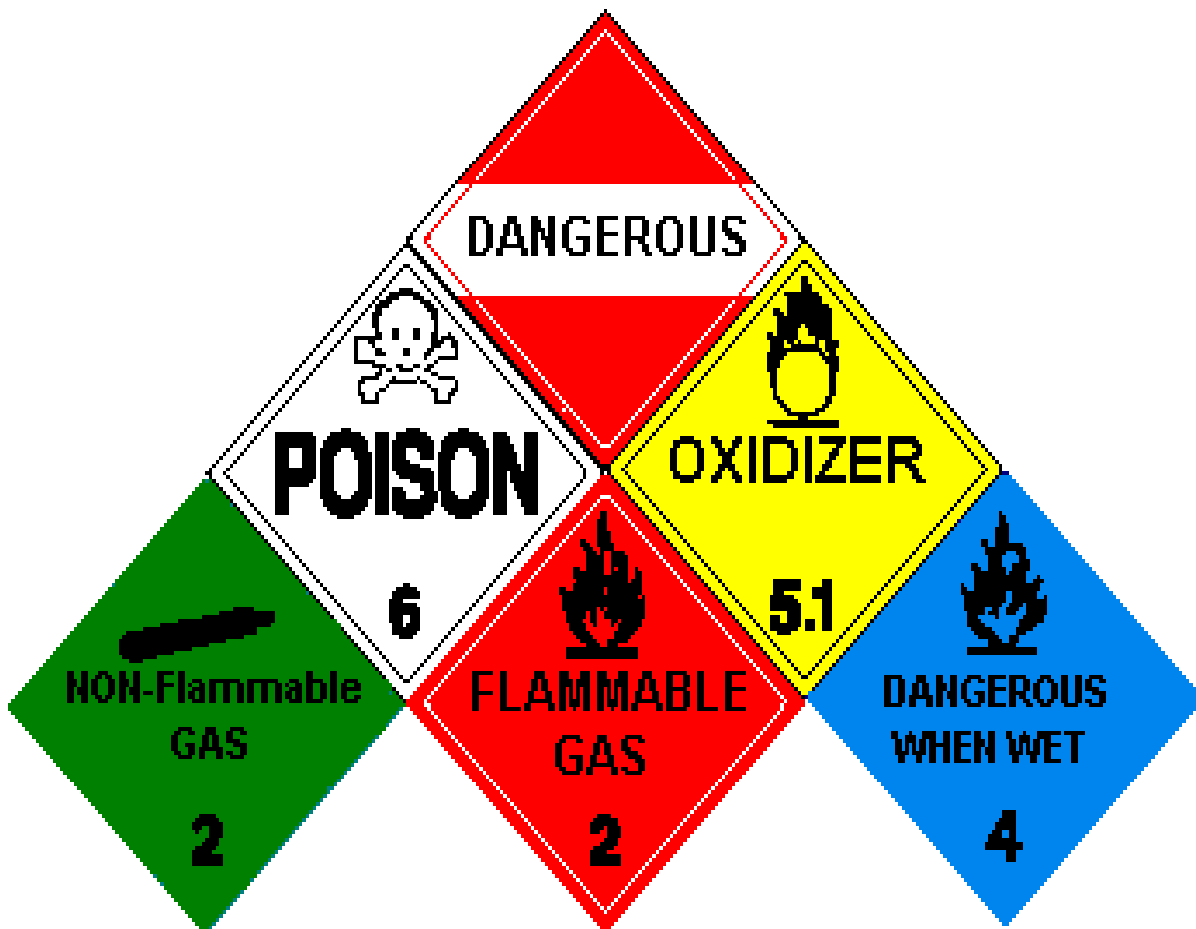


# UNIVERSITY OF HAWAII AT MANOA



## Hazardous Material Management Program

MAY 2022



May 24, 2022

Dear Colleagues:

A safe and healthy environment in which the faculty, staff and students work and study is one of the highest priorities on the Mānoa campus. Our students and employees should be able to go about their daily activities knowing that hazardous materials in our laboratories and workplaces are handled safely, with competence, and with the utmost concern for our health and a commitment to protect our environment. As an institution, we comply with applicable federal, state and local regulations that govern the use of hazardous materials and the disposal of hazardous wastes.

To assist us with compliance with applicable laws, rules and regulations, the UH Mānoa Hazardous Material Management Program (HMMP) manual has been revised by the Environmental Health & Safety Office. The manual is being distributed for immediate implementation. This manual has been prepared with everyone's safety in mind and is a definitive guide to handling hazardous materials and disposing of hazardous wastes. Our campus efforts and the requirements in this manual comply with the law and ensure the personal health and safety of everyone on campus. We all need to be aware of our responsibilities in these areas.

