

Temple College Compliance with the Environmental Protection Agency Requirements

Background: Temple College is subject to the Federal EPA regulations and procedures in regard to chemical usage, safety and disposal law. TC conducts periodic audits of departmental activities to insure compliance with the Hazardous Waste Management Plan and the Chemical Hygiene Plan approved by the Temple College Board of Trustees. These audits are "peer" audits performed by other college personnel who have been trained as EPA auditors under the guidance of a group of institutions (Independent Colleges and Universities of Texas).

Documents: The two documents following this page are the control documents that TC is required to comply with and are published here for departmental information and compliance. These documents are not the only health and safety requirements that are required (see complete listing below). The Chemical Hygiene Plan and the Waste Management Plan are specific to TC and are published here for that purpose.

TEMPLE COLLEGE

August 15, 2011

HAZARDOUS WASTE MANAGEMENT PROCEDURE

INTRODUCTION:

This manual presents policies, responsibilities and procedures for disposal of hazardous waste generated at Temple College. The information is given to assist college personnel in safely and efficiently managing the hazardous waste they generate.

As laboratories produce the majority of hazardous waste at the College, the manual focuses special attention on laboratory generated waste. The manual also contains information on art and photography waste, regulated medical waste, battery recycling, fluorescent lamp disposal, and office waste under the section on special waste streams. Although some of these wastes are not regulated as hazardous waste, they are included because there are restrictions on disposal, or special procedures involved in their management.

POLICIES AND GOALS:

Temple College is committed to protecting the environment as well as the health and safety of our staff, faculty and students. Our objective is to promote the safe handling and disposal of all waste in an environmentally sound manner consistent with local, state and federal regulations. Temple College will provide the resources to ensure that the handling of hazardous waste is conducted according to this policy. Generators are required to coordinate management of all hazardous waste at Temple College with the Office of Campus Development (OCD). OCD will assure properly trained personnel will perform hazardous waste management.

HAZARDOUS WASTE REGULATIONS:

There are comprehensive federal, state and local regulations for the management of hazardous waste. These rules apply to all Temple College personnel; from those who initially generate the hazardous waste to those who arrange for waste disposal. Strict regulatory requirements apply to labeling, handling, storing and disposing of hazardous wastes. Regulatory compliance is incorporated into the Hazardous Waste Management Program.

Definition

Broadly speaking, a waste is something unwanted or no longer useful: it can be a solid, liquid or contained gas. Not all materials regulated as hazardous waste are in fact "dangerous". Despite this, if a material is regulated as hazardous waste it must be handled in compliance with the hazardous waste regulations and this Manual. Until determined otherwise, most chemicals that are intended for disposal should be considered hazardous. It is the responsibility of the waste generating institution to determine if the waste is regulated as hazardous waste.

OCD provides waste disposal services on campus such as waste pickup, accumulation, treatment and shipment in order to meet the requirements of federal, state, and local regulations. Under federal and state laws, generators of hazardous waste are accountable for the management of these wastes from "cradle to grave" and serious civil and criminal penalties may result from failure to comply with legal requirements.

Regulations Summary

In general, until determined otherwise, consider most chemicals intended for disposal as hazardous. Hazardous waste is defined as waste that has certain hazardous characteristics, or waste that appears on lists of hazardous wastes. Trained specialists at OCD make the final determination whether a waste is hazardous according to specific regulatory criteria. Federal state and local laws strictly regulate hazardous waste collection, labeling, storage, transport and disposal. Failure to comply with regulations can result in fines and penalties against the College and individuals.

RESPONSIBILITIES AND REQUIREMENTS:

Each College employee who handles or generates hazardous waste is required to properly handle, store and label hazardous wastes and to comply with applicable federal, state and local regulations. It is the responsibility of all College employees who use or handle hazardous materials to follow the guidelines set forth in this Hazardous Waste Management Manual. It is the collective responsibility of individual employees, supervisors and the Campus Development Office to see that hazardous waste is managed safely and appropriately at the College.

