7
Toxaphene	8001-35-2	0.5
Trichloroethylene	79-01-6	0.5
2,4,5-Trichlorophenol	95-95-4	400.0
2,4,6-Trichlorophenol	88-06-2	2.0
2,4,5-TP (Silvex)	93-72-1	1.0
Vinyl chloride	75-01-4	0.2

<sup>a</sup> If o-, m-, p-Cresol concentrations cannot be differentiated, the total cresol concentration is used. The regulatory level of total cresol is 200 mg/L.

<sup>b</sup> Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

## 8.2 Listed Waste

A solid waste is a listed hazardous waste if it is not excluded from regulation, incorporating by reference 40 CFR 261 Subpart D. These lists include:

- Hazardous waste from nonspecific sources (F List).
- Hazardous waste from specific sources (K List).
- Discarded commercial chemical products, off specification species, container residues and spill residues thereof (P List and U List).

### Hazardous Waste from Nonspecific Sources:

Wastes on EPA's F List: These are wastes EPA has determined to be hazardous but not generated by a particular industry or manufacturing process. (See Appendix 4)

### Hazardous Wastes from Specific Sources:

Wastes on EPA's K List: These are wastes from particular industries that EPA has determined to be hazardous. (See Appendix 5)

### Discarded Commercial Products, Off-Specification Species, Container Residues and Spill Residues:

This classification of hazardous waste includes certain commercial chemical products having the generic names listed on the P and U lists when they are discarded or intended to be discarded. Materials on the P list are classified as acute hazardous waste and materials on the U list are classified as toxic waste. (See Appendix 6 for P-List and Appendix 7 for U-List)

The following materials on the P List or the U List are classified as hazardous **wastes if they are intended for disposal**:

- The material itself, including commercially pure grades and technical grades of the material that are produced or marked for commercial or manufacturing use.
- A formulated product in which the chemical is the sole active ingredient.
- Off-specification commercial chemical products or manufacturing intermediates, which, if specifications were met, would have the generic name, listed.
- Residues remaining in a container or in a container liner that has held any of the materials on the P or U list, unless the container is empty.
- P-or U- listed materials contained in products, which are applied to the land in lieu of their original intended purpose.
- P or U listed materials that are produced for use as (or as a component of) a fuel, distributed for use as a fuel or burned as a fuel.
- Spill residues of P and U listed materials, including contaminated soil, contaminated water and other debris resulting from the cleanup of a spill of any of the items listed above.

Examples of commercial chemical product hazardous wastes include products with the generic names listed on the P and U lists from research laboratories (expiration dated or unused reagents intended for disposal), photography laboratories and analytical laboratories. These items become hazardous waste when a decision has been made that they must be discarded or disposed of. For example, when the commercial products' expiration date has been reached or when they are no longer needed, it becomes hazardous waste.

### 8.3 Examples of Hazardous Waste

- Solvents used for parts cleaning or degreasing
- Paint thinners and paint removing compounds
- Organic solvents
- Battery acid and other waste acids
- Phenol wastes
- Dyes
- Adhesives
- Cements
- Lubricants
- Photographic film processing waste
- Laboratory waste
- Ethidium Bromide
- Water treatment chemicals
- Wastes containing metals such as lead, chromium, silver or cadmium
- Mercury waste
- Paints
- Inks
- Pigments
- Glazes
- Compressed gas cylinders (empty, partially full or full)
- Residues of spill materials
- Household cleaning supplies
- Used oil contaminated with PCBs or chlorinated refrigerant oil
- Pesticides

### 8.4 Wastes Requiring Special Handling

*Used Oil:* Support Building near Transportation Garage collects Used Oil and it is recycled. (See Appendix 8) Link to Used Oil regulations and EHS program).

*Oil filters:* Transportation to collect in separate drum and recycle.

*Computer Monitors:* Monitors that are broken and can no longer be used should be deemed hazardous waste. Those that are still working, but no longer needed should be donated for reuse. Contact Computer Services at 812 465-1255 during the hours of 8 a.m. through 4:30 p.m. on Monday through Friday.

*Universal waste:* Thermostats, bulbs and batteries are collected by EHS for recycling and proper handling. (See Appendix 9 for Mercury-Containing Lamp Program and Appendix 10 for Used Batteries)

*Toner Cartridges:* Many toner cartridges used in office equipment can be refurbished and used again. Check with the manufacturer of the toner cartridge to see if they will accept them back. For Hewlett Packard and Xerox cartridges contact Jeff Spohn at (812) 465-1601 during the hours of 8:00 a.m. through 4:30 p.m. on Monday through Friday. Any non-returnable toner cartridges, contact Environmental Health and Safety for other options. If any cartridge cannot be recycled than it should be deemed hazardous waste.

