



CHEMICALLY CONTAMINATED WASTE MANAGEMENT

PURPOSE

The inappropriate disposal of hazardous chemically contaminated materials can have serious physical, health, environmental, and regulatory implications. To help Wayne State University (WSU) personnel understand the appropriate disposal routes for chemically contaminated materials (e.g., tubes, pipettes, absorbent pads, etc.) used or generated in WSU facilities, the Office of Environmental Health and Safety (OEHS) has developed this guide. The OEHS also encourages facilities to find ways to minimize the waste generated. Review the information below to determine whether waste materials your facility produces require handling as chemical waste, or if it can be disposed of as regular trash. If you are unsure of the appropriate waste stream, please contact the OEHS for further information.

NOTE: Under no circumstances can hazardous waste be discharged down the drain, into the environment, or into regular trash.

DEFINITIONS

HAZARDOUS WASTE

Hazardous waste is defined by the [United States Environmental Protection Agency](#), as a solid, liquid, or gaseous material that displays either a “Hazardous Characteristic” or is specifically “listed” as a known hazardous waste.

Characteristic wastes are not listed specifically by their chemical name, but they are regulated as hazardous wastes because they exhibit one or more hazardous characteristics. These four characteristics are Ignitability, Corrosivity, Reactivity, and Toxicity.



The **Ignitability** characteristic applies to wastes that are:

- Liquids with a flash point less than 60 °C (140°F).
- Solids capable of spontaneous combustion under normal temperature and pressure.
- Oxidizing materials.
- Ignitable compressed gases.
- Examples include ethanol, sodium nitrate, hydrogen gas, xylene, and acetone.

The **Corrosivity** characteristic applies to wastes that are:

- Aqueous solutions with a pH less than or equal to 2 or greater than or equal to 12.5 or based on the liquid ability to corrode steel.
- This does not apply to solid or non-aqueous materials.
- Examples include hydrochloric acid, nitric acid, and sodium hydroxide solution.

The **Reactivity** characteristic applies to the following:

- Materials unstable under normal conditions.
- Materials which may be capable of detonation or explosion under normal conditions.
- Materials that react violently or generate toxic fumes when mixed with water.
- Cyanide or sulfide bearing wastes which evolve toxic fumes when mixed with acids or bases.
- Materials that are normally unstable or explosive.
- Examples include sodium metal, reactive sulfides, potassium cyanide and picric acid.



The **Toxicity** characteristic applies to wastes that:

- Are harmful when ingested or absorbed.
- May be able to leach from waste and pollute ground water, as determined by the [Toxicity Characteristic Leaching Procedure](#).
- Examples include arsenic, benzene, lead, and mercury.

LISTED WASTE

Listed wastes are identified to be hazardous waste in the Code of Federal Regulations (40 CFR 261) in one of four defined lists (the F, K, P and U lists). These may also have hazardous waste characteristics.

Unused or unopened chemicals will meet the definition of a listed hazardous waste if they appear on one of two lists. The [U-list](#) contains materials that are hazardous due to their toxicity. The [P-list](#) contains materials that are hazardous because they are acutely toxic. These lists only apply to unused materials that have one of the listed chemicals as the sole active ingredients. The list also applies to spill cleanups of these unused materials. The complete U and P lists are included in Appendix A and B of this manual. Empty containers of P-listed chemicals must be disposed of as chemical waste.

Certain used or spent solvents can be regulated as a hazardous waste if they appear on the [F-list](#).

[K-listed](#) wastes are "Specific Source Wastes". Most are from industrial process wastes and are very specific to a particular industrial process. For example, *K050...Heat exchanger bundle cleaning sludge from the petroleum refining industry*. This type of waste typically does not apply to WSU.

WHAT SHOULD BE HANDLED AS CHEMICAL WASTE?

When considering what types of materials are chemically contaminated, WSU personnel should consider substances beyond traditional chemicals. The following substances are considered chemicals, and, therefore, materials contaminated with these substances must be disposed of as chemically contaminated waste.

- Pharmaceutical compounds, investigative drugs - many are regulated by the EPA as listed or characteristic hazardous waste when being disposed.
- Newly synthesized chemicals, drugs, or materials
- Machine/pump oil, coolant
- Some cleaning agents – bleach, Lysol, cleaning ammonia, etc.
- Disinfectants

This is not a comprehensive list of chemical groups but is provided to help WSU personnel to assess the substances they work with and appropriate disposal routes.