Mahalo to each of you for ensuring we comply with this manual, implement sound practices and follow established procedures to maintain a safe workplace and to protect our work and study environment.

Sincerely,

A handwritten signature in cursive script that reads 'Michael Bruno'.

Michael Bruno  
Provost

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## ATTACHMENTS

Attachment 1: Authorization for Hazardous Materials

Attachment 2: List of Acutely Hazardous Waste

Attachment 3: Excess Hazardous Materials & Hazardous Waste Turn in Form

# HAZARDOUS MATERIAL MANAGEMENT PROGRAM

## I. INTRODUCTION.

This manual provides information on the requirements for the management of hazardous materials, including the disposal of hazardous waste. These requirements are based on Federal and State of Hawaii regulations. Failure to comply with these requirements may subject the University and/or individuals to fines, and civil or criminal prosecution. In addition, the proper management of hazardous materials is necessary to reduce disposal costs. While the disposal of all material as hazardous waste is expensive, there are certain materials that require special attention to minimize the difficulty and expense of their disposal. A copy of this Hazardous Material Management Program along with other useful information is available online at the University's website (<http://www.hawaii.edu/ehso/hazardous-materials-management-materials-waste-forms/>).

## II. MANAGEMENT OF HAZARDOUS MATERIAL

Compliance with the following requirements will assist the UH Manoa Environmental Health and Safety Office (EHSO) in ensuring the proper management of certain types of hazardous chemicals. Our hazardous material management strategy is divided into four parts: Approval to purchase, safety in use, inventory control, and audits.

- A. Approval to Purchase Certain Hazardous Chemicals. EHSO approval is required for the purchase or requisition of the specific chemicals on the "List of Chemicals Requiring EHSO Approval to Purchase" provided in Attachment (1), as cited in the University's Administrative Procedures. The "Procurement Authorization for Hazardous Materials" form must be filled out and submitted to EHSO for approval prior to initiating a purchase order for any of the materials on the list. If approved, a copy of the form will be provided to you for attachment to your purchase order or requisition. The purpose of EHSO approval is to enable us to assist you in ensuring the safe storage, handling and disposal of the material while minimizing cost to the University.
- B. Safety in Use. Certain hazardous materials require Standard Operating Procedures (SOPs) to ensure the safe use and storage of these materials. The University Chemical Hygiene Plan (CHP) provides requirements for SOPs and describes the specific types of material covered.
- C. Inventory of Hazardous Material. The requirement for a total chemical inventory has been incorporated into the University Chemical Hygiene Plan (CHP). A copy of the inventory must be available at the laboratory/facility for review, but a copy does not have to be submitted to EHSO unless specifically requested.
- D. Audit Program. EHSO has established an audit program to assist in maintaining laboratories and facilities that are safe and protective of the environment. EHSO personnel will periodically visit laboratories and facilities to review the

implementation of applicable safety, health and environmental policies and requirements. Specifically, the following items will normally be covered: Use of personal protective equipment, emergency eyewashes and showers, laboratory chemical hoods, hazardous material storage, survey for highly hazardous materials or acutely hazardous waste, Safety Data Sheet availability, hazardous waste accumulation areas, and emergency plans. A report indicating any corrective actions that are necessary and suggesting any improvements will be provided.

**III. HAZARDOUS WASTE DISPOSAL REQUIREMENTS.** The following requirements apply to all generators of hazardous waste:

- A. Mandatory Training: Initial and annual refresher training is required for hazardous waste generators. The purpose of the training is to familiarize waste generators with EPA requirements and University policies and procedures. The EHSO Training Coordinator (x65180) to schedule training. Principal Investigators have the primary responsibility for the storage and disposal of excess hazardous material and waste in the laboratories. They can choose to train all of the workers in the laboratory as hazardous waste generators or they can designate an individual or individuals as the trained hazardous waste generator(s) for the laboratory. At least one person in each laboratory must have current hazardous waste generator training. In addition, all persons who generate waste in the laboratory must know who the designated trained hazardous waste generator is and the basic requirements for waste disposal (i.e. hazardous waste must be labeled and stored in the satellite accumulation area in a closed container and non-hazardous waste must be appropriately disposed). The Principal Investigator has the responsibility to ensure that all persons who generate waste know the basic requirements for waste disposal and that the satellite accumulation area is periodically monitored to verify that requirements are met. **EHSO will NOT pick up any hazardous material or hazardous waste unless the person who signs the material/waste turn-in form has been trained.**
- B. Waste Generator Responsibilities: The following outlines waste generator responsibilities.
1. Become familiar with the hazardous materials you use and the University's policies on hazardous materials and hazardous waste management.
  2. Obtain initial waste generator training.
  3. Comply with waste requirements. Store and label waste properly, complete the waste turn-in form correctly.
  4. Complete annual waste generator training, available online from the EHSO website.
  5. Contact EHSO, if in doubt about the requirements or how to properly dispose of waste.