*Spray paint cans/aerosol cans:* Use cans until empty. Do not puncture the empty cans; dispose of in regular trash. If the cans still contain aerosol and are not to be used, handle as hazardous waste.

*Silver Recovery Units:* Two silver recovery units are used in the Photography studio in Smith Hall. The units are serviced by Safety-Kleen at a maximum of every 90 days. Photography personnel inspect the units weekly and document.

*Compressed gas cylinders:* Compressed gas cylinders should be returned to the company where originally purchased. Do not throw any compressed gas cylinder in the trash. Contact EHS when cylinder is empty or is no longer needed for use.

*Closed head metal drums:* (55 gallon or smaller) should be cut open and then disposed of as scrap metal. If they are not considered empty then they should be disposed of as hazardous waste. Open head drums, if empty, can be disposed of as scrap metal.

## 8.5 Examples of Wastes That Do Not Fall Under HWMP

### 8.5.1 Biomedical waste:

EHS is not responsible for collecting or disposing of sharps, needles, broken glass or biohazard material. These items must be disposed of through a work ticket. Work tickets may be called in at (812) 464-0000. Custodial Services will be responsible for collecting these items. Disposal procedure poster is located in **Appendix 11**.

Infectious waste boxes are the cardboard boxes with the red plastic liners that are used for the disposal of research materials that are contaminated with hazardous biological agents or chemicals to include: tissue samples, animal cadavers, animal organs, slides, broken lab glassware, absorbent pads, pharmaceuticals and small quantities of chemicals. Sharps should be collected in the red puncture resistant collection containers. The red puncture resistant sharps collection containers are purchased through each department. Following are the instruction for the infectious waste boxes:

- The boxes are delivered constructed (from Custodial Services).
- All sharps must be placed in a puncture resistant collection container inside of the infectious waste box.
- Do not pour liquids in the boxes or over pack -- weight limit is 40 lbs.
- Use only the infectious waste boxes provided.
- Do not deliver the boxes to the loading dock.
- Do not use for disposal of non-hazardous material.
- When the infectious waste box is ready for disposal:
- Label the box with the building name and lab room #.
- Seal the plastic liner, NOT the cardboard top.
- **Call (812) 464-0000, request a pickup and a replacement box.**

Any questions regarding these procedures please contact EHS at (812) 461-5393.

The red puncture resistant sharps container for labs that generate needles should be purchased through each department.

### 8.5.2 Select Agent List

In recent years, the threat of illegitimate use of infectious agents has attracted increasing interest from the perspective of public health, in view of concern that certain select agents could have serious adverse consequences for human health and safety. "The Antiterrorism and Effective Death Penalty Act of 1996," enacted on April 24, 1996, established new provisions to regulate transfer of hazardous agents. The term "select agent" means "a microorganism (virus, bacterium, fungus, rickettsia) or toxin listed in this section."

If you have in your possession any of the following select agents, please contact the **Office of Laboratory Safety and Compliance** to ensure that the agent has been properly registered with the Center for Disease Control and Prevention.

The Office of Health and Safety, Centers for Disease Control and Prevention, 1600 Clifton Road N.E., Mail Stop F05 Atlanta, Georgia 30333, USA last modified this list on 5/20/97.

#### Viruses

1. Crimean-Congo haemorrhagic fever virus
2. Eastern Equine Encephalitis virus
3. Ebola viruses
4. Equine Morbillivirus
5. Lassa fever virus
6. Marburg virus
7. Rift Valley fever virus syndrome
8. South American Haemorrhagic fever viruses (Junin, Machupo, Sabia, Flexal, Guanarito)
9. Tick-borne encephalitis complex viruses
10. Variola major virus (Smallpox virus)
11. Venezuelan Equine Encephalitis virus
12. Viruses causing hantavirus pulmonary
13. Yellow fever virus



*Exemptions:* Vaccine strains of viral agents (Junin Virus strain candid #1, Rift Valley fever virus strain MP-12, Venezuelan Equine encephalitis virus strain TC-83, Yellow fever virus strain 17-D) are exempt.

#### Bacteria

- |   |                           |
|---|---------------------------|
| 1. Bacillus anthracis                       | 5. Clostridium botulinum  |
| 2. Brucella abortus, B. melitensis, B. suis | 6. Francisella tularensis |
| 3. Burkholderia (Pseudomonas) mallei        | 7. Yersinia pestis        |
| 4. Burkholderia (Pseudomonas) pseudomallei  |                           |

*Exemptions:* vaccine strains as described in Title 9 CFR, Part 78.1 are exempt.

