Introduction
This document is intended to refer to the California University of PA Hazardous Materials, Storage, and Disposal Guide (HMHSDG) and provides basic instructions for normal operating procedures for 5 gallon carboys of standard types of waste (Aqueous, Halogenated Organic, Nonhalogenated Organic, and Solid) generated through experiments in undergraduate laboratories in the Chemistry and Physics Department at California University of Pennsylvania. Special accumulation and storage issues concerning hazardous waste that does not fall into these sections that are generated in the department are itemized below these common procedures. The documents created in this procedure will be located in the Chemistry and Physics Department Main Office (NSC104) and stored for 3 academic years from the time they are created.

Procedures
Obtaining a Chemical Waste Container
1- Contact the laboratory technician with the following information for each container needed:
   • Room number and location
   • Date needed (Accumulate Start Date)
   • Materials to be placed into container
2- Laboratory technician will prepare a Chemical Waste Spreadsheet (on a clipboard) for each container and place next to container. Basic information found on the container sticker will be added already, including ensuring “HAZARDOUS WASTE” and the beginning accumulation date are posted.

Waste Container Use
While stored in the laboratory, waste containers are under the responsibility of the faculty member and laboratory technician to ensure the following:
   • Waste generated in the laboratory is placed into the proper waste container. Please refer to the normal operating types of chemical waste containers above.
   • Waste added into each container is documented. The Chemical Waste Spreadsheet will have relevant information needed.
   • Area surrounding waste containers is maintained (clean and well organized).
   • Caps for waste containers always seal the waste containers.
There should be approximately 2 inches of “headspace” left at top of the carboy.

**Waste Container Full/Replacement**

Once a waste container is not needed anymore or is full, the faculty and/or laboratory technician responsible for the waste container in the room need to follow the below checklist to properly store the container until university waste disposal.

1. Contact the laboratory technician with the following information for each container:
   - Room number and location
   - Date
   - Waste container type

2. The chemical waste container will be inspected for cleanliness and to ensure it is sealed properly.

3. Laboratory technician will pick up Waste container and Chemical Waste Spreadsheet and transfer to a central accumulation area.

4. Information from the clipboard will be placed into an electronic Excel format on the H:drive and saved as a unique document. This file will be named as Building-Room-Type of Waste-Number (i.e. NSC112_Aqueous_01)

5. THREE Printouts of the Excel spreadsheet and the original (handwritten) spreadsheet will be placed into a unique folder (labeled with file name) prepared for this waste container. This file will be then be stored in the main office.

6. Using the spreadsheet, the materials in the container will be added to the sticker on the waste container. ALSO ADDED TO THE STICKER OF THE CONTAINER WILL BE THE FILE NAME OF THE WASTE SPREADSHEET. If stickers are unavailable, write the name of the file on the side of the carboy in large print.

7. When university waste pick-up occurs, electronic copies will be placed as below.
   a. One copy will be retained for department purposes. This copy will be taken from the file folder and placed into a 3 ring binder along with the handwritten copy for past records maintenance.
   b. One copy will be placed with the chemical waste container. Ensure FILE NAME IS ON HIGHLIGHTED ON BOTH THE CONTAINER AND ELECTRONIC COPY
   c. One copy will be provided to the Health and Safety Officer one week before the chemical waste pickup is scheduled to occur. This sheet should provide information as to where the container is currently held.

**Other Details**

As found in the California University of PA Hazardous Materials Plan, proper segregation of laboratory waste is essential to good chemical hygiene and a safe workplace environment. Many researchers often tend to put all of their wastes into the same cabinet or fume hood. Doing so can have disastrous results!
The guidelines for temporary storage of chemical wastes in the laboratory are really no different than those that you use for the storage of your usual lab chemicals. The most important rule is to make sure that any chemicals or wastes that stored together are compatible with each other! Therefore, proper segregation of wastes involves making sure that wastes within a bottle are compatible, but it also means that you should NEVER store the following types of wastes near each other:

- Acids and bases.
- Organics and acids.
- Cyanide, sulfide or arsenic compounds and acids.
- Alkali or alkali earth metals, alkyllithiums etc. and aqueous waste.
- Powdered or reactive metals and combustible materials.
- Mercury or silver and ammonium containing compounds.

This list is not comprehensive. If a bottle broke in a waste storage area where incompatibles were present, the results could be disastrous. Remember: incompatible bottles of wastes should be stored in separate cabinets, preferably as far apart as possible!