- C. Establishment of a Satellite Accumulation Area (SAA): Each generator shall establish an identifiable area, with a posted sign for the collection of waste. The area must be at or near the point of generation of the waste (i.e., in the same room or in a connecting room where the waste is being generated). Up to 55 gallons of ordinary waste or one quart of Acutely Hazardous (P-coded) Waste may be accumulated over an indefinite period of time. A list of Acutely Hazardous Waste is provided in Attachment (2). The containers must be labeled and must be closed except when waste is actively being added to them. If the 55 gallon or one quart limit is reached, you must contact EHSO immediately. The SAA should be neat and orderly; containers should not be stacked upon one another or containers of liquid should not be stored on their side. The SAA must be clearly defined and material that is not waste cannot be in the SAA.
- D. Waste Containers: Containers used for waste must be in good condition (i.e. not rusting, without 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 material composition must be compatible with the material to be stored and incompatible materials must not be stored in the same container. Containers must have a secure closure (e.g., screw cap). Parafilm, glass or rubber stoppers are not considered secure closures. Containers of liquid waste must not be "overfilled". The maximum amount of liquid in the container must not exceed 90% of its capacity.
- E. Labeling: Normally all waste material shall be labeled with the word "waste" and the chemical name(s) of the waste (e.g., "waste methyl alcohol" or "waste ethidium bromide"). Generic names can be used if a separate list is maintained to indicate the chemical names and the approximate amounts (e.g., "waste chlorinated solvent bottle no 1" with a separate list "Bottle no. 1 Chloroform 50%, Methyl Chloroform 40%, Methylene Chloride 10%"). Chemicals which are unused or only partially used, in original containers, do not have to be labeled as waste if the manufacturers label provides the chemical name and specific hazards (e.g., flammable, corrosive or poison) associated with the material. The name of the chemical and other required data are entered on the Hazardous Material and Hazardous Waste Turn-in Form.
- F. Secondary Containments. Secondary containments are required for containers of liquid waste under the following circumstances:
1. When the waste is stored in 55-gallon drums.
  2. When the waste is stored on the floor.
  3. When the waste is stored in a hood which has a drain.
  4. When the waste is stored within four (4) feet of a sink.
  5. When necessary to separate incompatible or high hazard wastes.

Plastic tubs can be used as secondary containments. EHSO should be consulted about secondary containments for 55-gallon drums.

- G. Hazardous Material and Hazardous Waste Turn In Form. This form, Attachment 3, may be downloaded on our website at <http://www.hawaii.edu/ehso/hazardous-materials-management-materials-waste-forms/>. This form shall be emailed to [hazwaste@hawaii.edu](mailto:hazwaste@hawaii.edu) for waste pick-up requests. This form also provides the University with a permanent auditable record of the excess material and hazardous waste generated. Instructions for completing the form and the Weight & Volume Conversion Table are also provided in Attachment 3.
- H. Hazardous Waste Disposal Costs. The cost of hazardous waste disposal for the Manoa Campus is borne by the Environmental Health and Safety Office with no charge to the generator of the waste, except for the following:
1. **Unknown Waste.** A charge of \$200 for each container of unknown waste is made to cover the cost of analysis. Waste cannot be legally disposed of unless it has been identified.
  2. **Radioactive Mixed Waste.** Wastes which are both naturally radioactive (e.g., Uranium or Thorium compounds) and a regulated waste (e.g., nitrates or flammable solvents), are very expensive to dispose. EHSO can assist researchers or Departments in making arrangements with environmental disposal companies, but the cost of the disposal must be borne by the researcher or Department.
  3. **Compressed Gas Cylinders.** Compressed gas cylinders should be returned to the vendor when empty or are no longer needed. For common gases in regular sized cylinders (e.g., air, nitrogen, helium, oxygen and acetylene) obtained from a local vendor, this is usually not a problem. The disposal of compressed gas cylinders that are not empty, have frozen valves, contain unknown, highly toxic or reactive gases present a difficult and expensive problem. EHSO can accept for disposal empty cylinders with operational valves for certain gases at no charge. EHSO cannot accept for disposal cylinders of highly toxic or reactive gases, cylinders of acetylene, or unknown gases. EHSO can assist researchers or Departments in making arrangements with environmental disposal companies, but the cost of the disposal must be borne by the researcher or Department that has the cylinders.
  4. **Dioxin or Dioxin Contaminated Materials.** Materials containing Dioxin (dibenzodioxins or dibenzofurans) must be disposed at one approved site on the Mainland which is only infrequently open or exported to a disposal site in Canada. This involves substantial cost, approximately \$1,000 per pound and special permits. EHSO can assist researchers or Departments in making arrangements with environmental disposal companies, but the cost of the disposal must be borne by the researcher or Department



