



UNIVERSITY OF HAWAI'I
John A. Burns School of Medicine at Kaka'ako

Hazardous Material and Hazardous Waste Management Program

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I. INTRODUCTION

This program outlines requirements for the management of hazardous materials and the disposal of hazardous waste at the University of Hawai'i John A. Burns School of Medicine at Kaka'ako, hereafter called JABSOM Kaka'ako. These requirements are based on federal, state and county regulations. Failure to comply with these requirements may subject JABSOM Kaka'ako and/or individuals to fines and civil or criminal prosecution. The proper management of hazardous materials is concerned with the safety of personnel and the public, the environment, and reducing waste generation and disposal costs. Revisions to this program require the approval from the University of Hawai'i John A. Burns School of Medicine Environmental Health and Safety Office (JABSOM EHSO). The change of names of designated individuals requires only notification to JABSOM EHSO which can be accomplished by memorandum.

A. RESPONSIBLE PERSONNEL

1. All personnel must

- Become familiar with the hazardous materials in their area and with this hazardous material and hazardous waste management program.
- Use Procurement Authorization for Hazardous Materials form (*Attachment 1*) to obtain approval for the purchase of hazardous materials.
- Submit an Approval for the Use of Hazardous Material form (*Attachment 2*) for grant approval.
- Maintain and update annually an inventory of all chemicals in your lab (*Attachment 4*).
- Store, segregate and label waste properly. Individual PIs are required to inspect the condition of all hazardous material containers to ensure that hazardous materials are stored in compatible containers in good condition and are properly labeled.
- Submit waste in a timely manner to JABSOM EHSO by submitting the Chemical Waste Disposal Request form (*Attachment 8*).
- Contact the John A. Burns School of Medicine (JABSOM) Health and Safety Coordinator if you have any questions about this "*Hazardous Material and Hazardous Waste Management Program*".

2. Designated program coordinator

The JABSOM Health and Safety Coordinator is responsible for overall coordination of the Hazardous Material and Hazardous Waste Management Program at JABSOM Kaka'ako. In addition, all hazardous waste generating personnel are required to attend initial and annual refresher hazardous waste generator training given by the JABSOM Health and Safety Coordinator. Hazardous waste generators are to contact JABSOM EHSO to register for this training.

II. HAZARDOUS MATERIAL MANAGEMENT

- A. **Training requirements.** Individuals who generate hazardous waste are required to attend an initial and annual hazardous waste generator training. A certificate for this training will be sent upon completion. This certificate is to be kept in the waste generator's working area with other training records. The JABSOM Health and Safety Coordinator will also have a record of attendance for this training on file. Contact JABSOM EHSO to sign up for a training session.
- B. **Authorization to purchase hazardous materials.** Approval from the JABSOM Health and Safety Coordinator is required for the purchase or requisition of all hazardous materials. The "Procurement Authorization for Hazardous Materials" form (*Attachment 1*), must be submitted to the JABSOM Health and Safety Coordinator before any purchase of hazardous materials is initiated. If approved, a copy of the form will be provided to you for attachment to your purchase order or requisition. The purpose of this approval is to ensure the safe storage, handling and eventual disposal of the material while minimizing cost.
- C. **Approval to use hazardous materials.** As part of the grant approval process (ORS Form 5, item 4 under PI certification) a specific form for the use of certain highly hazardous materials has been developed (*Attachment 2*). This form is similar to those already in place for the use of radioactive and biohazard materials. This form must be submitted to the JABSOM Health and Safety Coordinator prior to the completion of the grant process.
- D. **Inventory Control Procedures.**
1. **Annual Inventory of Chemicals.** JABSOM Kaka'ako programs that store chemicals are required to submit annual updated inventories to the JABSOM Health and Safety Coordinator. The chemical inventory form, *Attachment 4*, will help manage existing chemical/hazardous materials, monitor on-going usage, and prevent unnecessary accumulation. Both the program users and the JABSOM Health and Safety Coordinator are responsible for the condition of all chemical material containers to ensure that the chemicals are stored in containers which are in good condition and are properly labeled.
 2. **Inventory of Hazardous Waste.** Hazardous waste generators are required to submit their chemical waste to the JABSOM Health and Safety Coordinator. The "Chemical Waste Disposal Request" form (*Attachment 8*) shall be submitted to JABSOM EHSO on a regular basis. JABSOM EHSO will pick up waste from the requested lab and store it in their chemical waste room area in BSB 113A. The JABSOM Health and Safety Coordinator will keep an inventory of all waste submitted and assign the DOT hazard class and EPA Waste Code information in order to comply with state or federal inspections. The waste inventories help us ensure that we do not exceed our accumulation limits, thus subjecting JABSOM Kaka'ako to more stringent regulations. In addition, the completed forms document the hazardous waste determination

required by federal regulations. As part of the waste inventory procedure, the JABSOM Health and Safety Coordinator is required to inspect the condition of all hazardous wastes containers to ensure that hazardous wastes are stored in containers which are in good condition, compatible with the material being stored, and properly labeled.

3. Inventory of Special (non-regulated) Waste. While certain wastes are not regulated hazardous waste, they also cannot be disposed of in a sanitary landfill or down the drain, and may necessitate special disposal procedures (i.e. gels with ethidium bromide). These non-regulated wastes should be submitted on the "Chemical Waste Disposal Request" form (*Attachment 8*) to JABSOM EHSO.

E. Audit Program. The audit program will assist in maintaining a safe working and academic environment. The JABSOM Health and Safety Coordinator will conduct periodic audits of the campus to review the current operations with respect to all-applicable safety, health and environmental policies and regulations. The following issues will be reviewed: hazardous material storage, Material Safety Data Sheet availability, hazardous waste accumulation areas, use of personal protective equipment, survey of highly hazardous materials or acutely hazardous waste, and emergency and spill plans. A report indicating any corrective actions that are necessary and suggesting any improvements will be provided to the waste generator by the JABSOM Health and Safety Coordinator.

F. Material Safety Data Sheets (MSDS): All chemical manufacturers and suppliers of hazardous chemicals must furnish a MSDS with each initial shipment and furnish new MSDS information upon request. MSDSs generally contain information such as the following:

- Chemical composition
- Physical characteristics and chemical properties
- Fire, explosion and reactivity hazards
- Health hazard information and symptoms of overexposure
- Protective equipment recommendations
- Cleanup and disposal procedures
- Emergency first aid procedures

It is the responsibility of the PI/supervisor of each lab to ensure that MSDSs of all chemicals stored in the lab are readily available, in the area where products are stored, to all employees at any time. MSDSs must also be available to emergency response personnel and any state or federal agencies that request them. If a MSDS is missing or incomplete, it is likely that you can obtain a copy from an online source or from the manufacturer. Requests for missing MSDSs should be made in writing and sent by fax, and a copy of the request should be kept in your file.