#### Rickettsiae

1. Coxiella burnetii
2. Rickettsia prowazekii
3. Rickettsia rickettsii

#### Fungi

1. Coccidioides immitis

#### Toxins

- |  |                                 |
|--|---------------------------------|
| 1. Abrin                                 | 7. Ricin                        |
| 2. Aflatoxins                            | 8. Saxitoxin                    |
| 3. Botulinum toxins                      | 9. Shigatoxin                   |
| 4. Clostridium perfringens epsilon toxin | 10. Staphylococcal enterotoxins |
| 5. Conotoxins                            | 11. Tetrodotoxin                |
| 6. Diacetoxyscirpenol                    | 12. T-2 toxin                   |

*Exemptions:* Toxins for medical use, inactivated for use as vaccines or toxin preparations for biomedical research use at an LD50 for vertebrates of more than 100 nanograms per kilogram body weight are exempt. National standard toxins required for biologic potency testing as described in 9 CFR Part 113 are exempt.

#### Recombinant organisms/molecules

1. Genetically modified microorganisms or genetic elements from organisms on Appendix A, shown to produce or encode for a factor associated with a disease.
2. Genetically modified microorganisms or genetic elements that contain nucleic acid sequences coding for any of the toxins listed in this Appendix or their toxic subunits.

#### Other restrictions

The deliberate transfer of a drug resistance trait to microorganisms listed in this Appendix that are not known to acquire the trait naturally is prohibited by NIH "Guidelines for Research Involving Recombinant DNA Molecules," if such acquisition could compromise the use of the drug to control these disease agents in humans or veterinary medicine.

#### Additional Exemptions

1. Products subject to regulation under the Federal Insecticide Fungicide and Rodenticide Act (7 U.S.C. § 136 et seq.) and the Toxic Substances Control Act (15 U.S.C. § 1601 et seq.) are exempt.
2. Additional exemptions for otherwise covered strains will be considered when CDC reviews and updates the list of select agents. Individuals seeking an exemption should submit a request to CDC that specifies the agent or strain to be exempted and explains why such an exemption should be granted. Future exemptions will be published in the Federal Register for review and comment prior to inclusion in this select agent list.

Do not transfer select agents between institutions.

#### 8.5.3 Nuclear/radioactive waste:

Risk Management is not responsible for collecting or disposing of radioactive waste. Any radioactive waste

that is generated must be disposed of through the Radiation Safety Officer (Kent Scheller). He may be contacted at 812 464-1903.

## 9.0 Hazardous Waste Handling

Once solid waste is identified as hazardous waste by the generator, the CHO or EHS, it must be handled in accordance with the HWMP. Hazardous waste must not be: disposed or recycled with other forms of trash or waste, burned or allowed to evaporate into the air, disposed or diluted in water (i.e., down the drain), disposed on or buried in the land.

An appropriate container (bottle, jar, etc.) must be used to accumulate waste. It must be labeled properly, as discussed in Section 9.1, at the time the first drop of waste is added to the container. This is known as *The First Drop Rule*.

Hazardous waste containers must be kept closed except when adding or transferring waste and the contents of the containers must be compatible with the container. Hazardous waste containers must be segregated based on the hazards of the waste.

Hazardous wastes must be stored in designated waste storage areas; these areas must be equipped with secondary containment in the form of bins or a berm that would contain liquid waste in the event of a spill. A **DANGER** sign must be posted at waste storage areas to indicate the presence of hazardous waste. The room that has a waste storage area will have a phone, access to an emergency eyewash/shower, basic spill cleanup equipment, a fire extinguisher, adequate aisle space and will be incorporated into the University's contingency plan. Weekly inspections of the waste storage area are required and the inspection must be documented and maintained.

### 9.1 Labeling Containers

A chemical container must be labeled as hazardous waste at the time its content is designated as a hazardous waste. When a hazardous waste is added to a container, it must also be labeled as a hazardous waste at the time the first drop of hazardous waste is added to it. This is referred to as the First Drop Rule.

Chemicals that are to be reused should be clearly labeled as such to avoid confusion with hazardous waste. EHS will not remove any material that is not clearly labeled as hazardous waste.

The person who identifies the hazardous waste is responsible for labeling the container that stores the waste with the "Hazardous Waste" sticker or tag supplied by EHS.

If a sticker is too large for the container, use a tag in its place. Attach the tag with a rubber band or string. Use only a sticker or a tag to label but not both.