I. Emergency Plan for Spills: Preparedness, Prevention and Emergency Procedures for laboratories and facilities where hazardous materials are used must be in place.

A. General

1. Take action to minimize the possibility of fire, explosion, or release of hazardous material to the environment.
2. Ensure that the necessary equipment is available and maintained depending on the type of work being done (e.g. fire extinguishers, showers, eye washes, telephones, alarm systems)
3. Maintain aisle space to allow unobstructed movement of personnel to access fire protection equipment, decontamination equipment or exits for evacuation.
4. Provide the name and telephone number for the Emergency Coordinator for the space and post a copy of this contact information at the entry door and satellite accumulation area (SAA).

B. Specific – Implementation of Emergency Plans

1. Emergency Plan for Spills: A specific plan and training in the plan is needed for the chemical you will be using. Emergency procedures and emergency phone numbers should be posted in the work area. Personnel working with hazardous chemicals should be able to answer the questions: “What would I do if this material spilled?” Spill kits with instructions, adsorbents, reactants, and protective equipment should 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 safety without the assistance of safety and emergency personnel. All other chemical spills are considered major.

The following are general procedures for the handling of spills.

- a. *Attend to anyone who may have been contaminated or hurt, if it can be done without endangering yourself.*
- b. *Ensure that the fume hood(s) is on and open windows where it can be done without endangering yourself. If flammable materials are spilled, de-energize electrical devices if it can be done without endangering yourself.*
- c. *If the spill is major, contact the Department of Public Safety (x66911), EHSO (x63198) and the designated emergency coordinator for the space. If the spill is minor, clean up can be performed as follows:*
  - (1) *Ensure protective apparel is resistant to the spilled material. Neutralize acids and bases, if possible using neutralizing agents such as sodium carbonate or sodium bisulfate.*
  - (2) *Control the spread of liquids by containing the spill.*
  - (3) *Absorb liquids by adding appropriate adsorbent 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. If you have any questions regarding spill cleanup requirements, please contact EHSO at x63198.*

- (4) Collect and contain the cleanup residues by scooping it into a plastic bucket or other appropriate container and properly dispose of the waste as hazardous waste.*
- (5) Decontaminate the area and affected equipment. Ventilating the spill area may be necessary.*
- (6) 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.*

2. Emergency plans for fire. Fight the fire only if the fire is small and can be easily extinguished using a fire extinguisher; and does not involve flammable liquids or hazardous material in circumstances where the spread of the fire is likely. Notify the Emergency Coordinator after the fire is extinguished. If the fire is other than small, or if you feel you cannot extinguish it safely on your own, activate the fire alarm and evacuate the area, notify the Department of Public Safety (x66911), EHSO (x68660), and the Emergency Coordinator for the space.
3. Emergency plans for explosion. Activate the fire alarm and evacuate the area. Notify the Department of Public Safety (x66911), EHSO (x68660) and Emergency Coordinator for the space.

J. Specific Information on the Disposal of Various Materials. The individual possessing or generating the material retains the primary legal responsibility for the material. EHSO provides information on requirements and assistance in handling the materials. Specific information on various types of materials is given below.

1. **AEROSOL CANS:** Aerosol cans (e.g., paint cans, WD-40, or other aerosol products) whether full or empty shall be turned in to EHSO for disposal.
2. **BATTERIES:**
  - a. Lithium, nickel-cadmium, silver or mercury batteries will be accepted by EHSO for disposal.
  - b. Alkaline and Carbon Zinc batteries will NOT be accepted by EHSO for disposal. Under current Honolulu City and County regulations Alkaline or Carbon Zinc batteries can be disposed of as ordinary trash.
  - c. Lead acid batteries (i.e., UPS back-up power supplies) may be disposed of through EHSO. Lead acid vehicle batteries are recyclable and arrangements with local vendors can be made (e.g., Interstate Battery Systems of Hawaii, 94-120 Leokane St., 676-6000 or Battery Bill, 550 N. Nimitz Hwy, 536-4017). They accept car and other lead batteries for disposal/recycling. The disposal

of batteries from University vehicles are handled by Transportation Services. The disposal of other lead acid batteries used in research will be handled on a case by case basis, contact EHSO (x63198).