Laboratory Standard: An online server may be used to furnish MSDSs upon request, but hard copies of MSDSs must be maintained in the lab. A free of charge MSDS online source is located at www.hazard.com/msds (not all MSDSs can be found online).

Facilities Workshop/Maintenance Standard: Hard copies of MSDSs must be maintained.

II. HAZARDOUS WASTE MANAGEMENT

A. **Waste Identification and Classification.** All waste must be identified and then classified as hazardous or non-hazardous according to specific federal and state definitions summarized in *Attachment 5*. JABSOM EHSO will assist you in making a determination of whether a waste is hazardous.

1. A waste is:

- A useless by-product of an operation
- A material which is to be disposed
- Any material which can no longer be used
- A manufacturing or process by-product

2. To determine if a waste is hazardous:

- a. **Review the Material Safety Data Sheets.** MSDSs may provide information, which will assist you in making a proper hazardous waste determination.
- b. **Contact the JABSOM Environmental Health and Safety Office.** The office (692-1854) will assist you in making a determination of whether a waste is hazardous.

B. **Accumulation of Waste.**

1. **Limits on Waste Generation.** To maintain the status of conditionally exempt small quantity generator, JABSOM Kaka'ako **may not** generate more than 100 kilograms (approximately one half of a 55-gallon drum, 27 gallons, or 220 pounds) of hazardous waste in one month. JABSOM Kaka'ako also may not generate more than 1 kilogram (2.2 pounds) of acutely hazardous ("P" coded) waste in one month (see *Attachment 6* for a list of these chemicals).

2. **Limits on Waste Accumulation.** To maintain the status of a conditionally exempt small quantity generator, JABSOM Kaka'ako **may not** store more than 1000 kilograms (approximately five 55-gallon drums, or 275 gallons, or 2200 pounds) of total accumulated hazardous waste and no more than 1 kilogram (2.2 pounds) of accumulated acute hazardous ("P" coded) waste **at any time** (see *Attachment 6* for a list of these chemicals).

- 3. Designation of Waste Management Area.** All programs generating hazardous waste should establish a safe area near the point of generation for temporary storage of waste while awaiting disposal. The JABSOM Health and Safety Coordinator will bi-annually, or more frequently if necessary, hire a licensed hazardous waste contractor to transport the waste to an EPA permitted hazardous waste treatment, storage and disposal facility.

C. Storage of Hazardous Chemical Waste

1. Waste Containers (and Material Containers)

- a. Labeling.** All hazardous waste containers must be clearly labeled with the following:
- The words “**Waste _____.**” (examples: Waste Acetone, Waste Hydrochloric Acid, Waste methyl alcohol or Waste ethidium bromide, etc).
 - The **Chemical Name** of the Waste or an accurate description of the contents of the container, including the approximate percentages for mixtures. The manufacturer’s label or a label giving the chemical name and specific hazards (e.g., flammable, corrosive or poison) is acceptable.
 - The accumulation start date.
- b. Closed Containers.** All hazardous waste containers must remain closed except when waste is being added to them.
- c. Containers in Good Condition.** Containers used for waste must be in good condition (i.e. not rusting, no cracks or structural defects). If a container is broken or begins to leak, the material must be transferred to a container in good condition. The container's composition must be compatible with the material to be stored in it and incompatible materials must not be stored in proximity to one another. Package materials in sturdy cardboard boxes or plastic waste containers. Cushion the material in the containers to prevent breakage. If cardboard boxes are used which originally held other chemicals, the name of the chemical must be covered over or defaced. Failure to do so constitutes improper marking of contents and is an EPA and OSHA regulation violation.
- d. Secondary Containment** is required for all containers of liquid waste under the following circumstances:
1. When stored in 55-gallon drums.
 2. When stored on the floor.

3. When stored in a hood which has a drain.
4. When stored within four (4) feet of a sink.
5. When necessary to separate incompatible or high hazard wastes.

Consult with the JABSOM Health and Safety Office regarding appropriate containment when a 55-gallon drum is used to collect waste.

- e. **Separate Incompatible Materials/Waste.** Incompatible materials shall be segregated by hazard class (e.g. Toxic-Reactive-Ignitable-Corrosive). Examples of incompatible materials are: acids/bases, organics/oxidizers, and flammable liquids/oxidizers.
- f. **Unknowns and high hazard materials** such as cyanides, organic peroxides, pyrophorics, water reactives and explosives shall be segregated separately regardless of quantity. If there are any questions, please call JABSOM EHSO for assistance (692-1854).
- g. **Housekeeping.** The waste storage area should be neat and orderly. Containers should not be stacked upon one another or containers of liquids should not be stored on their sides.

D. Hazardous Waste Disposal.

The disposal of hazardous waste requires that a licensed hazardous waste contractor be hired to dispose of the waste. As stated previously, the JABSOM Health and Safety Coordinator will bi-annually, or more frequently if necessary, hire a licensed hazardous waste contractor to transport the waste to an EPA permitted hazardous waste treatment, storage and disposal facility.

- E. Drain Disposal Restrictions.** Consult with JABSOM EHSO (692-1854) if you are unsure about whether a material can be disposed of down the drain. No hazardous materials/waste may be disposed of down any drain. All liquids (except known clean water) shall be reviewed prior to any drain disposal to ensure that the liquid is permitted to be discharged down the drain. In addition, applicable County ordinances need to be consulted prior to disposing of items down the drain. They may prohibit drain disposal of items such as:

- Fats and greases, if their concentration and physical dispersion results in separation and adherence to sewer structures.
- Storm water, surface water, groundwater, roof runoff, subsurface drainage, cooling water, swimming pool water or other unpolluted drainage.
- Liquid or vapor having a temperature of >150 degrees Fahrenheit.
- Any water or waste containing >100 ppm, by weight, of fat, oil or grease.
- Gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid or gas.

- Garbage that has not been properly shredded. Garbage from commercial food establishments is prohibited.
- Ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure or any other solid or viscous substance capable of causing obstruction to the flow in sewers.
- Water or wastes having a pH lower than 5.5, higher than 11.0, or having any other corrosive property capable of causing damage to the sewage works or its personnel.
- Water or wastes containing a toxic or poisonous substance of sufficient quantity to injure or interfere with any sewage treatment process or cause a hazard to humans or animals.
- Noxious or malodorous gas or explosive liquids or substance capable of endangering public property and safety, or creating a public nuisance.
- Dyes for tissue/slide staining (concentrated dyes need to be disposed of as hazardous liquid waste, however, diluted dye rinse solutions may be disposed of via drain with copious amounts of water before, during, and after disposal.)