Specialized Hazardous Waste

The following categories of wastes require special containment or handling by the generator before the material can be sent for disposal. Contact the Director of Environmental Health and Safety to arrange for disposal.

A. Asbestos: Asbestos is not considered a hazardous waste but it still must be managed as a hazardous material. If the presence of asbestos-containing materials is suspected, especially those in poor condition, contact the department Chemical Hygiene Officer. The Officer will log/report this information and contact the Director of Environmental Health and Safety at 4411 for proper removal.

B. Batteries: Spent batteries are considered a hazardous material. Separate lead acid, nickel cadmium, alkaline, and any other batteries into separate containers. Lead acid batteries should be kept indoors or in a container. A sealed storage container for spent batteries will be located in NSC118. One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, the contents of this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste.

C. Gas Cylinders: Gas cylinders have a high disposal cost. The Director of Environmental Health and Safety recommends that cylinders not be used when possible. As part of common departmental practice, cylinders should be purchased from manufacturers who will accept them back after use. If a cylinder cannot be returned to the manufacturer, contact the Director of Environmental Health and Safety who will make special arrangements for disposal. One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, the contents of this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste.
D. **Empty Containers/Glassware:** After removing or defacing labels, empty containers and glassware should be placed in the trash. Empty containers that held acute hazardous waste (P-listed) must be triple rinsed before discarding into the trash. The rinsate will then be handled as hazardous waste. The contents of this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste. Temporary storage for the rinsate will be located in NSC118. One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, information concerning this Hazardous Waste will be provided to the Health and Safety Officer.

E. **Mercury Compounds:** Mercury compounds and mercury solutions will be disposed of as hazardous waste. Do not mix mercury with other types of waste. The waste will be stored in sealed container and the contents of this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste. Temporary storage for the waste will be located in NSC118. One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, information concerning this Hazardous Waste will be provided to the Health and Safety Officer.

**Elemental Mercury:** Elemental mercury will be recycled, when possible. Place the elemental mercury in a sturdy leak-proof container that has a screw-on cap. Contact the department Chemical Hygiene Officer who will log this information and contact the Director of Environmental Health and Safety to determine further procedures to take concerning the material.

F. **Mercury Thermometers and Mercury-Containing Devices:** Broken mercury thermometers or mercury-containing devices should be placed in a leak-proof container. Broken glass from the mercury thermometer or mercury containing devices should be placed in the same container. The waste will be stored in sealed container and the contents of this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste. Temporary storage for the waste will be located in NSC118. One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, information concerning this Hazardous Waste will be provided to the Health and Safety Officer.

G. **Polychlorinated Biphenyls (PCB) Waste:** The EPA strictly regulates the handling, storage, transportation, and disposal of PCBs. Some examples of items that may contain PCBs are: Electrical transformers, Electrical capacitors, Fluorescent light ballasts, Hydraulic fluids, Optical liquids. PCB waste should not be mixed with other waste. Manufacturers are required to label ballasts "Non-PCB". Prior to handling any ballast, check to see if it is labeled "Non-PCB". If the article is not labeled "Non-PCB", assume it contains PCBs and precautions should be taken when handling these items. If the
article is intact and not leaking, wear a pair of rubber or plastic gloves. Inexpensive surgical gloves will suffice if not worn for extended periods of time. If the article is leaking, also wear a pair of goggles. Contact The Director of Environmental Health and Safety to coordinate any clean up from the floor or other areas. Do not put leaking ballast in containers already holding non-leaking ballast. Leaking ballast must be segregated in a small container and managed as a chemical waste.

The waste will be stored in sealed container if possible and the contents of this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste. Temporary storage for the waste will be located in NSC118. If the item is too large for a container, contact the departmental Chemical Hygiene Officer who will arrange for pickup through the Environmental Health and Safety Office.

One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, information concerning this Hazardous Waste will be provided to the Health and Safety Officer.

H. Osmium Waste: Osmium waste is highly toxic. All liquid waste must be in a container with a screw-on cap. All solid waste must be double-bagged and the contents of this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste. Temporary storage for the waste will be located in NSC118. One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, information concerning this Hazardous Waste will be provided to the Health and Safety Officer.