3. **BIOLOGICAL MATERIALS:** For biohazardous wastes, refer to the University's biohazardous waste disposal guidelines or contact the Biosafety Program (x68009) for information concerning the handling and disposal of biological materials.
4. **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. (See page 4)
5. **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. EHSO cannot accept controlled substances for disposal.
6. **FLUORESCENT LIGHT BALLASTS:** Campus Operations and Facilities (COF) removes non-leaking ballasts. Ballasts that contained PCBs are believed to have already been removed from University light fixtures. Contact EHSO (x63198) for assistance concerning leaking ballasts or any known to contain PCBs.
7. **FLUORESCENT LIGHT TUBES:** COF removes and disposes of fluorescent light tubes. Contact Work Coordination (x67134) for assistance. Specialty lamps used in research (e.g., UV lamps, Halogen lamps, Atomic Absorption spectral lamps) can be submitted to EHSO for disposal.
8. **HAZARDOUS CHEMICALS AND HAZARDOUS WASTE:** EHSO will pick-up excess hazardous chemicals and hazardous chemical waste. Efforts should be made to determine if excess hazardous chemicals can be used by others in the department or facility prior to contacting EHSO for pickup. Chemicals considered non-hazardous waste can be disposed of in the municipal sanitary landfill or sanitary sewer under certain conditions (see "Non-Hazardous Waste" below). The completion of a hazardous material and hazardous waste turn in form is required for material/waste pickup by EHSO. A copy of this form is included as Attachment (3) and the form may be downloaded from the EHSO website. The following rules must be complied with for us to pick up your material.
  - a. YOU MUST BE CURRENT IN YOUR HAZARDOUS WASTE GENERATOR TRAINING (completed initial and annual refresher). We cannot pickup waste from persons who do not have current training.
  - b. YOU MUST HAVE SUBMITTED A COPY OF A "HAZARDOUS MATERIAL & HAZARDOUS WASTE TURN-IN FORM" IN ADVANCE TO EHSO FOR OUR REVIEW AND APPROVAL. Fill in the [excel form](#) and e-mail it to [hazwaste@hawaii.edu](mailto:hazwaste@hawaii.edu). Upon approval, a mutually convenient time for pickup will be arranged.

- c. BE SURE EACH CHEMICAL CONTAINER IS PROPERLY LABELED. Labels should clearly identify contents with a chemical name and percentages (i.e. no abbreviations or chemical formulas). Each waste container should be labeled with the number correlated with the number on the waste turn-in form.
- d. PACKAGE MATERIALS IN STURDY CARDBOARD BOXES OR PLASTIC WASTE CONTAINERS. ORIGINAL CONTAINERS FOR QUANTITIES GREATER THAN 5 GALLONS OR 55- GALLON WASTE DRUMS ARE ACCEPTABLE. Cushion the material in the containers to prevent breakage. If cardboard boxes are used which originally held chemicals, the name of the chemical must be covered over or defaced. Failure to do so constitutes improper marking as to contents and is an EPA regulation violation.
- e. REPACKAGE BROKEN OR LEAKING CONTAINERS INTO NON-LEAKING CONTAINERS PRIOR TO PICKUP.
- f. SEPARATE INCOMPATIBLE MATERIALS. Incompatible materials shall be segregated in separate boxes. Examples of incompatible materials are: acids/bases, organics/oxidizers, and flammable liquids/oxidizers. Unknowns and high hazard materials such as cyanides, organic peroxides, pyrophorics, and water reactives shall be packaged separately regardless of quantity.

Contact EHSO (x63198) if you have any questions on the proper disposal of hazardous material or waste.

- 9. **MERCURY:** EHSO will accept for disposal items containing functional mercury (e.g. light switches, barometers and thermometers).
- 10. **MIXED WASTE:** Mixed waste is defined as materials that possess a radioactive or biological hazard as well as an unrelated chemical hazard (e.g., acetone with carbon-14, is both flammable and radioactive). Contact the Radiation Safety Program (x68591) or Biosafety Program (x68009) for assistance in the proper disposal of these materials.
- 11. **NON-HAZARDOUS WASTE:** Listed in Table 1 are typical laboratory chemicals which are not considered hazardous wastes by the U.S. Environmental Protection Agency. If solid and in plastic containers, 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. If solid and in glass or metal containers the material would have to be transferred to plastic containers, labeled and marked "non-hazardous". This is necessary as the refuse contract does not permit the collection of metal or glass containers unless they are empty. As an alternative, all non-hazardous solid chemicals can be turned in to EHSO for disposal using the turn-in form. Contact EHSO (X63198) if you have questions on whether a chemical is non-hazardous.