TABLE 1: JABSOM KAKA'AKO DRAIN DISPOSAL RESTRICTIONS

Ethidium Bromide Solutions: <0.01% by weight and <2 quarts per day per laboratory
Phosphate Buffer Solutions: <10% by weight and <1 quart per day per laboratory
Salt Solutions: <10% by weight (sodium, potassium, lithium, ammonium: chlorides, carbonates, phosphates, sulfates, or acetates) < 2 quarts per day per laboratory
Dyes or Stains: Small, diluted amounts from slide rinsing. No concentrated solutions or significant volumes.
Alcohol Solutions: (methyl, ethyl, and isopropyl only) <10% by volume and <1 quart per day per laboratory
Formaldehyde Solutions (diluted): <3% by weight and <1 quart per day per laboratory
Sugar Solutions: <10% by weight and <2 quarts per day per laboratory
Amino Acids and their Salts in solution: <10% by weight and <2 quarts per day per laboratory
Citric and Lactic Acids and their Salts in solution: <10% by weight and <1 quart per day per laboratory.
Blood: <5 gal per day per lab of only non-infectious blood. Any tissue or other solid material must be filtered out.

- *Intentionally diluting wastes so that they can be poured down the drain is not permitted.*
- *The pH must be between 5.5 and 9.5.*
- *No solids/particulates, no infectious materials, and no radioactive materials may be allowed to go down the drain (unless specifically permitted to do so by the Radiation Safety Office.)*
- *NOTE: The percentage by weight or volume refers to a total of the items in any category. For example, a solution of 5% sodium chloride and 5% potassium chloride would meet the limit, while a solution of 10% sodium chloride and 5% potassium chloride would not. Similarly, a solution of 10% ethyl alcohol and 5% methyl alcohol would not meet the criteria for drain disposal. A solution of 10% ethyl alcohol and 10% sodium chloride would meet the criteria as they are in two different categories, but the volume permitted per day would be the lower of the two.*

IV. EMERGENCY SPILL PROCEDURES

Each lab/study must have a specific spill emergency plan in place and provide information and training to individuals working in your area regarding the plan. It is a requirement to post the emergency procedures and emergency phone numbers in the work area. All personnel working with hazardous chemicals should be able to answer the question:

"What would I do if this material spilled?"

Spill kits with instructions, absorbents, reactants, and protective equipment are required to be available to clean up minor spills. A **minor spill** is one that does not spread rapidly, does not endanger people or property except by direct contact, does not endanger the environment, and the workers in the area are capable of handling safely without the assistance of safety and emergency personnel. **All other chemical spills are considered major.**

The following are general procedures for the handling of all spills.

1. In the event of a spill, attend to anyone who may have been contaminated or hurt, if it can be done without endangering yourself.
2. Turn on the fume hood(s) and open windows where this can be done without endangering yourself.
3. If flammable materials are spilled, de-energize electrical devices if it can be done without endangering yourself.

A. Minor Spills

If you have any questions regarding spill clean up requirements, please contact the JABSOM Health and Safety Coordinator (692-1854) or the Environmental Health and Safety Office at the UH Manoa campus (808-956-8660).

- Take the time to put on the proper personal protective equipment for the job and ensure that is resistant to the spilled material.
- Neutralize acids and bases, if possible using neutralizing agents such as a compatible weak base or acid.
- Control the spread of liquids by containing the spill. Absorb liquids by adding appropriate absorbent materials, such as vermiculite or sand, from the spill's outer edges toward the center. Paper towels and sponges may also be used as absorbent material, but this should be done cautiously considering the character of the spilled material. Paper towels and sponges should never be used to clean up a flammable liquid or acid spill.

- Collect and contain the cleanup residue and all materials used to clean up the spill by placing it into a plastic bucket or other appropriate container. Properly label the container as "spill residue" with the chemical name of the spilled materials. Dispose of the spill residue as hazardous waste.
- Decontaminate the area and affected equipment. Ventilating the spill area may be necessary.
- Document what happened, why, what was done, and what was learned. Such documentation can be used to avoid similar instances in the future. Major incidents are almost always preceded by numerous near misses.

B. Major Spills

If the spill is major, contact the JABSOM Health and Safety Coordinator (692-1854), the Environmental Health and Safety Office at the UH Manoa Campus (808-956-8660), or the Fire Department (911). If the spill is after normal work hour (8 am to 4:30 pm) contact the Fire Department (911).

C. Reporting Requirements

After the initial spill response, contact the JABSOM Health and Safety Coordinator (692-1854) and/or the Environmental Health and Safety Office at the UH Manoa campus (808-956-8660) to determine whether there are any federal or state reporting requirements. Some reporting obligations are immediate, and must be made within 24 hours.

V. SPECIFIC INFORMATION ON THE DISPOSAL OF VARIOUS MATERIALS AND WASTE

The individual possessing or generating the material/waste retains the primary responsibility for the material/waste. The JABSOM Health and Safety Office can provide additional information on requirements and assistance in handling the materials. Specific information on various types of materials is given below.

BATTERIES: Lithium, nickel/cadmium or mercury batteries shall be stored at the hazardous waste accumulation site for contract disposal. Vehicle batteries are recyclable and arrangements with local vendors can be made. Operations and Maintenance handle disposal of batteries from State vehicles.

BIOLOGICAL MATERIALS: For biohazardous wastes, refer to the "Waste Disposal Guidelines for JABSOM Kaka'ako" (*Attachment 7*) or contact the JABSOM Health and Safety Office for information concerning the handling and disposal of biological materials.

COMPRESSED GASES: Compressed gas cylinders should be returned to the vendor. A return agreement with the vendor should be included in the contract. Without such an

agreement the return or disposal of the cylinders is difficult and very costly. Contact the JABSOM Health and Safety Coordinator for assistance.

CONTROLLED SUBSTANCES: The handling and disposal of controlled substances (i.e. drugs and other substances listed in 21 CFR 1308) are the responsibility of the permit holder. The JABSOM Health and Safety Office cannot accept controlled substances for disposal.

FLUORESCENT LIGHT BALLASTS: The Facilities Management Office removes non-leaking ballast. Ballast may contain PCBs, contact the JABSOM Health and Safety Coordinator (692-1854) for assistance concerning leaking ballast or any ballast known to contain PCBs.

FLUORESCENT LIGHT TUBES: The JABSOM Facilities Management Office is responsible for the removal and disposal of fluorescent light tubes.

HAZARDOUS CHEMICALS AND HAZARDOUS WASTE: The JABSOM Health and Safety Coordinator will bi-annually hire a contractor to dispose of hazardous wastes. Efforts should be made to determine if others could use excess hazardous chemicals in the department or facility prior to submitting for contract disposal. Chemicals considered non-hazardous waste (see "Non-hazardous Waste" below) could be disposed of in the municipal sanitary landfill or sanitary sewer.