Understand the properties, health risks, and precautions required for handling each hazardous material. Become familiar with available data concerning the chemicals; use reference books, articles, MSDSs and the College's Chemical Hygiene Plan (CHP) and Standard Operating Procedures (SOPs).

Select and use all appropriate personal protective equipment (PPE - gloves, goggles, lab coat, etc.) and other safety equipment required to safely work with hazardous materials. Plan the activity/experiment to consume, to the extent feasible, all hazardous materials.

Learn and follow guidelines for:

1. Waste segregation and waste container selection
2. Accurate and complete labeling
3. Waste minimization from purchase through disposal

WASTE MINIMIZATION AND VOLUME REDUCTION:

In keeping with the College waste minimization policy, every effort must be made to reduce the volume and toxicity of waste generated at Temple College. Hazardous waste disposal is extremely expensive, but by implementing waste minimization concepts into your work area you can significantly reduce the operational cost for your department and the College. A good waste minimization program combines prudent purchasing, source reduction, recycling and treatment.

Purchasing to Minimize Waste

Good purchasing decisions are the first steps in minimizing hazardous waste. Every effort must be made to keep purchase quantities to a minimum. Remember "LESS IS BEST" when planning work

and ordering chemicals. Stockpiling products for future use or to take advantage of unit cost savings doesn't work. This is because any net savings in purchase are lost during disposal if the chemical is not completely used. The average cost to dispose of unused hazardous materials may be two to three times the original purchase cost. Purchase only the quantity of material that will be completely used within a reasonable time frame.

1. Limit the amount you order.
2. Do not stockpile chemicals.
3. Avoid duplication - Check your inventory to avoid ordering chemicals that are already in stock. Keep up to date inventories.
4. Rotate chemical stocks to use up chemicals before their shelf lives expire.
5. Be wary of offers of "free" research materials or chemicals from outside the College. All too often "freebies" are inadequately labeled, or are packaged in large, industrial quantities that will not be used up. Research scale quantities, complete labels and material safety data sheets are required for any free materials.

LABORATORY WASTE MANAGEMENT:

1. Containers must be labeled with a description of the waste material and the words "Hazardous Waste".
2. Store waste in clean containers, free of residue. Use glass or plastic compatible with the waste.
3. Collect only compatible wastes within a container. Use separate containers for each of the following types of waste: Halogenated Organic Solvents, Non-halogenated Organic Solvents, Corrosives-acid, Corrosives-bases, Heavy metals, Elemental Mercury, Reactives, Oxidizers, Toxic (poisons), Acutely Hazardous Wastes. Refer to the original chemical MSDS or label to determine the category of waste; look it up using safety references or contact ORM for help.
4. Segregate containers according to chemical compatibility.
5. Use secondary containment for waste containers. Inspect regularly for leaking or damaged containers. Do not fill containers completely; leave head space. Refer to the following sections for complete details on container selection, segregation of wastes, collecting and storing waste and labeling containers.

Waste Containers

The first step in the waste disposal process involves obtaining a suitable container for the waste. Safety is the primary consideration in container selection. Follow all the guidelines given.

1. Use plastic or glass containers compatible with the waste.
2. Containers must have a screw on cap (or other equivalent secure closure).
3. Whenever possible, use containers that hold less than 1 gallon.
4. Empty containers in which the chemicals were supplied are usually adequate. Liquids must be in small-necked containers designed for liquids. Solids must be in wide-mouthed containers designed for solids.
5. Containers must be clean and free of residue that might react with waste.
6. Rusted, dented or degraded containers are not acceptable.
7. Do not use beakers, or other lab ware, coffee cans, plastic milk jugs or soda bottles.
8. Do not use rubber stoppers, corks, Para film, or glass stoppers
9. OCD will provide assistance with container selection for new waste streams.