**TABLE 1: Non-Hazardous Waste**

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

12. **DRAIN DISPOSAL OF LIQUID NON-HAZARDOUS CHEMICALS:** Non-hazardous liquid chemicals or chemical solutions can only be disposed of to the sanitary sewer (i.e., down the drain) if they are within the scope of the University's Industrial Wastewater Discharge Permit. The general requirements and a list of the materials that can be disposed of to the sanitary sewer is as follows. The liquid or solution must have a pH between 5.5 and 9.5. No viscous solutions or solutions containing oil are permitted. No solutions at a temperature of greater than 40 degrees Centigrade are permitted. No solutions containing ashes, cinder, sand mud, straw, shaving metal powder, glass, rags feathers, tar, plastics wood or paper are permitted.

- **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
- **Sodium chloride, sodium carbonate, sodium phosphate, sodium sulfate, sodium acetate:** <10% by weight and <2 quarts per day per laboratory.
- **Potassium chloride, potassium carbonate, potassium phosphate, potassium sulfate, potassium acetate:** <10% by weight and <2 quarts per day per laboratory.

- **Lithium chloride, lithium carbonate, lithium phosphate, lithium sulfate, lithium acetate:** <10% by weight and < 2 quarts per day per laboratory.
- **Ammonium chloride, ammonium carbonate, ammonium phosphate, ammonium sulfate ammonium acetate:** <10% by weight and <2 quarts per day per laboratory.
- **Small amounts of dyes or stains from slides as part of laboratory experiments**
- **Methyl alcohol solutions:** <10% by volume and < 1 quart per day per laboratory.
- **Ethyl alcohol solutions:** <10% by volume and < 1 quart per day per laboratory
- **Isopropyl alcohol solutions:** <10% by volume and < 1 quart per day per laboratory.
- **Formaldehyde solutions:** < 3% by weight and < 1 quart per day per laboratory
- **Sugar solutions:** < 10% and < 2 quarts per day per laboratory.
- **Amino Acid solutions:** < 10% by weight and < 1 quart per day per laboratory.
- **Citric acid solutions:** < 10% by weight and < 1 quart per day per laboratory.
- **Potassium citrate:** < 10% by weight and <1 quart per day per laboratory
- **Sodium citrate:** < 10% by weight and <1 quart per day per laboratory
- **Ammonium citrate:** < 10 % by weight and < 1 quart per day per laboratory.
- **Magnesium citrate:** <10 % by weight and < 1 quart per day per laboratory.
- **Calcium citrate:** < 10 % by weight and < 1 quart per day per laboratory
- **Potassium lactate:** < 10% by weight and < 1 quart per day per laboratory
- **Sodium lactate:** < 10% by weight and < 1 quart per day per laboratory
- **Ammonium lactate:** < 10% by weight and < 1 quart per day per laboratory
- **Magnesium lactate:** < 10 % by weight and < 1 quart per day per laboratory
- **Calcium lactate:** < 10% by weight and < 1 quart per day per laboratory.

Contact EHSO (x63198) if you have chemicals that you believe may be non-hazardous for a written determination as to whether they must be turned-in to EHSO for disposal or may be disposed in the sanitary sewer in small amounts

13. **OILS AND TRANSFORMER FLUID:** EHSO will accept waste pump oil. EHSO will NOT accept used motor oil, unless it was used in research. Used motor oil is recyclable through local vendors. Used motor oil from University vehicles is handled by Transportation Services. Transformer fluid will be handled on a case by case basis, contact EHSO (x63198) for assistance.

14. **RADIOACTIVE MATERIALS:** Refer to the University Radiation Safety Manual or contact the EHSO Radiation Safety Program (x68591) for information concerning the proper handling and disposal of radioactive material.

15. **SHARPS/GLASSWARE:** Refer to the Lab Safety Chemical Hygiene Plan's Broken Glass and Sharps – Collection and Disposal matrix at [www.hawaii.edu/ehso/lab-safety-reference-materials/](http://www.hawaii.edu/ehso/lab-safety-reference-materials/)
16. **ABANDONED WASTE:** Abandoned waste should not occur, as the abandonment of waste is a violation of the HMMP. In the event that abandoned waste is discovered, the following policy will be implemented.
- If the waste material is in a building or adjacent to a building such that it can be assumed that the waste came from the building, then the Department/School/College occupying the building is responsible for the disposal of the waste material in accordance with the HMMP.
  - If the waste material is in an area such that it is not easily identifiable as having come from a building (e.g., the material is in a dumpster or parking lot), or if a chemical spill is involved, then EHSO will respond and dispose of the material as abandoned waste in accordance with the HMMP.