If a mistake is made on the sticker after it has already been attached to the container, use a one-line cross out with initial and date to modify and add the correction. **Do not place a new sticker on top of an old sticker, unless changing the old one would make it legible.** Do not change the accumulation start date on the label. The hazardous waste regulations strictly prohibit this act and it will not be tolerated.

If a mistake is made on the tag, discard the old tag and complete a new one immediately. Dispose of the old tag in the trash.

If a container already has a label that identifies content and hazards (e.g., a manufacturer's label), try to place the sticker on a location that does not cover that label or use a tag. Regardless of the label existing on the container, place a completed hazardous waste sticker or tag on the container once the contents are deemed hazardous waste. Hazardous waste tags are also available for labeling of bottles and containers that hold hazardous waste. The tags contain the same information as the stickers, but are smaller.

*Contact Person:*

Whoever generates the waste is deemed the contact person (a.k.a., generator). The person's name should be legibly written into this space on the label.

*Dept.:*

Identify the department in which the generator is employed at the University.

*Bldg. and Room:*

Identify the building and the room inside that building where the waste is generated. If the room does not have a number, describe the location, e.g., custodial closet or mechanical room.

*Ext.:*

Identify the on-campus telephone extension of the person who generated the waste. If a direct number is not available, write in the department's central extension.

*Accumulation Start Date:*

This is the date the chemical is deemed hazardous waste. It may be the date on which the first drop of waste entered an accumulation container. It may be the date you decide you no longer need to use the chemical. It should not be the purchase date of the chemical.

*Hazard Class:*

To the best of your ability, identify the hazards associated with the hazardous waste. The hazard information should be identified on the container's label per the OSHA Hazard Communication standard.

- Flammable hazards: Flammable substances are those that readily catch fire and burn in air. They may be solid, liquid or gaseous. A common fire hazard is a flammable liquid or the vapor produced from such a liquid. Examples: acetaldehyde, acetone, diethyl ether, toluene, methyl alcohol.
- Corrosive hazards: Corrosive substances cause destruction of living tissue by chemical action at the site of contact and can be solids, liquids or gases. Examples: sulfuric acid, aqueous solutions of sodium hydroxide and solid form of sodium hydroxide, ammonia gas, nitrogen dioxide, phenol.
- Oxidizer hazards: Oxidizing substances promote combustion of other materials thereby causing fire either of the oxidizing substance itself or of other materials. Examples include: chlorine, hydrogen peroxide.
- Toxic hazards: Toxic substances are poisonous and cause adverse effects on living systems. Toxic effects of chemicals can occur after single, repeated or long-term exposure. Examples: mercury, hydrogen cyanide.
- Reactive hazards: Reactive substances may release great quantities of energy from a chemical reaction at a rate too great to be absorbed by the immediate environment. There are water reactive materials that react violently with water, such as sodium metal, aluminum bromide or calcium oxide. There are also pyrophoric materials that oxidize rapidly in oxygen or moisture and ignite, such as some finely divided metals.
- Carcinogens: Carcinogens are agents that cause cancer. Carcinogens are defined by OSHA and by the International Agency for Research on Cancer (IARC). Examples: arsenic, benzene, diethylstilbestrol, ethylene oxide, formaldehyde.

*Chemical and %/Volume:*

To the best of your ability, identify the contents of the container. It may contain 100% of one chemical or it may contain a variety of chemicals, e.g., from a student laboratory in which the jar was used to accumulate different but compatible compounds. Do not use chemical formulas to identify the contents; write out the chemical names.

## **9.2 Waste Storage Areas**

The CHO, with assistance from EHS, will designate waste storage areas in locations where waste is generated. The CHO should consult with personnel who work in the room where a potential waste storage area will be located to determine waste generation habits. The waste storage area must be placed next to or near the process that generates the hazardous waste and the person who operates that process or area must control the hazardous waste placed in the waste storage area.

Waste storage areas can be in a laboratory fume hood, on a countertop or on the floor (but not in an aisle). They should not be placed in front of or behind doors or windows, blocking means of egress or suspended from equipment.

Aisle space must be maintained to allow the unobstructed movement of emergency equipment and personnel into all areas where waste is stored. Adequate aisle space is determined based on the types of emergency equipment that is necessary to respond to fires, spills, releases or explosions of the waste materials on site.

The room that houses the waste storage area should be equipped with:

- A device capable of summoning emergency assistance, e.g, a telephone or a hand-held two-way radio;
- Water at adequate volume and pressure to supply water hose streams or foam producing equipment or automatic sprinklers or water spray systems;
- An internal communications or alarm system capable of providing immediate emergency instruction to personnel who can be affected by the emergency incident;
- Portable fire extinguishers and
- Spill control equipment.