WSU SPECIFIC REGULATED CHEMICALS OF CONCERN

WSU has or may identify some chemicals whose containers also require specific disposal procedures due to their toxicity, corrosivity, or reactivity. These include:

- Picric acid
- Hydrofluoric acid
- Peroxides or peroxide-forming chemicals

MIXED WASTE

Mixed waste is a material that is both a chemical hazardous waste and is also contaminated with radioactive and/or biological materials. Users must identify if there are any additional hazards present



in the waste materials being produced (e.g., radioactive, and/or biological). Due to the different regulatory requirements for hazardous waste disposal, mixed wastes may need to be handled differently to the guidelines provided below. Chemical and radioactive mixed waste can be extremely expensive to dispose of. Please contact OEHS if you will be producing mixed waste for guidance on how to correctly dispose of these materials and how to minimize the waste.

CHEMICALLY CONTAMINATED MATERIALS

WSU facilities can produce a wide variety of solid waste which is chemically contaminated. Below are examples of materials which may need to be disposed of as hazardous waste through OEHS if chemically contaminated.

- Original chemical containers – bottles (intact or broken), cans, vials, ampules, etc.
- Non-original containers – solutions bottles (broken), mixing containers, Falcon tubes, microcentrifuge tubes, vials, glass test tubes, TLC plates, slides, etc.
- Solvent contaminated wipes
- Solids – gloves, disposable gowns, Kim wipes, paper towels, weigh boats, absorbent pads, pipettes, pipette tips, tubing, syringes, etc.
- Sharps – needles, GC syringes, lancets, razor blades, scalpels, etc.
- Lecture bottles
- Aerosol cans
- Contaminated debris associated with a chemical spill cleanup – cardboard, paper, etc.

DISPOSAL ROUTES OF CHEMICALLY CONTAMINATED MATERIALS

While considering disposal routes, WSU personnel must also consider chemical incompatibility prior to collection into solid waste containers. Refer to Safety Data Sheets (SDS) for specific incompatibilities or the [EPA Waste Compatibility Chart](#) for more general information on chemical waste incompatibilities. See also the Storage of Chemically Contaminated Materials section of this document for chemical segregation information. Note, OEHS provides high density polyethylene solid waste containers and sharps containers, which can be requested through the [Chemical Waste Pick-Up and New Container Request Form](#).

EMPTY ORIGINAL CONTAINERS

According to [40 CFR 261.7b](#), “empty container” means:

- (1) A container or an inner liner removed from a container that has held any hazardous waste, except a waste that is a compressed gas or that is identified as an acute hazardous waste listed in §§ 261.31 or 261.33(e) is empty if:
 - a. All wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g., pouring, pumping, and aspirating, **and**
 - b. No more than 2.5 centimeters (one inch) of residue remain on the bottom of the container or inner liner, **or**
 - c. No more than 3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 119 gallons in size; **or**
 - d. No more than 0.3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 119 gallons in size.

If a container is not considered empty in accordance with the definition above, then containers and the remaining contents in them must be disposed of as unwanted chemicals.



Empty original containers of chemicals with some Hazardous Characteristics and/or some Listed chemicals.

(Not for containers of pyrophoric chemicals, WSU specific regulated chemicals of concern, or P-Listed chemicals.)

Three use/disposal route options:

- An empty intact original container can be used as a waste container for the same chemical it originally contained. Or it can be triple rinsed with an appropriate solvent, label defaced, and used as a waste container for other chemicals. The rinsate must be collected in a hazardous liquid waste container for disposal by OEHS.
- Empty intact original containers can be triple rinsed with appropriate solvent, label defaced, and cap removed before placing in the regular trash or, if glass, placed in a broken glass box (for non-contaminated glass). The rinsate must be collected in a hazardous liquid waste container.
- Empty original containers can be collected in a polyethylene solid waste container provided by OEHS for disposal as hazardous waste without rinsing. Ensure chemical compatibility when collecting original containers in a waste container.
 - Some reasons to not “triple rinse” a bottle for disposal will be if the chemical is: reactive (water-reactive chemicals if residual chemical remains, like sodium metal), odiferous (smelly, like thiols/mercaptans), or impervious (water will not do anything to remove the contents such as hydrophobic oils or organosilanes). Empty containers of odiferous materials should be placed into a sealed bag prior to placing them in a waste container.

Containers of pyrophoric chemicals.

- Maintain in an inert atmosphere (e.g., glovebox) or under other controlled conditions until collected by OEHS for disposal. Do not rinse. Wrap the outside of the cap with Parafilm. May be used for collection of pyrophoric chemical waste if compatible with original contents.

Containers of WSU specific regulated chemicals of concern.

(Picric acid, hydrofluoric acid, peroxides or peroxide-forming chemicals.)

- Must be disposed directly into a solid hazardous chemical waste container. Do not rinse, wash, or reuse containers.

Containers of P-Listed chemicals.

