

**MARQUETTE UNIVERSITY
HAZARDOUS WASTE MANAGEMENT PROGRAM
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MARQUETTE UNIVERSITY HAZARDOUS WASTE MANAGEMENT PROGRAM

This program provides information on the guidelines and procedures for the proper management of hazardous waste at Marquette University (MU). This program also serves to ensure compliance with United States Environmental Protection Agency (USEPA) and Wisconsin Department of Natural Resources (WDNR) regulations pertaining to management of hazardous, special, and universal wastes.

1. PURPOSE

This program has been developed to provide specific procedures for the management of hazardous wastes generated at MU.

2. RESPONSIBILITIES

This section describes responsibilities related to hazardous waste management at MU.

2.1 ADMINISTRATION

Administration is responsible for providing the necessary resources for the proper and compliant management of hazardous wastes generated by all activities at MU.

2.2 PRINCIPAL INVESTIGATORS

Principal Investigators (PI) are ultimately responsible for the proper collection, storage and pickup of wastes generated within their laboratories. PIs shall ensure staff and student have received training and instruction related to proper management of hazardous waste generated in their laboratories.

2.3 FACULTY AND STAFF

A responsibility of faculty and staff creating hazardous waste includes:

- Dispose of waste using the procedures outlined in this program
- Ensure all wastes are packaged and labeled according to this program
- Arrange for prompt removal of full waste containers

2.4 ENVIRONMENTAL HEALTH AND SAFETY

Environmental Health and Safety (EH&S) office provides for the collection, transportation, storage, and proper disposal of hazardous chemical wastes generated on campus as well as administration of the waste management program including regulatory documentation. Though primarily focused on small quantities of wastes from laboratories, studios and shops, EH&S will also be responsible for coordinating collection and disposal of any bulk wastes and special wastes.

3. WASTE DETERMINATION

All wastes must be properly classified to ensure proper disposal. This section discusses how a waste is classified to determine if it will require special handling and disposal. Any questions regarding classification of wastes shall be directed to EH&S. EH&S reserves the right to make the final determination of a waste's classification.

3.1 HAZARDOUS WASTE

Hazardous wastes constitute a subset of solid waste. There are specific federal and state specifications for what classifies a waste as "hazardous". In general, a hazardous waste may be a "Characteristic Waste" or a specific "Listed Waste". WDNR regulations pertaining to the characterization of wastes, and the tables of "Listed Wastes" described below can be found under **NR 605 Identification and Listing of Hazardous Wastes** at <http://www.dnr.state.wi.us/org/aw/wm/information/wiacssh.htm>.

3.1.1 Characteristic Wastes

Characteristics wastes are those that fall within the definition of one of the four categories below:

- **Ignitable** - a liquid with a flash point less than 140 Fahrenheit, an ignitable compressed gas or oxidizer, or other material that can cause fire through friction, absorption of moisture or spontaneous chemical changes. Common examples include used oil-based paint, used paint thinner, adhesives and mineral spirits.
- **Corrosive** – an aqueous solution with a pH less than or equal to 2.0 or greater than or equal to 12.5, or a liquid that corrodes plain carbon steel at a rate greater than 6.35 mm per year. Examples include waste rust removers and waste battery acids.
- **Reactive** - a waste that is normally unstable, readily undergoes violent changes without detonating, reacts violently with water, forms a potentially explosive mixture with water, or generates toxic gases or fumes when exposed to pH conditions between 2 and 12.5, is capable of detonation or explosive reaction, or is a forbidden Class A or Class B explosive.
- **Toxic** - A waste is considered toxic if (according to a specific Toxicity Characteristic Leaching Procedure) it exceeds the regulatory concentration for any of the listed eight metals, six pesticides or 25 organic chemicals. This list includes metals like chromium, lead, mercury, silver and organic chemicals like benzene, chloroform, methyl ethyl ketone, and butadiene.

3.1.2 Listed Wastes

Listed wastes fall into four groups. These listed wastes are found in the four tables in the hazardous waste regulations. Each listed waste has a hazardous waste number which starts with the letter "F", "K", "P", or "U."