MERCURY: Items containing functional mercury (e.g. light switches, barometers and thermometers) shall be stored at a hazardous waste accumulation site for contract disposal.

MIXED WASTE: Mixed waste is defined as materials that possess a radioactive or biological hazard as well as an unrelated chemical hazard (e.g. potassium dichromate solution contaminated with Carbon-14). Contact JABSOM Health & Safety Coordinator (692-1854) for assistance in the proper disposal of these materials.

NON-HAZARDOUS WASTE: Listed in Table 2 below are typical laboratory chemicals that are not considered hazardous wastes by the U.S. Environmental Protection Agency. If the facility's refuse contractor permits the disposal of the solid chemicals listed in Table 2 then they may be disposed of as ordinary trash. The container must have the chemical name on it and it should be marked "non-hazardous" to mitigate any concern by the refuse collectors. Alternatively, non-hazardous solid chemicals can be collected for disposal with the periodic hazardous waste disposal. Liquid chemicals or chemical solutions can only be disposed of to the sanitary sewer (i.e. "down the drain") if the requirements of the applicable County ordinances or the facility's Industrial Wastewater Discharge Permit are met. Contact JABSOM EHSO if you have chemicals that you believe may be non-hazardous for a determination as to whether they may be disposed of as ordinary trash or in the sanitary sewer in small amounts.

TABLE 2: Non-Hazardous Waste

Sugars (e.g., sucrose, glucose, mannose)	Silica Gel
Starch	Alumina (aluminum oxide)
Naturally occurring Amino Acids	Calcium Fluoride
Citric Acid and its Sodium, Potassium, Magnesium, Calcium and Ammonium Salts.	Lactic Acid and its Sodium, Potassium, Magnesium, Calcium and Ammonium, Salts
Sodium, Potassium, Calcium, Strontium, and Ammonium Sulfates	Sodium, Potassium, Calcium, Magnesium, Strontium and Ammonium Phosphates
Sodium, Potassium, Magnesium and Ammonium Chlorides	Sodium, Potassium, Magnesium, and Calcium Borates
Silicon Dioxide	Sodium, Potassium, Ammonium Acetates
Boron, Magnesium, Copper Oxides	Sodium, Potassium, Magnesium, Calcium , and Ammonium Carbonates

OILS AND TRANSFORMER FLUID: The Facilities Management Office will assist with disposal of used pump oil. Used motor oil is recyclable through local vendors. Operations and Maintenance handle used motor oil from University vehicles.

Transformer fluid will be handled on a case-by-case basis. The following requirements apply to used oil:

- Used oil may only be stored in containers that are in good condition and not leaking.
- Containers, aboveground storage tanks, and fill pipes must be labeled or marked clearly with the words “**Used Oil.**”
- Upon detection of a release of used oil, a generator must stop the release, contain the used oil, clean up and manage properly the used oil and other materials, and if necessary, repair or replace any leaking used oil storage containers. If a release of used oil occurs, contact the JABSOM Health and Safety Coordinator for information regarding cleanup, and special regulatory reporting requirements which may apply.

PHOTOGRAPHIC CHEMICALS: Photographic fixer must be stored in a capped container and labeled, “Fixer for Recycling”. Photographic fixer solution may contain silver salts after use. Silver is an EPA toxic characteristic waste and must be recycled or disposed of as a hazardous waste. If your facility has a silver recovery unit, it should be

used to process the used fixer in accordance with the manufacturing instructions. This would include ensuring that the effluent from the unit meets the requirements for safe drain disposal and that the unit filter, when full, is sent for recycling. If your facility does not have a silver recovery unit, there are contractors who will furnish one for a fee or for the value of the silver recovered. Alternatively, the used fixer solution can be handled and disposed of as a hazardous waste.

RADIOACTIVE MATERIALS: Contact the EHSO Radiation Safety Officer (956-6475) for information concerning the proper handling and disposal of radioactive material.

SHARPS AND GLASSWARE: See *Waste Disposal Guidelines for JABSOM Kaka'ako (Attachment 7)* for proper handling and disposal of sharps and glassware.

UNKNOWN: To dispose of any "unknown" hazardous (or potentially hazardous) material, please contact the JABSOM Health and Safety Coordinator for assistance. "Unknown" potentially hazardous materials require testing to identify the material's hazardous properties so that it may be disposed of properly. Principle Investigator's will be charged \$70 to test an "unknown" potentially hazardous material.

VI. HAZARDOUS WASTE MINIMIZATION

A. **Buying Chemicals in Smaller Amounts**

The "large economy size" may cost less to buy, but costs to dispose of any unused or excess materials, in most cases, are several times the initial cost of the material. In many cases containers of excess or waste chemicals sent for disposal are full or 3/4 full. All chemical users should accurately estimate the amount of chemical they expect to use to complete the job and only purchase what they will need in a relatively short time frame. For example purchasing large amounts of chemicals that may be used over a ten to twenty year time frame is not recommended. Chemicals can deteriorate and become dangerous over time as well as incur substantial costs to be disposed of. EHSO recommends that chemical users only store a one to two year supply of chemicals.

B. **Recycling and Redistribution**

Efforts should be made to find someone in the laboratory or department who can use the hazardous material before it is submitted to the JABSOM EHSO as waste for contract disposal. Subsequently, unopened chemicals that still have a two year or more shelf life, and are in their original container with the original label can be submitted on the UH Electronic Swap Meet website for recycling (<http://www.hawaii.edu/ehso/hazmat/material.htm>).

C. **Use of Less Hazardous or Non-hazardous Materials**

The following provides some examples of the use of less hazardous or non-hazardous materials. All are encouraged to think of alternatives that may be applicable to their research or instructional materials.

1. **Cleaning Solutions:** Chromerge, chromic acid and dichromate cleaning solutions are not desirable from a waste disposal prospective, as they cannot be made non-hazardous and are expensive to dispose of. There are many non-toxic biodegradable cleaning solutions that can be used instead of chromic acid. For extremely dirty glassware a product called Nochromix, which uses sulfuric acid and an organic oxidizer in place of chromium can be used. While this requires neutralization of the acid for ordinary disposal, it is far less costly to dispose of than chromium solutions. A number of alternative cleaning solutions are: NoChromix, Alconox, Liquinox liquid detergent, Citranox, Fisherbrand sparkleen, and FL-70 Concentrate.
2. **Drying Agents:** The safest common drying agents are calcium chloride, silica gel, molecular sieves and calcium sulfate (Drierite). These are recommended because of their low toxicity and stability. Drying agents that pose varying degrees of hazard and disposal problems include:
 - Phosphorus pentoxide, which generates highly corrosive phosphoric acid and heat on contact with water. This material also has to be disposed of as a hazardous waste.
 - Magnesium perchlorate (Dehydrite), which is a strong oxidizer and may cause fires or explosions on contact with organic materials. This material has to be disposed of as a hazardous waste.
3. **Thermometers:** Mercury thermometers should be replaced with non-mercury thermometers whenever possible. Broken mercury thermometers create spills that are a potential hazard, time consuming to clean up, and are one of the most expensive hazardous wastes to dispose. Non-mercury thermometers with equivalent accuracy are available for temperature ranges of 0° to 250° Centigrade. Contact the JABSOM Health and Safety Coordinator or check your laboratory supply catalog for more information. If mercury-containing equipment is used, then a mercury spill kit and personnel knowledgeable in its use is required in the laboratory or facility.

