

Standard Operating Procedure

Chemical Waste Determination

Document#: CHE008.02	Distribution: External
Section: Chemical Waste Management Program	Effective Date: 11/2019
Total Pages: 7	Revision Date: 1/2020

As a result of recent changes to US Environmental Protection Agency regulations regarding hazardous waste disposal, a chemical waste determination must be performed by the waste generator at the point of generation in any area in which a chemical waste is generated.

EHRS understands that this is a new procedure and can be a challenging task. A new chemical waste tag has been developed by EHRS to assist you in complying with this change. Contact EHRS if you require any assistance in conducting a chemical waste determination.

This procedure provides guidance on conducting a chemical waste determination at Temple University.

Procedure

The process for determining if your chemical waste is a “hazardous” waste is called a *waste determination*. Waste determinations can be made in one of two ways:

- Through collecting a sample of the waste and sending it for analysis using EPA approved standardized test methods, or
- Exercising knowledge of the chemical and process knowledge to make an accurate waste determination. Safety Data Sheets (SDS) are useful in these determinations.

NOTE: For most operations, it is usually possible to use chemical and process knowledge to make an accurate waste determination. The generators must be able to document the chemicals used in the process and maintain supporting documents, such as SDS, process controls or written procedures.

If the waste meets any of the requirements described below then the material is a regulated waste and must be processed through EHRS for proper disposal. Refer to the Chemical Waste Management Manual for additional information.

1. Is it a waste?

In general, an unwanted or unneeded material is considered a waste if:

- It has been used or has gone through a process causing it to be contaminated/impure and is no longer needed,
- It is an unused commercial chemical product that is no longer wanted or has exceeded its expiration date, or
- It is a cleanup material from a chemical spill.

NOTE: Even if you no longer desire to keep a material, it may not be waste if it is still usable and has value. Refer to the Chemical Waste Minimization and Pollution Prevention program for additional information.

2. Is it a hazardous waste?

For a material to be a hazardous waste, it must first be what is termed a **solid waste**. Solid is a regulatory term that does not refer to a physical state of matter; thus, many solid wastes are actually liquids, sludges or gases. The regulations define what exactly a solid waste is and what is excluded from the definition. A material that meets the definition of a solid waste must then be assessed by the person generating the waste to determine if it also a hazardous waste.

NOTE: EPA provides exemptions or reduced compliance requirements for certain waste in order to promote recycling and to provide practical alternatives for managing many common, low-risk waste-Contact EHRS for additional information.

There are two ways a waste may be hazardous waste: listed or characteristic.

Listed

Unused or unopened chemicals that will meet the definition of a listed waste if they appear on one of the EPA list below:

There are four list which include > 400 chemicals or mixtures:

F List: waste from non-specific sources. Mostly mixtures containing 10% or more (before use) of halogenated and non-halogenated solvents such as: *trichloroethylene, methylene chloride, carbon tetrachloride, chlorobenzene, xylene, acetone, ethyl acetate, ethyl benzene, methanol ethyl ether, cresols, nitrobenzene, toluene, MEK, carbon disulfide, pyridine, benzene...*

K List: waste from specific sources, such as wood preserving or pharmacy waste (rare at colleges/universities)

U List: The U-list contains materials that are unused that have one of the listed chemicals as the sole active ingredients. The list also applies to spill cleanups of these unused materials. Some common examples of U listed waste are: *acetone, formaldehyde, alcohols and many solvents.*

P List: The P list contains materials that are **acutely hazardous** (toxic or reactive in small amounts) wastes. Some common examples of P listed waste are: *sodium azide, acrolein, oxides of arsenic, benzyl chloride, carbon disulfide, cyanides, nicotine, nitroglycerin.*

CAUTION: Empty containers that previously contained a P-listed chemical such as sodium azide or cyanide salts are also regulated as hazardous waste. These containers must be labelled as hazardous waste and process through EHRS for proper disposal.

Characteristic

Characteristic waste are not listed specifically by their chemical name but they are regulated as hazardous waste because they exhibit one or more of the four characteristics shown below.

Ignitability

- A **liquid** with a flash point < 140°F
- A **solid** that can cause a fire and sustain combustion
- An ignitable **compressed gas** or **aerosol can**
- An **oxidizer**

Examples: *Alcohols, solvents, stains and mixtures containing these materials.*

Corrosivity (Acids/Bases)

- A chemical waste is corrosive if it has a pH of less than or equal to 2 or greater than or equal to 12.5.