- Containers that held EPA-defined acutely toxic (P-listed) chemicals must be disposed directly as hazardous waste. Do not rinse, wash, or reuse containers.
- Satellite accumulation areas must not accumulate more than 2 pounds or 1 quart of acutely hazardous (P-Listed) waste at any time. This limit includes containers which originally held P-Listed chemicals.

NON-ORIGINAL CONTAINERS

Containers of chemicals with Hazardous Characteristics or Listed.

- Collect in a polyethylene solid waste container provided by OEHS for disposal as hazardous waste. Ensure chemical compatibility when collecting containers in a waste container.
- If not empty, there is no need to empty contents into a separate waste container (i.e., pour liquid chemical into a liquid chemical waste container), as this may increase the risk of exposure, spills, or other adverse events. Place directly into a solid chemical waste container.

CONTAINERS OF NON-REGULATED CHEMICALS

([Full Green Circle EPA Safer Chemicals](#) () or chemicals approved by OEHS.)

- Obliterate, remove, or thoroughly deface label and write the words “Empty” on the container.
- Dispose into:
 - Cardboard box lined with plastic bag. When full, seal box and dispose of as regular trash. *Max weight 20 lbs.*
 - If glass, place in a plastic lined “broken glass” box (for non-contaminated glass). When full, seal box and dispose of as regular trash. *Max weight 20 lbs.*
 - Or
 - Directly into normal trash.
- Empty bottles can also be reused to collect small quantities of chemical waste.

SOLVENT CONTAMINATED WIPES

(Wipes - a woven or non-woven shop towel, rag, pad, or swab made of wood pulp, fabric, cotton, polyester blends, or other material.)

Solvent contaminated wipes are often generated during equipment cleaning and maintenance activities conducted in laboratories, clinical settings, and other WSU facilities. Wipes that have been in contact with certain solvents and listed chemicals are considered hazardous waste and must be managed appropriately. The following wipes must be collected as hazardous waste.

- Wipes containing free liquid that cannot be drain disposed.
- Wipes contaminated with:
 - Heavy metals or MI "S" listed waste (Aflatoxin, Dioxins & Dibenzofuran TCDF)
 - PCBs
- Wipes used to clean up spills of:
 - "P" listed commercial chemical product or "U" listed commercial chemical product".
 - Hazardous waste
- Wipes that have been in contact with:
 - An ignitable or toxic solvent (other than F-listed) where the solvent has not been consumed in the process.
 - The following F-listed solvents or chemicals:

Halogenated Solvents

Tetrachloroethylene	Carbon Tetrachloride	Ortho-dichlorobenzene
Trichloroethylene	Chlorinated Fluorocarbons	Trichlorofluoromethane
Methylene Chloride	Chlorobenzene	1,1,2-trichloroethane
1,1,1-trichloroethane	1,1,2-trichloro-1,2,2-trifluoroethane	

Non-Halogenated Solvents

Xylene	n-Butyl Alcohol	Carbon Disulfide
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Acetone	Cyclohexanone	Isobutanol
Ethyl Acetate	Methanol	Pyridine
Ethyl Benzene	Cresols & Cresylic Acid	Benzene
Ethyl Ether	Nitrobenzene	2-ethoxyethanol
Methyl Isobutyl Ketone	Toluene	2-nitropropane
	Methyl Ethyl Ketone	

Wipes that Can Be Disposed in Normal Trash

Wipes that have been in contact with a solvent (other than listed above) where the solvent has been consumed during use may be discarded as normal trash. Examples include ethanol or isopropyl alcohol wipes where the ethanol or isopropyl alcohol has been consumed during use and the wipe is dry at the time of disposal.

SOLIDS CONTAMINATED WITH HAZARDOUS CHARACTERISTIC OR LISTED CHEMICALS

(Gloves, disposable gowns, Kim wipes, paper towels, weigh boats, absorbent pads, pipettes, pipette tips, tubing, syringes, disposable mixing spatulas, etc.)

- Designated high density polyethylene solid waste container.
- For pyrophoric chemicals, collect solid waste in a container in the glovebox. Maintain in an inert atmosphere (e.g., glovebox) or under other controlled conditions until collected by OEHS for disposal.

SHARPS

(Chemically contaminated needles, GC syringes, lancets, razor blades, scalpels, etc. No infectious agents, radioactive materials, or pharmaceutical drugs present.)

- RCRA Chemical Use Only, Black Sharps Container.
 - Must contain only residue of chemicals. No liquids or full syringes.