ATTACHMENT 1

PROCUREMENT AUTHORIZATION FOR HAZARDOUS MATERIALS

An approved (signed) copy of this form must accompany any request, purchase order or requisition for the procurement of all hazardous materials.

NAME: _____
(Instructor/Program Coordinator)

DEPARTMENT: _____ **PHONE NO., EXT.:** _____

LOCATION: _____

Chemical Name	Solid/Liquid/ Gas	Amount (gallon, lbs)	Usage Plan	Estimated Usage Period

Program Coordinator _____ **DATE:** _____
(Signature)

Dean/Director approval _____ **DATE:** _____
(Signature)

PLEASE SEND THE COMPLETED FORM TO: JABSOM Health and Safety Coordinator
(phone: 808-692-1854, fax: 808-692-1957)

FOR OVERALL PROGRAM COORDINATOR USE ONLY

APPROVAL: _____ **DATE:** _____
(Program Coordinator)

APPROVAL NO.: _____

ATTACHMENT 2

**UNIVERSITY OF HAWAII, JOHN A. BURNS SCHOOL OF MEDICINE AT KAKAAKO
ENVIRONMENTAL HEALTH & SAFETY OFFICE
HAZARDOUS MATERIAL MANAGEMENT PROGRAM
APPROVAL FOR THE USE OF HAZARDOUS MATERIAL**

1. **Principal Investigator:** _____

2. **Project Title:** _____

3. If your project will involve any of the types of hazardous materials listed below, please provide a list of the chemical name(s) and approximate amounts of the materials to be used, information on how the material will be used and stored, also information on any special safety measures that will be taken. The information is needed to ensure the materials are stored, used and disposed of in accordance with the applicable Federal and State regulations.

a) **Explosive materials** (e.g., ammonium perchlorate, picric acid or picrates, azides, acetylides or fulminates of heavy metals, aromatic di or tri nitro compounds such as dinitrophenol or trinitrotoluene, nitroglycerine, RDX and tetrazene).

b) **Water reactive chemicals** (e.g., alkali metals such as sodium, potassium or lithium; metal hydrides such as lithium aluminum hydride, sodium borohydride or lithium hydride; calcium carbide, ethyldichlorosilane and phosphides).

c) **Flammable or poison gases** (e.g. methane, ethylene, chlorine, phosgene and hydrogen sulfide).

d) **Organic peroxides** (e.g., methyl ethyl ketone peroxide or peracetic acid).

e) **Highly toxic materials** (e.g., cyanides, osmium tetroxide, phosphorus, strychnine, pentaborane, or any material with a LD₅₀ [oral rat] of 50mg/kg or less).

f) **Flammable liquids** (i.e., materials with a flash point of 140 degrees Fahrenheit or less) in quantities of 60 gallons or more at any one time.

4. If your project will involve the use of controlled substances (i.e., materials listed in 21 CFR 1308 by the U.S. Drug Enforcement Agency such as cocaine, chloral hydrate, morphine, and sodium barbital), provide the number of the required Federal or State permit for possession and use of these materials.

5. I agree to: (1) comply with the University of Hawaii John A. Burns School of Medicine at Kakaako Hazardous Material Management Program (HMMP) requirements and any additional requirements provided by the Environmental Health and Safety Office that are necessary to ensure compliance with Federal and State regulations, (2) inform the Environmental Health and Safety Office if there are any amendments to the project which affect the types of hazardous material listed above, and (3) transfer or properly dispose of all my hazardous material as specified in the HMMP prior to leaving the University or transferring to a different laboratory. I believe the above information is accurate and complete.

PRINCIPAL INVESTIGATOR

DATE

DEPARTMENT CHAIRPERSON

DATE

PLEASE SEND THE COMPLETED FORM TO: JABSOM EHSO 651 Ilalo Street, BSB 112. The JABSOM Health and Safety Coordinator can be contacted at 692-1854 or email jabsom-ehso@hawaii.edu if you have questions.

6. The use of the hazardous materials listed above is approved subject to the special requirements listed below.

JABSOM Health and Safety Coordinator

DATE

SPECIAL REQUIREMENTS:

ATTACHMENT 3

LIST OF CHEMICALS REQUIRING ENVIRONMENTAL HEALTH & SAFETY OFFICE (EHSO) APPROVAL TO PURCHASE

Because the following chemicals are highly toxic, explosive, water reactive or for other reasons very difficult and expensive to dispose of (disposal costs can be more than \$1000 per container), their use needs to be minimized and monitored. Contact JABSOM EHSO (692-1854) for further information.

Arsine	Methyl Amine
Boron Trichloride	Methyl Bromide
Boron Trifluoride	Methyl Chloride
Bromine Chloride	Methyl Lithium
Butyl Lithium	Nitric Oxide
Carbon Monoxide	Nitrogen Dioxide
Carbonyl Sulfide	Nitrogen Trifluoride
Cesium	Phosgene
Calcium Hydride	Phosphine
Chlorine	Phosphorus
Chlorine Trifluoride	Picfume
Chloropicrin	Picric Acid
Cyanogen	Picryl Sulfonic Acid
Cyanogen Chloride	Picramide
Diborane	Potassium
3,5-Dinitrophenol	Rubidium
2,4-Dinitrophenylhydrazine	Silane
3,5-Dinitrosalicylic Acid	Silane Dichloride
Ethylene Oxide	Sodium
Fluorine	Sulfur Dioxide
Hydrogen Bromide	Trinitroaniline
Hydrogen Chloride	Trinitrobenzene
Hydrogen Cyanide	Trinitrocresol
Hydrogen Fluoride	Trinitronaphthalene
Hydrogen Sulfide	Trinitrophenol
Lithium	Trinitrotoluene
Lithium Aluminum Hydride	Urea Nitrate
Lithium Hydride	Vinyl Chloride

ATTACHMENT 5

Procedure for Making Hazardous Waste Determinations

All wastes must be screened to determine whether they are hazardous. A hazardous waste is one which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. The EPA has determined that the following meet the definition of a hazardous waste:

- a) A waste which is listed as hazardous in the regulations (40 CFR 261);*
- b) A mixture that includes a listed hazardous waste; or
- c) A waste which exhibits any of the four following characteristics; ignitability, corrosivity, reactivity, or toxicity.