EHS will maintain a database of waste storage areas on campus (Appendix 12). Designated waste storage areas will be marked with a " DANGER" sign distributed by EHS. Waste storage areas can be added or removed based on changes in hazardous waste generation habits.

### 9.3 Container Management

Containers used to collect hazardous waste must be compatible with the substance they contain. Glass or Nalgene jars are appropriate for most wastes. Do not use soda bottles, food containers or other containers that could be confused with consumer products.

To avoid a hazardous chemical reaction, do not place incompatible wastes in the same container. Do not place hazardous waste in an unwashed container that previously held an incompatible material. If you are unsure if a waste is incompatible with the waste in a container or with the container itself, contact EHS for advice.

Storage containers holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles or open tanks will be separated from the other materials or protected from them by means of a dike, berm, wall or other device. Separate hazardous waste containers that store wastes which may be incompatible. Place compatible liquid waste containers in secondary containment bins. Compatible waste containers of non-liquids can be placed on a counter that is away from a sink or in secondary containment bins. Depending on the quantity and types of hazardous waste produced, several different secondary containment bins can be provided for use. Secondary containment bins ensure that in case of a spill, the hazardous waste is contained and does not mix with incompatible materials. Contact EHS to obtain secondary containment bins.

EPA has published a list of potentially incompatible waste components and materials along with the harmful consequences of mixing those materials together. This list does not include every possible hazardous chemical reaction, but should be used as a guide in packaging and storing these materials.

*The list indicates the potential consequences of the mixing of a GROUP A material with a GROUP B material.*

#### Compatibility Table

<p><b>GROUP 1-A</b>          Acetylene sludge          Alkaline caustic liquids          Alkaline cleaner          Alkaline corrosive liquids          Alkaline corrosive battery fluid          Caustic wastewater          Lime sludge and other corrosive alkali</p>	<p><b>GROUP 1-B</b>          Acid sludge          Acid and water          Battery acid          Chemical cleaners          Electrolyte, acid          Etching acid liquid or solvent          Pickling liquor and other corrosive acids</p>
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Lime wastewater  
Lime and water  
Spent caustic

Spent acid  
Spent mixed acid  
Spent sulfuric acid

*Potential consequences: Heat generation; violent reaction*

**GROUP 2-A**

Aluminum  
Beryllium  
Calcium  
Lithium  
Magnesium  
Potassium  
Sodium  
Zinc powder

Other reactive metals and metal hydrides

*Potential consequences: Fire or explosion; generation of flammable hydrogen gas.*

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**GROUP 2-B**

Any waste in GROUP 1-A or 1-B

**GROUP 3-A**

Alcohol  
Water

**GROUP 3-B**

Any concentrated waste in GROUP 1-A  
Calcium  
Lithium  
Metal hydrides  
Potassium  
SO<sub>2</sub>Cl<sub>2</sub>, SOCl<sub>2</sub>, PCl<sub>3</sub>, CH<sub>3</sub>SiCl<sub>3</sub>  
Other water-reactive waste

*Potential consequences: Fire, explosion or heat generation; generation of flammable or toxic gases.*

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**GROUP 4-A**

Alcohols  
Aldehydes  
Halogenated hydrocarbons  
Nitrated hydrocarbons  
Unsaturated hydrocarbons  
Other reactive organic compounds

**GROUP 4-B**

Concentrated GROUP 1-A or 1-B wastes  
GROUP 2-A wastes

*Potential consequences: Fire, explosion or violent*

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**GROUP 5-A**

Spent cyanide and sulfide solutions

**GROUP 5-B**

GROUP 1-B waste

*Potential consequences: Generation of toxic hydrogen*

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**GROUP 6-A**

Chlorates  
Chlorites  
Chromic acid  
Hypochlorites  
Nitrates  
Nitric acid, fuming  
Perchlorates  
Permanganates  
Peroxides  
Other strong oxidizers

**GROUP 6-B**

Acetic acid and other organic acids  
Chlorine  
Concentrated mineral acids  
GROUP 2-A wastes  
GROUP 4-A wastes  
Other flammable and combustible wastes

*Potential consequences: Fire, explosion or violent*

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Keep hazardous waste containers closed unless adding or removing waste. If you use a funnel to transfer waste, remove the funnel after the transfer and close the container. A closed container is one whose contents would not spill if the container were knocked over. Depending on the design of the container, it may be properly closed by firmly applying a screw-on cap, bung, drum ring, cork, etc.