LECTURE BOTTLES

- Lecture bottles (small, compressed gases) are purchased through chemical supply vendors (such as Sigma Aldrich and Matheson). OEHS recommends that WSU personnel attempt to purchase lecture bottles from vendors who will accept returns of partially full or empty containers when they are no longer needed. Airgas offers returnable lecture bottles in many common gases. Contact Airgas for more information on returning lecture bottles.
- The disposal of lecture bottles is extremely expensive. If the vendor or supplier will not accept an unwanted lecture bottle, contact OEHS to arrange for its disposal. Ensure that the label on each cylinder is legible and clearly label the cylinder with the words 'empty'. Keep the valve protection cap on the cylinder when not in use. When the cylinder is in use, keep this valve cap near it, so it does not get misplaced.
- **NOTE: Never dispose of hazardous gases by releasing outdoors or in a fume hood.**



AEROSOL CANS

Aerosol cans are containers in which gas under pressure is used to aerate and dispense any material through a valve in the form of a spray or foam. There are two different categories of aerosols in the hazardous waste program: food-related & all other types.

Food-related aerosols can be thrown directly into the trash. There is no regulated disposal for these.

All other types of aerosols must be given to and disposed of by OEHS. Common examples include paint, adhesives, lubricants, pesticides, cleaners, electronic dusting sprays, expanding foam sealers, and air fresheners. Each aerosol can must be prepared in such a way to prevent a release. The two most common ways are to remove the nozzle or leave the protective cap on top of the can. Other requirements include:

- Accumulation onsite is limited to 90-days from start date.
- Containers used to collect aerosol cans onsite must be labeled with the words "Hazardous Waste: Used Aerosol Cans" and a start date.
- Store away from heat sources.
- Leaking or damaged aerosol cans must be packaged separately and with absorbents.

Puncturing aerosol cans should not be performed on campus, because an Air Permit from the Michigan Department of Environment, Great Lakes, and Energy would be required. Collect empty aerosol cans in a container labeled "Hazardous Waste: Used Aerosol Cans Only." When full, submit a [Chemical Waste Pick-up Request Form](#).

SPILL CLEANUP DEBRIS

- Line a high-density polyethylene solid waste container with a plastic bag.
- Collect all spill debris in the plastic bag.
- When spill clean-up is complete, tie top of bag into a knot and close the container.
- Do not add any other waste to the container.
- Attach detailed hazardous waste tag and submit a request for disposal.

TAGGING WASTE FOR DISPOSAL

- Complete and attach a Hazardous Chemical Waste Tag to the waste container when first adding waste to the container.
 - Include the full chemical or product name, written in English, of each chemical present. NO FORMULAS OR ABBREVIATIONS!
 - Check off hazard classification(s)
 - Include the date when solid waste was first added to the waste container.
 - Sign the tag.
- Waste tags can be requested through the [Chemical Waste Pick-up Request Form](#).

STORAGE AND SEGREGATION OF CHEMICALLY CONTAMINATED MATERIALS

- Store waste containers out of aisleways and high traffic areas.
- As with chemical storage and disposal, the user **MUST** ensure that chemically contaminated debris is correctly segregated. Do not combine incompatible waste into one waste container. This will prevent unintended, sometimes dangerous, reactions from occurring.
- Do not mix:
 - Mercury or Mercury-containing materials with any other waste
 - Dioxin or dioxin containing materials with any other waste

- Peroxide forming chemicals with any other waste
- Oxidizing agents with organic compounds, flammable, and combustible materials
- Oxidizing agents with reducing agents (e.g., zinc, alkaline metals)
- The following documents can assist users in determining how to segregate chemically contaminated debris.
 - Product specific Safety Data Sheet (SDS)
 - Wayne State University [Chemical Segregation Flow Chart](#)
 - Environmental Protection Agency (EPA) [waste compatibility chart](#)
- A satellite accumulation area is limited to 55 gallons of nonacute hazardous waste, 1 quart of liquid acute hazardous waste or severely toxic hazardous waste, or 1 kg of solid acute hazardous waste or severely toxic waste, for all waste streams combined. If your area produces significant amounts of waste in a short period of time, contact OEHS as soon as possible to ensure frequent waste pickups.

EMERGENCY RESPONSE

In the event of an emergency call Wayne State Police at 313-577-2222 immediately.

REFERENCES

1. 40 CFR PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE
2. U.S. Environmental Protection Agency: [Hazardous Waste Management](#); (2023)
3. [Proper Waste Management of Solvent Contaminated Wipes](#). University of Michigan. 2018.
4. U.S. Environmental Protection Agency: [Frequent Questions About Implementing the Regulations for Solvent-Contaminated Wipes](#); (2023)

VERSION CONTROL

Version	Date	Notes
Initial	January 22, 2024	Internal Review
2.0	March 20, 2025	Remove references to “laboratory”, “laboratories”, and “lab(s); make document applicable to other chemical use areas.