- **"F" Waste** - waste that results from production or waste treatment process, are discarded chemical products or are contaminated with a specific chemical.
- **"K" Waste** - waste that results from specific production or waste treatment processes. The university rarely has this type of waste.
- **"P" Waste** - waste chemicals that are considered acutely hazardous when discarded because they can be extremely dangerous to human health or the environment. Cyanides and arsenic as well as some pesticides are found in this table. "P" wastes are of particular concern since a small quantity of this waste (2.2 pounds) generated in one month can change our classification to a large quantity generator with significantly greater regulatory burden.
- **"U" Waste** - waste that is considered hazardous but is not an extreme danger to human health or the environment. Examples include phenol, formalin, chlorobenzene, aniline dyes and carbon tetrachloride.

3.2 SPECIAL AND UNIVERSAL WASTES

Special and universal waste, are wastes that may not meet the definition of a hazardous waste, but still require special disposal or reclamation procedures. (Refer to MU Universal Waste Management Program)

3.2.3 Infectious Waste

Infectious waste is regulated under Chapter NR 526, Medical Waste Management. A waste is considered to be an infectious waste if it falls in one of the following categories:

a. Sharps

- Contaminated sharps which are both infectious and may easily cause punctures or cuts in the skin, including but not limited to: hypodermic needles, syringes with needles attached, scalpel blades, lancets, broken glass vials, broken rigid plastic vials and laboratory slides. Contaminated means they have come in contact with blood or other potentially infectious material.
- Unused or disinfected sharps which are being discarded, including hypodermic needles, scalpel blades, lancets and syringes with needles attached.

Note: Only "contaminated" broken glass, plastic vials, laboratory slides, etc. are considered infectious waste. However, all discarded sharps (contaminated or not) such as hypodermic needles, scalpel blades, lancets and syringes with needles attached are considered infectious waste.

b. Bulk blood and body fluids from humans

"Bulk blood and body fluids" means drippable or pourable quantities or items saturated with blood or other potentially infectious materials. Determine if the blood or other potentially infectious material is drippable, squeezable, pourable or flakeable.

c. Consult the Blood Borne Pathogen Exposure Control Plan for safe handling and disposal procedures.

4. WASTE MINIMIZATION

Reduction in the quantity generated is the waste management method of choice. Reduced volume means reduced labor effort, time, and costs. This section discusses various waste minimization approaches.

As a Large Quantity Generator (LQG), MU must certify it has made a good faith effort to minimize waste generation each time a manifest is signed. It is important that all persons and departments generating hazardous waste consider how they can contribute to waste minimization. The goal is to either prevent the formation or production of pollutants at the source or reduce the amount of hazardous waste that is generated.

4.1 BASIC CONCEPTS

Basic waste minimization options include:

- Waste stream segregation-keep hazardous and non-hazardous wastes clearly separated
- Good housekeeping-prevent contamination of good material, control spillage, etc.
- Inventory control-keep track of materials to prevent duplicate orders, and generating outdated material
- Order chemicals in smaller containers and quantities
- Material substitution-where possible, use a non-hazardous chemical
- Using smaller scale demonstrations
- Modifying specific experiments-use a non-hazardous metal in place of mercury, lead, cadmium, etc.

4.2 NEUTRALIZATION OF ACIDS AND BASES

Neutralization of acids or bases by the student or researcher as part of the experiment is highly recommended. If a liquid is hazardous only because of pH, the campus EH&S staff may neutralize the solution and pour it down the drain. Please call the EH&S office at 8-8411 if you have acids or bases to dispose of. The following are recommended procedures to be used by students or researchers when neutralizing acid or bases

- Acidic solutions (pH <5)
 - Adjust the pH to 5-9 using a dilute solution (e.g. KOH, NaOH, NaHCO₃). Use a pH meter, indicator solution, or pH paper to determine the pH.
 - Flush down the drain of a chemical sink with 20 volumes of cool water.
- Basic solutions (pH > 9)
 - Adjust pH to 5-9 using a dilute solution (e.g. HCl, H₂SO₄, HNO₃). Use a pH meter, indicator solution, or pH paper to determine pH.
 - Flush down the drain of a chemical sink with 20 volumes of cool water.

Note: For highly concentrated acids, neutralization with a relatively dilute basic solution will take a very large volume of base and a long time. In this case, consider neutralization using a concentrated basic solution with plenty of ice for an ice bath, performed slowly and carefully and with constant stirring. Monitor the temperature of the solution with a suitable thermometer to ensure that the solution doesn't get too hot. The same is true for neutralizing some concentrated bases.