Examples: *Hydrochloric acid, nitric acid and sodium hydroxide.*

Reactivity

- Materials that react violently or generate toxic fumes when mixed with water.
- Cyanide or sulfide bearing waste which evolve toxic fumes when mixed with acids or bases.
- Materials that are normally unstable or explosive.

Examples: *Sodium metal, reactive sulfides, potassium cyanide and picric acid.*

Toxicity

The toxicity characteristic applies to waste that have the potential to contaminate groundwater if improperly disposed of. These materials are regulated as hazardous waste due to their potential to leach out specific toxic substances in a landfill. There are currently 40 contaminants on the list that include certain metals, pesticide and organic compounds. These chemical constituents are listed in the two tables below;

Metals: Reagents and items/debris contaminated with or containing any of the following:

Arsenic (As)	Barium (Ba)	Cadmium (Cd)	Chromium (Cr)
Lead (Pb)	Mercury (Hg)	Selenium (Se)	Silver (Sg)

Examples: *Mercury containing compounds, elemental mercury, silver, lead nitrate and chromic acid.*

Organics: Reagents and items/debris contaminated with or containing any of the following:

Benzene	Carbon tetrachloride	Chlordane
Chlorobenzene	Chloroform	o-Cresol
m-Cresol	p-Cresol	Cresol
1,4 Dichlorobenzene	1,2-Dichloroethane	1,1-Dinitroethylene
Heptachlor (and its epoxide)	Hexachlorobenzene	Hexachlorobutadiene
Methyl ethyl ketone	Nitrobenzene	Pentachlorophenol
Pyridine	Tetrachloroethylene	2,4,5-Trichlorophenol
2,4,6-Trichlorophenol	Vinyl chloride	

Pesticide: Reagents and items/debris contaminated with or containing any of the following

Endrin	Methoxychlor	2,4-Dichlorophenoxyacetic acid
Lindane	Toxaphene	2,4,5-TP (Silvex)

The levels at which these chemicals are regulated varies from 0.2 ppm to 400 ppm. These levels are very low. A waste should be considered as hazardous if the waste contains one or more of the components listed above unless a TCLP analysis has been conducted and it shows the waste to be below the regulatory limits. All TCLP analysis results must be approved by EHRS.

3. Is it a special subclass of “hazardous waste”?

Universal Waste

There are 6 types of wastes that are currently classified as “Universal Waste” by the EPA and PADEP. Universal waste is hazardous, but the generators can manage it separately and with fewer

regulatory restrictions. Refer to the Chemical Waste Management Manual for specific waste management procedures.

EPA Universal Waste: EPA has designated four classes of universal waste.

Batteries: Includes most rechargeable batteries (*i.e. Ni-Cd, Li-ion and small lead sealed (Pb) batteries commonly found in cordless tools, cellular phones, laptops, cameras and 2-way radios*). Large Pb-acid batteries (e.g. auto) **must be recycled** separately and are not Universal waste. Common dry-cell batteries (*i.e. AA, AA, C & D*) are not hazardous and may be discarded in the municipal waste stream.

Pesticides: This is a very limited category and should seldom be a concern. It primarily applies to recalled, banned, damaged or obsolete pesticide subject to a pesticide collection program.

Mercury-containing equipment: Includes mercury-containing thermometers, thermostats, manometers, sphygmomanometers, mercury switches and mercury tube control devise.

Lamps: Includes all types of fluorescent bulbs, high-intensity bulbs (HID), Mercury lamps, UV, projector bulbs, and U-tube or circular bulbs.

In Pennsylvania, the PADEP has also included the following:

Oil-Based Finishes: Includes oil-based paints, lacquers, stains and aerosol paint cans.

Photographic Solutions: Includes silver-bearing waste streams from photographic processing solutions or rinse water.

4. Is it a chemical waste that requires special management?

Certain chemical wastes require special management because they may threaten water quality, create a nuisance, or endanger humans or the environment. Examples of these waste include, but are not limited to:

- Lead-acid batteries
- Used oil and oil filters

- PCBs (e.g. pre-1979 lighting ballast)
- Other waste known to be hazardous or otherwise may be dangerous to humans or the environment.

Examples:

- *Concentrated stock solutions and stained agarose gels containing Ethidium bromide*
- *Corrosive solids, such as anhydrous metal salts or solid hydroxide compounds (i.e. sodium hydroxide or potassium hydroxide pellets, commonly used to adjust pH's of working solutions.*
- *Carcinogens (dioxins, asbestos, aldehydes. etc.) mutagen, teratogens; and*
- *Chemicals with an SDS which warn of skin irritation, eye damage, noxious fumes, etc.*