Use an overpack drum or container for containers that may leak or cannot be closed. Overpack containers must also be compatible with the waste, be sealable and may be filled with vermiculite to occupy extra space. Overpack containers for hazardous waste are available from several manufacturers, including Lab Safety Supply and Fisher Scientific.

When adding waste to a container, do not completely fill the container. Leave space for the contents to expand. Containers and chemicals may expand or contract based on temperature. Transfer of hazardous waste is not recommended. If a transfer is necessary, ensure adequate spill response equipment is available, wear personal protective equipment (PPE) and use adequate transferring mechanisms, e.g., a funnel.

Ground ignitable hazardous waste to prevent sparks from igniting flammable vapors. Use a bonding wire and a ground wire when transferring flammable liquids into containers to prevent sparks caused by the buildup of static electricity during pouring operations.

#### *Empty Containers*

A container that held a P-listed waste is empty if it has been triple-rinsed using a solvent capable of removing the waste. Any rinsate must be collected as hazardous waste, but the container can be disposed of as regular trash.

If the container did not hold a P-listed waste, the container is empty when all contents have been removed that can be removed by using common practices such as pouring, pumping and aspirating. The container can be disposed of as regular trash if:

- No more than one inch of residue remains on the bottom of the container or inner liner; or
- For a 100 gallon container or less, no more than 3% of the total capacity of the container remains; or
- For a container larger than 100 gallons, no more than 0.3% remains.

A compressed gas cylinder is empty when the pressure in the container approaches atmospheric pressure. Many compressed gas cylinder suppliers recycle compressed gas cylinders as part of their contract. Check with your supplier. Do not throw empty gas cylinders in the regular trash. Contact EHS for proper disposal.

Empty closed head metal drums (55 gallon or smaller) should be cut open and then disposed of as scrap metal. Open head drums, if empty, can be disposed of as scrap metal.

### **9.4 Weekly Inspections**

CHOs are required to perform weekly inspections of waste storage areas, using a multi-week inspection form developed by EHS (See Appendix 13). EHS recommends that each CHO establish a schedule for inspections to ensure they become routine. For example, establish Wednesday mornings as the designated inspection time and every week perform the inspection at that time.

Keep the inspection form adjacent to the waste storage area, either in a binder or in a covered, protective folder.

Use the form for a maximum of sixteen weeks. Use one form per waste storage area. The form consists of nine questions to guide you through the inspection. Any question that is answered with a "no" must be addressed and corrective actions noted at the bottom or on the back of the form.

When a form is complete, start a new inspection form. At that time, photocopy the completed form (two sides as necessary), mail the copy to EHS and file the original.

Once a waste storage area has been established, a weekly inspection of that area is required, regardless of the quantity of waste in the storage area. Even if no waste has been added to a storage area, an inspection is still required.

The exception to this rule will be the December Winter break when the University is officially closed. CHOs will not have to perform the weekly inspection during that break. EHS will complete a waste pickup prior to the closure to ensure the majority of all waste is removed from the waste storage areas. EHS will document this via a memorandum at that time. It is the CHOs responsibility to resume inspections the week following the holiday break when the University reopens.

If the CHO for a designated waste storage area is not able to complete the weekly inspection due to absence, it is his/her responsibility to ensure the inspection is completed. A database of CHOs, established by EHS, will be available.

## 10.0 Contingency Plan

The HWMP documents the University's commitment to manage hazardous waste so as to minimize the possibility of a release of hazardous waste into the environment. As part of this commitment, we maintain equipment on-site to facilitate spill cleanup and protect human health. In addition, to addressing emergency issues and large releases, we have made mutual aid arrangements with The Minor Emergency Center, the Perry Township Volunteer Fire Department, the local Police Department and an emergency spill response company.

The University has a Spill Prevention, Control and Countermeasure (SPCC) Plan per EPA regulations. The Energy Environmental Management Office maintains the SPCC Plan. EHS has designed a Contingency Plan which contains each waste storage area. The contingency plan is designed to help manage spill response and emergency situations related to hazardous waste management.

The Contingency Plan for the waste storage areas will be designed by EHS in consultation with the CHO for that area. The plan will include:

- a list of names, addresses and phone numbers (office and home) of all persons qualified to act as emergency coordinator.
- a list of all emergency equipment at the storage area such as fire extinguishing systems, spill control equipment, communications and alarm systems and decontamination equipment.
- the location and a physical description (schematic drawing) of each item and the storage area.
- an evacuation plan for facility personnel where there is a possibility that evacuation could be necessary.