Segregate Waste

Not all wastes can be stored in the same container. Wastes that could react together to cause explosions, fires, leaks, fumes, heat or other releases must be collected and stored in separate containers. The correct segregation of waste allows the best disposal options - both economically and environmentally.

Use separate containers for each of the following types of waste:

1. Halogenated Organic Solvents
2. Non-halogenated Organic Solvents
3. Corrosives - Acids
4. Corrosives - Bases
5. Heavy Metals
6. Elemental Mercury
7. Mercury- Other
8. Reactives
9. Oxidizers
10. Toxic (Poisons)
11. "Acutely" hazardous

Collecting and Storing Waste

1. Keep containers **TIGHTLY CLOSED** except when you fill them. This is to prevent spills, leaks, fires and your exposure to fumes - it's also the law!
2. Do not fill liquid containers completely full. For a 1-gallon container, leave about 2" of headspace to prevent buildup of pressure.
3. A funnel may help prevent spills when adding waste to containers; make sure it is clean and free of residues. Do not leave funnels on containers.
4. Wear goggles, gloves and lab coat when adding waste to containers.
5. Keep containers in good condition, handle them carefully, replace any leaking ones immediately, and make sure the outside is clean.
6. Inspect regularly for leaking or damaged containers and tightly closed lids. Weekly inspections are recommended.
7. Separate and protect reactive or ignitable waste from sources of ignition or reaction.
8. Segregate waste containers according to chemical compatibility just as you would unused chemicals - flammables, oxidizers, reactive, corrosive acids and bases must be stored separately. Do not store all waste containers in the same place just because it is convenient!
9. Use secondary containment for liquid waste. Secondary containment may be a tray, pan, bucket or other container capable of holding the contents of the primary container. Secondary containment aids in separating incompatible waste and in cleanup of leaks and spills.

CHEMICAL WASTE PICKUP:

Before requesting a chemical waste pickup, make sure you have followed the procedures above for container selection, labeling, handling and storage of hazardous waste. Make sure containers are clean on the outside and have caps that are tightly closed.

Requesting a Chemical Waste Pickup

A chemical pickup may also be requested electronically by contacting the office of Campus Development or the Physical Plant office.

Be ready to submit the following information:

1. Your name
2. Phone number
3. Department name
4. Building
5. Room number
6. Material(s) name(s) - content of the waste
7. Quantity
8. Size of containers to be picked up
9. Physical state of the material

MERCURY WASTE:

Replace thermometers and measuring instruments containing mercury with equipment that uses non-hazardous fluids or electronic devices.

Mercury mixed with other wastes is very difficult to dispose of. Mercury compounds are also difficult to dispose of. Consult OCD prior to generating mercury waste mixtures in order to develop a strategy for waste minimization and disposal.

ART / PHOTOGRAPHIC WASTE:

A number of art materials are hazardous both to the user and the environment. When these materials are discarded, they are subject to federal, state and local laws. Personnel handling these hazardous wastes must follow hazardous waste regulations. Art materials are often labeled with information indicating whether hazardous components are present. Material safety data sheets list detailed information about hazardous content, safe use and disposal. Users must take the time to read labels, data sheets and heed hazard warnings. At all times, select and use the least hazardous art materials available.

PHOTOGRAPHY AND DARKROOMS:

Fixer waste may contain silvers, a valuable metal, which must not be poured down the drain. Fixer waste is collected separately and the silver is reclaimed. All areas, which generate fixer waste, must collect waste in labeled containers and contact OCD for disposal of fixer.