*NOTE: the complete text of the hazardous waste regulations is available online at www.epa.gov/epahome/cfr40.htm

The following procedures must be used to determine if a waste is hazardous. If it is, the procedures will identify the appropriate EPA hazardous waste number for each waste, which will in turn determine disposal requirements:

- (i.) Determine the proper name of the waste and its specific source.
- (ii.) Check the EPA's hazardous waste lists in the following order:
 - (a.) "U" list of toxic wastes (40 CFR 261.33f).
 - (b.) "P" List of acutely hazardous waste (40 CFR 261.33e).
 - (c.) "K" List of hazardous wastes from specific sources (40 CFR 261.32).
 - (d.) "F" List (40 CFR 261.31) for a non-specific source of waste.
- (iii.) If the waste is not one the "U" List, the "P" List, the "K" List or the "F" List, you must determine whether the waste exhibits any of following four characteristics:
 - (a.) Ignitability. A waste that exhibits the characteristic of ignitability has the EPA hazardous waste number of D001. See 40 CFR §261.20.
 - (b.) Corrosivity. A waste that exhibits the characteristic of corrosivity has the EPA hazardous waste number of D002. See 40 CFR §261.22.
 - (c.) Reactivity. A waste that exhibits the characteristic of reactivity has the EPA hazardous waste number of D003. See 40 CFR §261.23.
 - (d.) Toxicity. A waste that exhibits the characteristic of reactivity will have and the EPA hazardous waste number of D004 through D043. See 40 CFR §261.24.

ATTACHMENT 6

LIST OF ACUTELY HAZARDOUS WASTE (P-CODED WASTE)

The following materials are hazardous wastes if and when they are intended to be discarded (40 CFR 261.33):

1. Any commercial chemical product, or manufacturing chemical intermediate having the generic name listed below.
2. Any off-specification commercial chemical product or chemical intermediate having the generic name listed below.
3. Any residue remaining in a container that is not empty. P-coded containers must have their contents removed and be triple rinsed with an appropriate solvent before they are legally empty and no longer regulated.
4. Any residue resulting from the clean-up of a spill of a P-coded waste.
5. The phrase "commercial chemical product or manufacturing chemical intermediate having a generic name listed below" refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient.

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P023	107-20-0	Acetaldehyde, chloro-
P002	591-08-2	Acetamide, N-(aminothioxomethyl)-
P057	640-19-7	Acetamide, 2-fluoro-
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P002	591-08-2	1-Acetyl-2-thiourea
P003	107-02-8	Acrolein
P070	116-06-3	Aldicarb
P203	1646-88-4	Aldicarb sulfone.
P004	309-00-2	Aldrin
P005	107-18-6	Allyl alcohol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-Aminopyridine
P009	131-74-8	Ammonium picrate (R)
P119	7803-55-6	Ammonium vanadate

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium
P010	7778-39-4	Arsenic acid H[INF]3[/INF] AsO[INF]4[/INF]
P012	1327-53-3	Arsenic oxide As[INF]2[/INF] O[INF]3[/INF]
P011	1303-28-2	Arsenic oxide As[INF]2[/INF] O[INF]5[/INF]
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic trioxide
P038	692-42-2	Arsine, diethyl-
P036	696-28-6	Arsonous dichloride, phenyl-
P054	151-56-4	Aziridine
P067	75-55-8	Aziridine, 2-methyl-
P013	542-62-1	Benzenamine, 4-chloro-
P077	100-01-6	Benzenamine, 4-nitro-
P028	100-44-7	Benzene, (chloromethyl)-
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P014	108-98-5	Benzenethiol
P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1).
P001	81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P028	100-44-7	Benzyl chloride
P015	7440-41-7	Beryllium powder
P017	598-31-2	Bromoacetone
P018	357-57-3	Brucine
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino]carbonyl oxime
P021	592-01-8	Calcium cyanide
P021	592-01-8	Calcium cyanide Ca(CN)[INF]2[/INF]
P189	55285-14-8	Carbamic acid, [(dibutylamino)thio]methyl-, 2,3-dihydro-2,2-dimethyl- 7-benzofuranyl ester

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]- 5-methyl-1H- pyrazol-3-yl ester.
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H- pyrazol-5-yl ester.
P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester.
P127	1563-66-2	Carbofuran.
P022	75-15-0	Carbon disulfide
P095	75-44-5	Carbonic dichloride
P189	55285-14-8	Carbosulfan.
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	p-Chloroaniline
P026	5344-82-1	1-(o-Chlorophenyl)thiourea
P027	542-76-7	3-Chloropropionitrile
P029	544-92-3	Copper cyanide
P029	544-92-3	Copper cyanide Cu(CN)
P202	64-00-6	m-Cumenyl methylcarbamate.
P030	Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P033	506-77-4	Cyanogen chloride
P033	506-77-4	Cyanogen chloride (CN)Cl
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P016	542-88-1	Dichloromethyl ether
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P038	692-42-2	Diethylarsine
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	55-91-4	Diisopropylfluorophosphate (DFP)
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro- 1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8 abeta)-1 1 1
P060	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro- 1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8ab eta)-

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2alpha,3beta,6beta,6aalpha,7beta, 7aalpha)-
P051	72-20-8	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta, 7aalpha)-, & metabolites
P044	60-51-5	Dimethoate
P046	122-09-8	alpha,alpha-Dimethylphenethylamine
P191	644-64-4	Dimetilan.
P047	534-52-1	4,6-Dinitro-o-cresol, & salts
P048	51-28-5	2,4-Dinitrophenol
P020	88-85-7	Dinoseb
P085	152-16-9	Diphosphoramidate, octamethyl-
P111	107-49-3	Diphosphoric acid, tetraethyl ester
P039	298-04-4	Disulfoton
P049	541-53-7	Dithiobiuret
P185	26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O- [(methylamino)-carbonyl]oxime.
P050	115-29-7	Endosulfan
P088	145-73-3	Endothall
P051	72-20-8	Endrin
P051	72-20-8	Endrin, & metabolites
P042	51-43-4	Epinephrine
P031	460-19-5	Ethanedinitrile
P194	23135-22-0	Ethanimidothioc acid, 2-(dimethylamino)-N-[[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester.
P066	16752-77-5	Ethanimidothioic acid, N-[[[(methylamino)carbonyl]oxy]-, methyl ester
P101	107-12-0	Ethyl cyanide
P054	151-56-4	Ethyleneimine
P097	52-85-7	Famphur
P056	7782-41-4	Fluorine
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Fluoroacetic acid, sodium salt
P198	23422-53-9	Formetanate hydrochloride.
P197	17702-57-7	Formparanate.
P065	628-86-4	Fulminic acid, mercury(2+) salt (R,T)