The plan must be maintained at each waste storage area. The diagram will be posted at the door(s) to the room where the waste storage area is located. Revisions or amendments, when necessary, must be made in conjunction with EHS.

## 11.0 Pick-up Schedule

As a large quantity generator, the University must not accumulate hazardous waste for more than 90 days. Therefore, it is imperative that hazardous waste that is stored in waste storage areas be managed in an organized and systematic manner to ensure compliance with the 90-day regulation.

Environmental Health and Safety coordinates quarterly hazardous waste pick-ups for all campus departments which generate hazardous waste. A contracted hazardous waste disposal company provides waste pick ups approximately every 60 days, but not exceeding 90 days.

It is the responsibility of the CHO to contact EHS to arrange a hazardous waste pick-up from the waste storage area. EHS will remove the waste from the storage area within five business days and transport the waste to the central hazardous waste accumulation point located in **Science Center Room** . If EHS cannot transport to the central accumulation point, we will arrange to have the waste removed from the waste storage areas using a licensed hazardous waste disposal company. Keeping within the 90-day clock EHS will arrange for hazardous

waste removal from campus using a qualified waste transportation and disposal company.

To guarantee 100 percent compliance with the 90-day regulation EHS recommends that waste should be removed from laboratories within 60 days of the accumulation start date. The weekly inspection form can be used as a tracking calendar. The form is designed for sixteen consecutive weeks or 128 days of waste storage area inspections. When the form is on the eighth week, contact EHS to pick-up any hazardous waste from the waste storage area.

If there is no waste in the waste storage area, there is no need to contact EHS.

No matter the quantity of hazardous waste in the waste storage area, send a completed copy of the inspection form to EHS for recordkeeping purposes.

To arrange for pick-up from the waste storage areas, contact EHS via phone, email or submit the Chemical Waste Removal Request Form via the Internet. The removal request form can be accessed at [www.usi.edu/riskmgmt/HazWaste.asp](http://www.usi.edu/riskmgmt/HazWaste.asp). Note that if your area does not submit a form, then chemical waste will **NOT** be picked up from your area.

Prior to pick-up, ensure in-house recordkeeping or documentation is complete. Each department is responsible for its own recordkeeping.

## 12.0 Training

Newly appointed CHOs will receive initial hazardous waste management training within six (6) months of the date of their appointment to the position. Thereafter, every CHO will receive annual training in the hazardous waste management practices applicable to our University. EHS will provide classroom training for CHOs. EHS trainers will receive annual hazardous waste training from an independent firm. Generators and/or handlers of hazardous waste will receive hazard communication training based on either 29 CFR 1910.1200 or 29 CFR 1910.1450 depending on their work practices. Hazard communication training will include an introduction to the HWMP.

Hazardous waste management training will include, at a minimum, emergency procedures, emergency equipment, emergency systems and a review of the regulatory requirements set forth by the EPA, DOT and OSHA. The training will focus on the details of the HWMP as described in this document.

Following each training session, a quiz will be administered. The quiz is designed to review the most important concepts of hazardous waste management practices and provide feedback to the trainer. A 75-percent pass rate is required. Department chairs and supervisors will receive documentation of trainees who successfully complete the training and pass the quiz, issued from EHS.

EHS will maintain names, job titles and job descriptions for USI employees that receive the hazardous waste management training for 3 years from the date the employee last worked at the University (See Appendix 14 for a list of names and job title and Appendix 15 for job descriptions).

## 13.0 Recordkeeping

Document all waste management activities. If you suspect something should be documented, you are probably correct. If you do not think something should be documented, you may be incorrect; so document it regardless.

Documentation requirements:

- Initial / annual training in hazardous waste management.
- Quizzes will be filed by EHS and maintained per regulatory requirements.
- Proof of training will be documented on sign-in sheets and will be filed by EHS and maintained per regulatory requirements.
- Training records for those who have achieved at least 75% on the training quiz will be issued to department chairs and supervisors. Department chairs and supervisors should file these records and



- keep them for the duration of three years.
- Weekly inspection forms should be managed by the CHO, filed and saved for three years.
- Photocopies of the weekly inspection forms will be managed by EHS, filed and saved for three years.
- All other hazardous waste documentation relating to shipment, regulatory reports and land disposal records will be maintained by EHS for at least three years. Land disposal records will be maintained for at least five years.

#### 14.0 Little Known but Allowable Ways to Manage Hazardous Waste

At times, chemicals may be reacted with other chemicals, to render them non-hazardous or to reduce the volume of hazardous waste. Treatment in containers is permitted only when the treatment occurs in the container in which the waste was generated. Some examples include:

- Oxidizing organic chemicals with sodium hypochlorite;
- Using phase separation of organics from aqueous solutions and liquids from solids;
- Precipitation of toxic metals;
- Oxidation of inorganic cyanides and sulfides;
- Destruction of ethidium bromide using hydrophosphorus acid and NaNO<sub>2</sub>.