I. Ethidium Bromide Waste: Ethidium bromide is not considered a hazardous waste, but still must be managed as a hazardous material. Ethidium bromide solutions must be in a container with a screw-on cap. All solid waste, including ethidium bromide gels must be double-bagged. Do not place ethidium bromide gels or ethidium bromide debris in a "biohazardous bag" for disposal; place the ethidium bromide and debris in a 6-mil plastic bag.

Contents for this container will be itemized, inventoried, and prepared for pickup using the Hazardous Waste log sheets used for common laboratory waste. Temporary storage for the waste will be located in NSC118. One week prior to Hazardous Waste pick-up dates arranged by the Director of Environmental Health and Safety, information concerning this Hazardous Waste will be provided to the Health and Safety Officer.

J. Fluorescent Light Tubes: The fluorescent light tubes that provide light to your workspace may be hazardous waste. **DO NOT THROW THE FLUORESCENT LIGHT TUBES INTO THE TRASH.** Place the used fluorescent light tube in its original box for proper disposal. The boxes should be sealed, marked with the words "Used Lamps" and the number of tubes marked on the top of the box. Contact the departmental Chemical Hygiene Officer, who will log this information and contact the Health and Safety Office for proper pickup and disposal.
K. **Picric Acid:** Picric acid with water is a mixture that requires no special handling. However, when picric acid is dry, it is **HIGHLY EXPLOSIVE.** Do not touch or move the container. Notify the departmental Chemical Hygiene Officer and Director of Environmental Health and Safety immediately whenever dry picric acid is discovered in a lab or work area. The Director of Environmental Health and Safety will examine the picric acid and determine if it poses a threat to human health, university property, or the environment.

L. **Benzoyl Peroxide:** Benzoyl peroxide can be an unstable material in a dry state. Benzoyl peroxide is usually in a non-metallic container to prevent static electricity, which could cause ignition.

M. **Ethers:** Ethers, especially diethyl ether, form peroxides in the presence of light and oxygen. Special care will need to be taken for ethers that are more than one year old. The Director of Environmental Health and Safety will examine the ether container and determine if it poses a threat to human health, university property, or the environment.

**MISCELLANEOUS WASTE**

Other wastes not covered in this guideline may require special handling or disposal are as follows:

**Broken Glassware:** Pipettes, broken glassware, microscope slides, and cover slips not considered infectious under this guide should be regarded as injurious materials because they present a physical hazard to custodians if placed in the regular trash. Additionally, plastic vials, pipettes etc are also defined as injurious and should be handled as such in the same manner indicated. These items should be boxed, sealed, and labeled "Broken glassware disposal". Please insure the box selected for shipping broken glass is suitable, sturdy and is taped completely closed for shipping. Boxes needed to insure proper shipping of broken glass and plastic can be ordered through Fisher Scientific (1-800-766-7000) or Lab Safety Supply (1-800-356-0783). Glass that is **not broken** may be placed in regular trash receptacles provided that it is not done so in a manner that can reasonably be expected to lead to its breakage. For more details on unbroken glass, see the Empty Container section found later in this Disposal Guide.

It is the responsibility of every department, unit, or laboratory generating biohazardous waste to provide the appropriate packaging materials (i.e., sharps container and orange or red infectious waste bags). Biohazard waste bags must be orange or red and can be obtained from the biohazardous waste contractor.

**Pharmaceutical and controlled drugs:** Various controlled substances may be used at the University for instructional activities or conducting research. Any person engaged in activities with controlled substances must be registered with the Drug Enforcement Administration (DEA).
To dispose of controlled substances, contact the DEA for authority and instructions. The DEA will require certificates of destruction in many cases. The DEA will then authorize and instruct you to dispose of the controlled substances in one of the following manners:

- By delivery to the local DEA
- By destruction in the presence of an agent of the DEA
- By such other means as the DEA may determine to assure that the substance does not become available to unauthorized persons.

The person in possession of the substance is responsible for its disposal in accordance with the DEA regulations. The Director of Environmental Health and Safety will only pick up controlled substances on a case-by-case basis.

**Waste oils:** Waste oils from maintenance shops, pumps, equipment, machinery, etc. should be collected. Do not mix any other material with waste oils and do not allow water to enter waste oil containers. Waste oils are transferred to a recycler at little cost to the university. However, waste oil, which has been mixed with water, solvents, heavy metals, toxics, PCB’s, or other chemical substances, may result in substantial costs to the university. Containers used for accumulating waste oils must be clearly marked "USED OIL" will help prevent this problem.