4.3 REUSE/REDISTRIBUTION

Where feasible, reuse or redistributing partial quantities of a chemical to another department or employee is highly encouraged. Reuse of chemicals, especially in a laboratory, may not be as easily achieved due to the typical need for higher purity ingredients. However, chemicals such as acids and bases not contaminated with hazardous constituents can be used for neutralization reactions and used to reduce the volume of corrosive hazardous waste sent out for disposal. Records of neutralizations must be maintained as described in Section 4.2.

5.0 WASTE STORAGE

This section describes management of waste during storage at accumulation points.

5.1 ACCEPTABLE CONTAINERS

Hazardous waste must be collected in suitable containers. Contact the EH&S Director for questions regarding acceptable containers for a given waste stream, ext 8-8411.

Use only containers that are in good condition and made of or lined with a material that is not reactive or incompatible with the waste being stored.

- Containers must have tight sealing caps or lids.
- Do not use an oversized container that may take a year or longer to fill.

5.2 LOCATION OF CONTAINERS

Containers used for collection and temporary storage of hazardous waste must be appropriately located within a facility or room. Listed below are guidelines for container placement.

- Place containers in locations where they will not be subject to damage, tipping, or spilling from foot traffic, carts, work activities, etc.
- Laboratory hoods are sometimes necessary for storage of hazardous waste containers containing odorous and volatile chemicals. Do not obstruct the hood opening or rear baffles.
- Laboratory hoods are expensive hazardous waste storage areas. Alternative storage is highly recommended.
- Provide secondary containment at 110% capacity of largest container if there is a potential for the material to enter a drain.

5.3 LABELING

- Remove or deface any old labels.
- Clearly label waste containers with the words “HAZARDOUS WASTE” with the hazardous waste label that is provided by the EH&S office. Identify hazardous constituents as they are added to the container (e.g. “hazardous waste organic solvents, contains toluene and xylene”).

- Example of the hazardous waste label that must be used on hazardous waste containers.

- Labels should face forward and be clearly visible for viewing and inspection

5.4 SATELLITE ACCUMULATION MANAGEMENT

Hazardous waste collection points must adhere to the following satellite accumulation requirements until the waste is transferred to the campus hazardous waste storage facility:

- Waste containers must be placed in some type of secondary container for spill control. A simple plastic tub capable of holding the contents of the waste containers is acceptable.
- Keep the waste containers closed at all time, except when adding or removing waste. A funnel left in the opening of a waste container makes the container “open,” is considered an open container by regulatory agencies, and is not acceptable.
- Handle and store waste containers properly to prevent rupture or leakage.
- Do not mix hazardous waste with non-hazardous waste. Do not mix incompatible wastes.
- Know what to do in the event a spill should occur. Keep suitable spill control supplies on hand and keep emergency phone numbers posted in labs and work areas.
- When a container is 90 % full, fill out the Chemical Waste Inventory Disposal sheet, contact the EH&S office at ext. 8-8411 to arrange for transfer to the hazardous waste storage facility within three days.
- Satellite accumulation areas must inspected weekly for waste containers integrity, labeling, containment etc..

5.5 STORAGE PERIODS

Regulatory requirements limit storage of hazardous waste to a maximum of 90 days except at satellite collection locations. Once waste is move to waste storage area, the 90 days storage limit takes effect. Satellite accumulation points in laboratories or shops have a storage time limitation of (1) year, no more than 50 gallons of a single waste may accumulate before the waste must be moved to the hazardous waste storage area.

5.5.1 Other

Low volume, routine wastes generated in other areas, including art studios, academic shops, maintenance shops and paint shops, shall be stored at accumulation locations for no longer than one year regardless of quantity. As storage containers are filled to 90% shop or studio managers will notify the EH&S office that hazardous waste needs to be transported to the storage facility.

6. WASTE PICKUP AND REMOVAL

This section outlines the procedures to use for waste pickup and removal of specific waste streams.

6.1.1 Standard Procedures

Most wastes generated by Science Departments will be associated with research and teaching labs. In general, wastes pickup will be coordinated through the lab technician or the lab manager. They will

contact the EH&S office to arrange for the transport of their hazardous waste. In addition, containers of waste shall not simply be left anonymously in, or near, the hazardous storage facility.