Elementary neutralization is also permitted. Combining like wastes to neutralize an entire batch is permitted.

Be absolutely certain that the waste is not hazardous before it is disposed of as non-regulated waste. If you are not 100 percent certain, the waste should be deemed hazardous and should be managed under this program.

#### 15.0 Waste Minimization

Wherever feasible, the generation of waste is to be reduced or eliminated as expeditiously as possible. Implementing a comprehensive waste minimization program may reduce the generator status of the University and therefore reduce the compliance requirements. It can reduce potential environmental liabilities and help protect the environment through more efficient resource utilization. It also reduces expenses by minimizing waste treatment and disposal costs, raw material purchases and other operating costs.

Benefits of waste minimization include economic savings, increased environmental integrity, decreased exposure to toxic materials and an improved image for the University.

There are many ways to prevent or minimize hazardous waste generation. This list provides some ideas for waste minimization techniques.

- Maintain a limited inventory of chemicals on hand so those chemicals do not expire or deteriorate and necessitate disposal. Only purchase what is needed.
- Develop a running inventory of chemicals on hand.
- Use the inventory to track unused chemicals for possible use by other departments.
- Reduce or eliminate the use of highly toxic chemicals in lab experiments.
- Establish reasonable waste minimization goals within your department.
- Perform laboratory experiments on a microscale whenever feasible.
- Reuse or recycle spent solvents.
- Recover metal from catalyst.
- Initiate procedures to reduce mercury use; e.g., replace mercury-bearing instruments with alternatives.
- Polymerize epoxy waste to a safe solid.
- Replace chromic acid cleaning solutions with Alconox or a similar detergent.
- Recycle office equipment such as computer monitors.

Waste handling options and the priority in which they should be considered are illustrated below.



## 15.0 References

- Title 40 of the Code of Federal Regulations, Parts 260-268, 270, 273, 279.
- Environmental Protection Agency, Hazardous Waste Regulation, 40 CFR 260
- [http://www.access.gpo.gov/nara/cfr/cfrhtml\\_00/Title\\_40/40cfr260\\_00.html](http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr260_00.html)
- USI Chemical Hygiene Plan.
- Chemical compatibility table from USI Chemical Hygiene Plan.
- EPA Compatibility Table 40 CFR 264, Appendix
- [http://www.access.gpo.gov/nara/cfr/cfrhtml\\_00/Title\\_40/40cfr264\\_00.html](http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr264_00.html)
- Listing Information (F, K, P, U Lists):
- 
- 
- OSHA information on carcinogens:
- <http://www.osha-slc.gov/SLTC/carcinogens/index.html>
- The Catholic University of America Hazardous Waste Management Plan.
- University of California at Santa Cruz Hazardous Waste Classification and Determination Guide.

**APPENDIX 1:**  
**AUGUST 9, 2000 MEMO FROM VICE  
PRESIDENT OF ACADEMIC AFFAIRS**

**APPENDIX 2:**  
**WASTE STORAGE AREA DANGER**  
**SIGN**

**APPENDIX 3:**  
**HAZARDOUS WASTE**  
**DETERMINATION & CLASSIFICATION**

**APPENDIX 4:**  
**F-LISTED WASTES**

**APPENDIX 5:**  
**K-LISTED WASTES**

**APPENDIX 6:**  
**P-LISTED WASTES**



**APPENDIX 7:**  
**U-LISTED WASTES**

**APPENDIX 8:**  
**USED OIL PROGRAM**

**APPENDIX 9:**  
**MERCURY-CONTAINING LAMP**  
**PROGRAM**

**APPENDIX 10:**  
**BATTERY RECYCLING AND DISPOSAL**  
**PROGRAM**

**APPENDIX 11:  
DISPOSAL PROCEDURES FOR  
SHARPS, GLASS and BIOHAZARD  
MATERIALS**

**APPENDIX 12:  
WASTE STORAGE AREA LOCATIONS**

**APPENDIX 13:**  
**WEEKLY INSPECTION SHEET**

**APPENDIX 14:**  
**HAZARDOUS WASTE HANDLER**  
**NAMES AND JOB TITLES**



**APPENDIX 15:**  
**JOB DESCRIPTIONS FOR**  
**HAZARDOUS WASTE HANDLERS**

# APPENDIX 16: DEFINITIONS