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P059	76-44-8	Heptachlor
P062	757-58-4	Hexaethyl tetraphosphate
P116	79-19-6	Hydrazinecarbothioamide
P068	60-34-4	Hydrazine, methyl-
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P096	7803-51-2	Hydrogen phosphide
P060	465-73-6	Isodrin
P192	119-38-0	Isolan
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate.
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-
P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S[prime])-
P196	15339-36-3	Manganese dimethyldithiocarbamate.
P092	62-38-4	Mercury, (acetato-O)phenyl-
P065	628-86-4	Mercury fulminate (R,T)
P082	62-75-9	Methanamine, N-methyl-N-nitroso-
P064	624-83-9	Methane, isocyanato-
P016	542-88-1	Methane, oxybis[chloro-
P112	509-14-8	Methane, tetranitro- (R)
P118	75-70-7	Methanethiol, trichloro-
P198	23422-53-9	Methanimidamide, N,N-dimethylN[prime]-[3-[[[(methylamino)-carbonyl]oxy]phenyl]-monohydrochloride.
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N[prime]-[2-methyl-4-[[[(methylamino)carbonyl]oxy]phenyl]-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-,3-oxide3
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P199	2032-65-7	Methiocarb.
P066	16752-77-5	Methomyl
P068	60-34-4	Methyl hydrazine
P064	624-83-9	Methyl isocyanate
P069	75-86-5	2-Methylactonitrile
P071	298-00-0	Methyl parathion
P190	1129-41-5	Metolcarb
P128	315-8-4	Mexacarbate
P072	86-88-4	alpha-Naphthylthiourea

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P073	13463-39-3	Nickel carbonyl
P073	13463-39-3	Nickel carbonyl Ni(CO) ₄ , (T-4)-
P074	557-19-7	Nickel cyanide
P074	557-19-7	Nickel cyanide Ni(CN) ₂
P075	54-11-5	Nicotine, & salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P076	10102-43-9	Nitrogen oxide NO
P078	10102-44-0	Nitrogen oxide NO ₂
P081	55-63-0	Nitroglycerine (R)
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P085	152-16-9	Octamethylpyrophosphoramidate
P087	20816-12-0	Osmium oxide OsO ₄ , (T-4)-
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P194	23135-22-0	Oxamyl.
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	51-28-5	Phenol, 2,4-dinitro-
P047	534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester).
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate.
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate.
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P094	298-02-2	Phorate
P095	75-44-5	Phosgene
P096	7803-51-2	Phosphine
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P204	57-47-6	Physostigmine.
P188	57-64-7	Physostigmine salicylate.
P110	78-00-2	Plumbane, tetraethyl-
P098	151-50-8	Potassium cyanide
P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Potassium silver cyanide
P201	2631-37-0	Promecarb
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime.
P101	107-12-0	Propanenitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal
P005	107-18-6	2-Propen-1-ol
P067	75-55-8	1,2-Propylenimine
P102	107-19-7	2-Propyn-1-ol
P008	504-24-5	4-Pyridinamine
P075	54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-,methylcarbamate (ester), (3aS-cis)-.
P114	12039-52-0	Selenious acid, dithallium(1+) salt

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P104	506-64-9	Silver cyanide Ag(CN)
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P106	143-33-9	Sodium cyanide Na(CN)
P108	57-24-9	Strychnidin-10-one, & salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
P108	57-24-9	Strychnine, & salts
P115	7446-18-6	Sulfuric acid, dithallium(1+) salt
P109	3689-24-5	Tetraethyldithiopyrophosphate
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Tetraethyl pyrophosphate
P112	509-14-8	Tetranitromethane (R)
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide Tl_2O_3
P114	12039-52-0	Thallium(I) selenite
P115	7446-18-6	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic diamide $[(H_2N)_2C(S)]_2NH$
P014	108-98-5	Thiophenol
P116	79-19-6	Thiosemicarbazide
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P072	86-88-4	Thiourea, 1-naphthalenyl-
P093	103-85-5	Thiourea, phenyl-
P185	26419-73-8	Tirpate.
P123	8001-35-2	Toxaphene
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium oxide V_2O_5
P120	1314-62-1	Vanadium pentoxide
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-
P001	81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-S,S[prime])-
P121	557-21-1	Zinc cyanide
P121	557-21-1	Zinc cyanide $Zn(CN)_2$

Hazardous No.	Chemical waste abstracts No. (CAS)	Substance
P122	1314-84-7	Zinc phosphide Zn ₃ P ₂ , when present at concentrations greater than 10% (R,T)
P205	137-30-4	Ziram

ATTACHMENT 7

Waste Disposal Guidelines for JABSOM Kaka`ako

These guidelines will assist you with determining how to properly dispose of materials and supplies that are commonly used in research laboratories. These procedures are specific for JABSOM Kaka`ako but may refer to more general guidelines as well. If you have any questions, please contact the [JABSOM EHSO](#) (692-1854/692-1855) or contact the various Safety Programs at [UH EHSO Safety Programs](#).

RADIOACTIVE WASTES

Radioactive Sharps, Liquids, Solids and Radioactive Mixed (with Biological and/or Chemical) Wastes

- Contact the EHSO [Radiation Safety Program](#) (808-956-6475) for assistance with the proper disposal of these materials.

SHARPS (Infectious Biological, Chemical, Non-Contaminated)

GLASS

Non-Contaminated Broken Glass

- Place in a plastic bag lined puncture resistant (ex: cardboard) box → When box is full, tape box closed → Write "BROKEN GLASS" on the outside of the box → Label with P.I. name, location, phone number → Dispose in the trash compactor. These items cannot be recycled. Do not leave these items left sitting outside of the trash compactor; if trash compactor is full, contact security at 692-0911.

METAL SHARPS

Biological Contaminated METAL Sharps (ex: hypodermic needles with syringes/tubing, blades, scalpels, razors, lancets, etc.)

- Place in RED BIOHAZARDOUS SHARPS CONTAINER → When container is full, strap lid with autoclave tape → Label as "METAL SHARPS" → Label with P.I. name, location, phone number → Autoclave → Contact [JABSOM EHSO](#) for pick up.

Chemical Contaminated METAL Sharps (ex: hypodermic needles with syringes/tubing, blades, scalpels, razors, lancets, etc.)

- Rinse with water and collect this contaminated liquid (this liquid is hazardous, follow procedure for chemical waste) if this can be done safely → Place the sharp in a puncture proof, leak proof container → Label as "CHEMICAL METAL SHARPS" → Label with P.I. name, location, phone number → Contact [JABSOM EHSO](#) for pick up.