6.1.2 Expired and Old Chemicals

Faculty and the lab technician should regularly check the inventory of chemicals in their area for expired and unusable containers of chemicals. Several hazards may arise from excessive storage periods with some chemicals including formation of shock sensitive peroxides, disintegration of containers, leaking, and degradation of labeling. Contact the EH&S office for assistance with removal of expired and old chemicals.

6.1.3 Laboratory Cleanouts

Closure of a laboratory/studio or the retirement of faculty may result in the need for cleanout of chemicals from research laboratories, and other work areas. A serious concern associated with cleanouts is unlabeled or poorly labeled containers of chemicals. Unlabeled containers of chemicals require considerable effort to identify contents and can present a serious health and safety hazard to employees involved in the cleanout.

- Prior to their departure, faculty responsible for the laboratory or work area to be vacated shall contact the EH&S office and arrange for a meeting at the location to discuss and view containers of chemicals that will need to be disposed of or returned to stock.
- The contents of all containers must be identified. The faculty member shall work with the EH&S manager to identify the contents of unlabeled containers. If the identity is uncertain, “fingerprint” testing shall be performed to ascertain the physical properties of the chemical prior to removal from the area.
- Any unlabeled container shall be removed from the area prior to re-occupancy.
- Usable chemicals shall be inventoried and returned to stock.

6.2 FACILITIES MANAGEMENT AND RESIDENCE LIFE HAZARDOUS WASTE

Waste from Facilities Management (FM) or Residence Life (RL) may consist of old oil-based paints, used solvents, old or contaminated pesticides, contaminated oils, aerosol cans and several special and universal wastes.

- Old oil-based paints will be collected on an as-needed basis. When the containers are full, FM personnel shall contact EH&S directly for pickup.
- Old and contaminated pesticides will be collected and transferred to the hazardous waste storage room on an as-needed basis.
- In general, most oils used by FM (lubricants, engine oils, etc.) can be collected and taken to the used oil storage tank for recycling. Oils from transformers or other electrical equipment will need to be screened for PCBs. PCB containing oils will be transferred to the hazardous waste storage

room. Oils contaminated with chlorinated solvents will need to be treated as a hazardous waste and transferred to the hazardous waste storage room.

6.3 MISCELLANEOUS

On occasion, old or unused chemicals may need to be removed from classrooms, darkrooms, storage areas, etc. When containers of chemicals are found, employees should contact EH&S. EH&S will inspect the containers to determine the proper disposal procedures and arrange for removal.

2.0 TRAINING

7.1 FACULTY AND ACADEMIC STAFF

Faculty and academic staff responsible for generating hazardous waste or overseeing activities that generate hazardous waste will receive basic training on hazardous waste management. EH&S will schedule annual training sessions for staff at the beginning of the academic year.

7.2 STUDENTS

Undergraduate students must receive training and information sufficient to ensure waste management protocol will not be violated in teaching laboratories. Information on proper experimental waste procedures should be provided as part of the student safety orientation. At the beginning of each experiment, students should also be reminded to use the designated waste collection container.

7.3 FACILITIES SERVICES AND RESIDENCE LIFE STAFF

FS staff will receive periodic training regarding the proper collection, storage and pickup of hazardous wastes. Training will be included with annual refresher training provided to FS and RL personnel.

8.0 INSPECTIONS

Bi-weekly inspections will be conducted of the hazardous waste storage rooms located in Todd Wehr Chemistry and Wehr Life Sciences. Inspection reports will be kept on file in the department of Environmental Health & Safety.

8.1 BI-ANNUAL WALKTHROUGHS

On a bi-annual basis, walkthrough inspections shall be performed in all areas which generate hazardous waste to verify compliance with the requirements of this program.

9.0 EMERGENCY RESPONSE

Refer to site Contingency Plan

9.1 SPILLS/RELEASE

In the event of a spill/release the following action steps shall be taken:

1. For large spills/release call Public Safety 8-1911 and evacuate the building
2. For smaller spills/release there are spill clean up kits that are strategically placed in labs or departments for use in the area where the spill occurred. If a staff member has not been trained to clean up the spill they should call the EH&S office 8-8411 and ask for assistance

If the EH&S office can not be reached, call the Public Safety Office at 8-6800 and the appropriate help will be called.