#### **IV. HAZARDOUS WASTE MINIMIZATION**

- A. Buying Chemicals in Smaller Amounts. The "large economy size" may cost less to buy, but disposal costs, in most cases, are several times the initial cost of the material. Many of the bottles of excess or waste chemicals turned in are full or 3/4 full. Everyone needs to accurately estimate the amount of chemicals they expect to use.
- B. Recycling and Redistribution. As described in the hazardous material control and hazardous waste program above, efforts are to be made to find someone in the laboratory or department who could use the hazardous material before it is turned in to EHSO as excess or waste. EHSO encourages the redistribution and exchange of surplus chemical products within the UH system as an alternative to disposal as waste. Information on the chemical exchange program and the UH electronic swap meet can be found online at <http://www.hawaii.edu/ehso/hazardous-materials-management-chemical-redistribution-program/> and <http://www.hawaii.edu/swapmeet> If no qualified user can be found then the material will be disposed of as hazardous waste. This program will reduce waste generation and save the University waste disposal costs.
- C. Use of Less Hazardous or Non-hazardous Materials. The following provides some examples of the use of less hazardous or non-hazardous materials; everyone is encouraged to seek other alternatives to hazardous materials 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 such as NoChromix, Alconox, Liquinox liquid detergent, Citranox, Fisherbrand sparkleen, and FL-70 Concentrate may be used as a safer alternative.

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:
  - a. 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 unless it can be reacted and neutralized.
  - b. 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.
  - c. Water Reactive Chemicals, (materials such as sodium metal, potassium metal, calcium metal, calcium carbide, calcium hydride, lithium hydride, lithium aluminum hydride, sodium hydride and potassium hydride) are not recommended for use as general purpose drying agents because they form flammable gases on contact with water and are both dangerous and expensive to dispose of. Small amounts of these materials can be safely disposed of by reacting them with water under controlled conditions by knowledgeable personnel to create non-hazardous or less hazardous materials. If a bottle of solvent contains a water reactive drying agent, this information must be clearly marked on the bottle. This is necessary for the safety of personnel handling the material during disposal.
3. Thermometers: Mercury thermometers should be replaced with non-mercury thermometers whenever possible. Broken mercury thermometers create spills that are a potential health hazard, time consuming to clean up, and are one of the most expensive hazardous wastes we handle. Non mercury thermometers with equivalent accuracy are available for temperature ranges of -20 to 250 degrees Centigrade. If mercury-containing equipment is used, then a mercury spill kit and personnel knowledgeable in its use is required in the laboratory or facility.

D. Conversion to Non-hazardous Material. As part of instruction or research operations, hazardous materials can be converted into non-hazardous wastes. The neutralization of acids or bases is an example of this. Experiments can be designed to convert residual or produced hazardous materials into non-hazardous wastes. In some cases, this can have instructional value as well as reducing the amount of hazardous waste and its disposal cost.