Mixed (Biological & Chemical) Contaminated METAL Sharps

- Place in RED BIOHAZARDOUS SHARPS CONTAINER → Label as "CHEMICAL/BIOLOGICAL METAL SHARPS" → Label with P.I. name, location, and

phone number → Contact [JABSOM EHSO](#) (692-1855) for assistance with proper treatment and disposal.

PIPETS

Non-Contaminated Pipets/Pipet Tips (Glass or Plastic)

- Place in puncture proof container (ex: detergent bottle, cardboard box lined with plastic bag, etc.) → When container is full, secure top or lid with tape → Label container as “*NON-HAZARDOUS, NON-METAL SHARPS*” → Label with P.I. name, location, and phone number → Dispose container in the trash compactor. Do not leave these items left sitting outside of the trash compactor; if trash compactor is full, contact security at 692-0911.

Biological Contaminated Pipets/Pipet Tips (Plastic Only)

- Place in autoclavable Red Biohazard Bag (put a strip of autoclave tape on the bag) → Autoclave & Let cool completely → Place into a plastic trash bag → Dispose in trash compactor or place in sealed cardboard box labeled with P.I. name, location, and phone number, and place on cart outside of autoclave room for custodians to dispose of.

Biological Contaminated GLASS Pasteur Pipets, Cover Slips, Slides, etc.

- Place in autoclavable puncture proof container (put a strip of autoclave tape on the container) → Autoclave, let cool completely → Label container as “*NON-METAL SHARPS*” → Dispose in trash compactor or place in sealed cardboard box labeled with P.I. name, location, and phone number, and place on cart outside of autoclave room for custodians to dispose of.

Chemical Contaminated Pipet Tips (Plastic)

- Rinse with water and collect this contaminated liquid (this liquid is hazardous, follow procedure for chemical waste) → Place the sharp in a puncture proof container → Label with P.I. name, location, and phone number → Label as “*NON-METAL SHARPS*” → Contact [JABSOM EHSO](#) to dispose of.

MIXED BIOLOGICAL & CHEMICAL WASTES

Mixed Biological & Chemical Contaminated Liquids (ex: Cyclohexamide, Cyanides, etc.)

- Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal of these items.

Mixed (Biological & Chemical) Contaminated Pipets/Pipet Tips

- Rinse with water and collect this contaminated liquid (this liquid is handled as hazardous waste) → Place the sharp in a puncture proof, leak proof container → Label with P.I. name, location, and phone number → Label as “*BIOLOGICAL/CHEMICAL NON-METAL SHARPS*” → Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal.

Mixed (Biological & Chemical) Contaminated METAL Sharps

- Place in RED BIOHAZARDOUS SHARPS CONTAINER → Label as “*CHEMICAL/BIOLOGICAL METAL SHARPS*” → Label with P.I. name, location, and

phone number → Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal.

Mixed (Biological & Chemotoxic) Contaminated Solids (*neoplastic, genotoxic, pharmaceutical experimental drugs*)

- Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal of these items.

BIOLOGICAL or INFECTIOUS WASTES

Non-Infectious Blood and Urine

- Filter out solids and dispose solids as non-infectious solid waste → Liquid may go down the drain with copious amounts of water → Limit is 5 gallons per day per lab.

Biological Contaminated Liquids (*ex: liquid tissue culture media, animal or human blood and blood elements, animal or human body fluids, etc.*) **Observe any more stringent requirements per permitting or other regulatory agency.**

- Filter out solids → Contact [JABSOM EHSO](#) for assistance with treatment and disposal of solids → Treat liquid according to your project requirements (i.e. autoclave or chemically treat) → Once disinfected, flush down sink drain with large amount of water.

Biological Contaminated Solid Materials (*gloves, petri dishes, Kim wipes, tissue culture flasks, etc.*) **Observe any more stringent requirements per permitting or other regulatory agency.**

- Place in doubled autoclavable polypropylene bags (put a strip of autoclave tape on the bag) → Autoclave within a secondary autoclavable tray in a spore tested autoclave at 121° C for 60 minutes → Let cool and ensure no leakage or puncture of the bags → Place into black plastic trash bags and affix the cycle receipt tape for verification of decontamination → Dispose in trash compactor or place in sealed cardboard box labeled with P.I. name, location, and phone number, and place on cart outside of autoclave room for janitors to dispose of.

Unpreserved Tissues, Whole Body, and Body Parts (Vertebrate, Invertebrate)

- Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal of these items.

Human Body Parts and Organs (Recognizable)

- Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal of these items.

Animal Tissues, Whole Body, and Body Parts

- Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal of these items.

CHEMICAL WASTES

Hazardous Chemical Waste

- Refer to the [Hazardous Material Management Program \(HMMP\)](#) for information on surplus chemicals, hazardous and non-hazardous chemical wastes, compressed gasses and/or cylinders, and wastes generated by facilities operations. You may also contact the [JABSOM EHSO](#).
- Complete the [Kaka`ako Hazardous Waste Turn-In Form](#) JABSOM EHSO jabsom-ehso@hawaii.edu.

Chemical Preserved Tissue Specimens (Animal & Plant)

- Separate solid from liquid → Dispose of liquid as hazardous chemical waste → Contact [JABSOM EHSO](#) for assistance with proper treatment and disposal of solid.

OTHER WASTE CATEGORIES

For other WASTE CATEGORIES such as Oil, Light Bulbs, Paint, Freon Containing Wastes, Batteries, Computers, etc. please go to [Waste Categories](#) or refer to the JABSOM [Hazardous Material Management Program \(HMMP\)](#).

Household batteries may go into the regular trash.

Nickel-cadmium batteries, lithium batteries, laptop batteries, microscope light bulbs, ballasts potentially containing PCBs, mercury containing switches/relays/bulbs, UV light tubes/bulbs/lamps, used pump oil, must be turned in as hazardous waste to JABSOM EHSO.

Contact JABSOM EHSO about unwanted lab equipment.

Fluorescent light tubes must be turned in to Facilities.

Contact Facilities about old computer equipment or unwanted lab furniture, office furniture, or office/break room equipment.

NOTES:

1. In the event that a laboratory's primary autoclave is not operational, the waste to be autoclaved shall be autoclaved at the nearest secondary autoclave and transported there in a closed-top, puncture proof, leak proof container. In the event that both the primary and secondary autoclaves are not operational, store biological waste in a laboratory refrigerator, freezer, or cold room until the autoclaves are operational. If this cannot be done, please call the [JABSOM EHSO](#) or the [UH Biological Safety Program](#) (956-3197).

2. Chemical Unknowns: For all unknowns, please contact [JABSOM EHSO](#) or the [UH Hazardous Materials Management Program](#) (956-3198).