APPENDIX A

Characteristics Of Hazardous Waste

According to EPA, waste is classified as hazardous in two ways:

- (1) if it shows the hazardous characteristics of ignitability, corrosivity, reactivity or toxicity;
- (2) if it appears on certain lists of wastes developed by the EPA

Ignitability

1. Most liquids that have a flash point of less than 60 deg C (140 deg F).
2. Materials other than liquids that are capable of burning vigorously and persistently; cause fire through friction, adsorption of moisture, or spontaneous chemical changes under standard temperature and pressure, and when ignited.
3. Flammable compressed gases, including those that form flammable mixtures.
4. Oxidizers that stimulate combustion of organic materials.
5. Ignitable chemicals include many common laboratory solvents such as acetone, toluene, xylene, hexane, methyl ethyl ketone, ethyl acetate, ethyl ether; gases such as hydrogen, acetylene, methane; substances such as phosphorus, lithium aluminum hydride, and benzoyl peroxide.

Corrosivity

A liquid is corrosive if it has a pH of less than 2 or greater than 12.5, or if it corrodes certain grades of steel. Only liquids can be corrosive hazardous wastes. Most of the common laboratory acids and bases are corrosive including hydrochloric, nitric, sulfur acids, ammonium hydroxide, and sodium hydroxide solutions.

Reactivity

A solid waste is reactive if:

1. It is normally unstable and undergoes violent change without detonating;
2. It reacts violently with water;
3. It forms potentially explosive mixtures with water;
4. Generates toxic gases, vapors or fumes dangerous to human health when mixed with water; It is a cyanide- or sulfide-bearing waste which when exposed to pH conditions between 2 and 12.5 can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health.
5. It detonates or explodes when subjected to a strong initiating source or heating under confinement or at standard temperature and pressure.
6. Reactive chemicals include sodium metal, lithium metal, sodium cyanide, and potassium cyanide.

Toxicity

A solid waste exhibits the characteristic of toxicity if it, or an extract, exceeds specified regulatory thresholds for metals, pesticides and other organic chemicals. If the waste contains 0.5% or more filterable solids, the comparison is made to an extract prepared using the EPA-defined Toxicity Characteristic Leaching Procedure (TCLP).

The TCLP is a test that measures the tendency of specific group of toxic materials to be leached (extracted) from the waste material; simulating conditions in a landfill. The waste material will be regulated as hazardous waste if a TCLP test (or analysis of the filtered waste if it contained less than 0.5% filterable solids) indicates the presence of at least one of a group of heavy metals, organic toxicants, and pesticides above the regulatory level noted.

APPENDIX B

Incompatible Chemical Combinations

The following list is to be used only as a guide. Specific incompatibilities are listed in the material safety data sheets.

Chemical	Incompatible with
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Acetone	Concentrated nitric and sulfuric acid mixtures
Alkali and alkaline earth metals (such as powdered aluminum or magnesium, calcium, lithium, sodium, potassium)	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia (anhydrous)	Mercury (e.g. in manometers), chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid (anhydrous)
Ammonium nitrate	Acids, powdered metals, flammable liquids, chlorates, nitrites, sulfur, finely divided organic combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine	See chlorine
Calcium oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents
Chlorates	Ammonium salts, acids, Powdered metals, sulfur, finely divided organic or combustible materials
Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide,

	benzene, finely divided metals, turpentine
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene hydro peroxide	Acids (organic or inorganic)
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	All other chemicals
Hydrocarbons (such as butane, propane, benzene)	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydro cyanic acid	Nitric acid, alkali
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous), hydrogen
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Hypo chlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Acids
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydro cyanic acid, hydrogen sulfide, flammable liquids and gases, copper, brass, any heavy metals
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury
Oxygen	Oils, grease, hydrogen; flammable liquids, solids, and gases
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohols, paper, wood grease, oils
Peroxides, organic	Acids (organic or mineral), avoid friction, store cold

Phosphorus (white)	Air, oxygen, alkalis, reducing agents
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium chlorate	Sulfuric and other acids
Potassium per chlorate (see also chlorates)	Sulfuric and other acids
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds, fulminic acid
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl and methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric acid	Potassium chlorate, potassium perchlorate, potassium permanganate (similar compounds of light metals, such as sodium, lithium)
Tellurides	Reducing agents