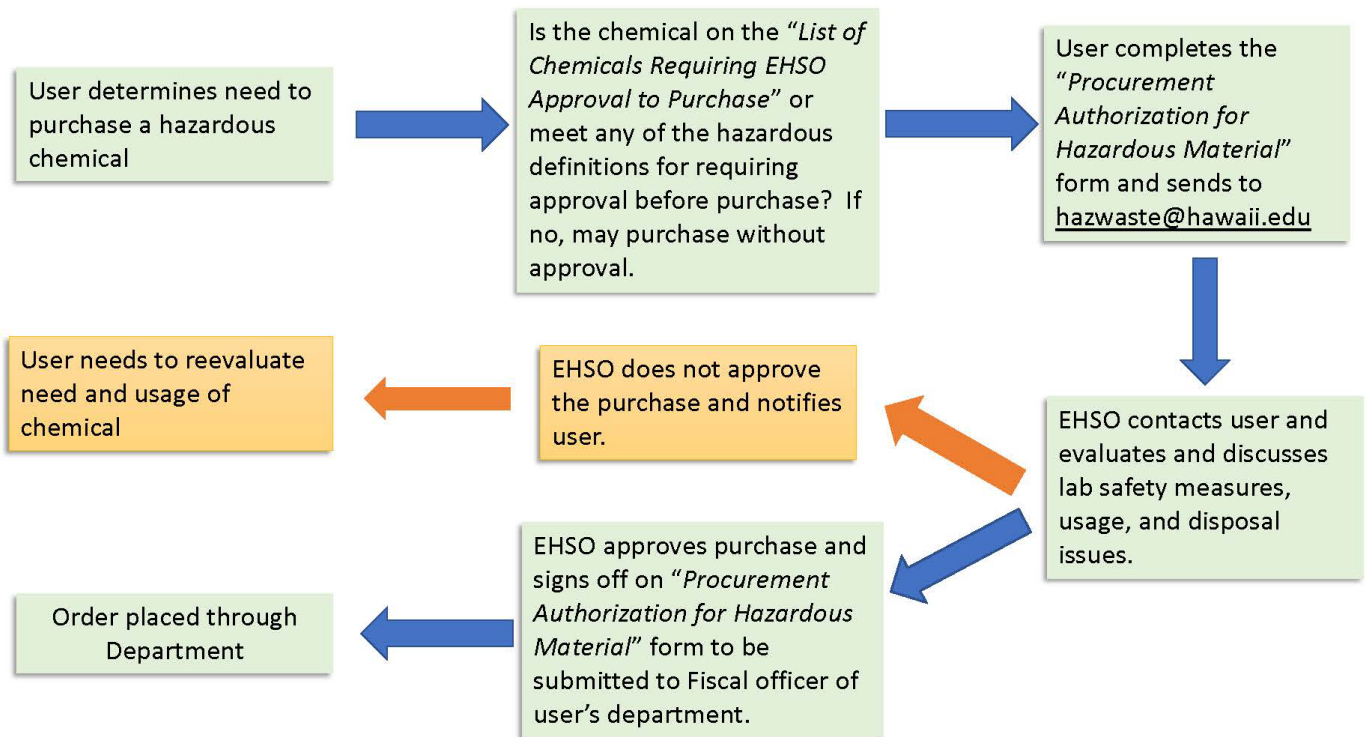


# ATTACHMENT 1

## HAZARDOUS CHEMICALS REQUIRING ENVIRONMENTAL HEALTH & SAFETY OFFICE (EHSO) APPROVAL TO PURCHASE

Chemical users at UH Manoa need to evaluate and determine the need to purchase certain hazardous chemicals because some of these chemicals are highly toxic, explosive, water or air reactive or for other reasons very difficult and expensive to dispose of.

It is important to note that the list (next page) must not be considered "all inclusive". Many other chemicals that are not listed may also possess extremely hazardous properties so please refer to the SDS of the chemical and contact the Hazardous Materials Management Officer at EHSO (x63198) if further information is needed.



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

|   |   |
|---|---|
| Acrolein  | Methyl fluorosulfonate                          |
| Arsine  | Methyl Lithium                                  |
| Boron Trichloride   | Methyl mercaptan                                |
| Boron Trifluoride (compounds)   | Nickel carbonyl                                 |
| Bromine Chloride  | Nitric Acid - concentrated only ( $\geq 68\%$ ) |
| Butyl Lithium   | Nitric Oxide                                    |
| Calcium Hydride   | Nitrogen Dioxide                                |
| Carbon Monoxide   | Nitrogen Trifluoride                            |
| Carbonyl Sulfide  | Phosgene  |
| Cesium  | Phosphine                                       |
| Chlorine  | Phosphorus                                      |
| Chlorine Trifluoride  | Picric Acid                                     |
| Chloropicrin (Picfume)  | Picryl Sulfonic Acid                            |
| Cyanogen  | Picramide                                       |
| Cyanogen Chloride   | Potassium                                       |
| Diazomethane  | Rubidium  |
| Diborane (gas)  | Silane  |
| 3,5-Dinitrophenol   | Silane Dichloride                               |
| 2,4-Dinitrophenylhydrazine  | Sodium (metal)                                  |
| Ethylene Oxide  | Sulfur Dioxide                                  |
| Fluorine  | 1H-Tetrazole                                    |
| Hydrogen Bromide  | Thorium Compounds                               |
| Hydrogen Chloride   | Trinitroaniline                                 |
| Hydrogen Cyanide  | Trinitrobenzene                                 |
| Hydrogen Fluoride   | Trinitrocresol                                  |
| Hydrogen Sulfide  | Trinitronapthalene                              |
| Lithium   | Trinitrophenol                                  |
| Lithium Aluminum Hydride  | Trinitrotoluene                                 |
| Lithium Hydride   | Uranium Compounds                               |
| Methyl Bromide  | Urea Nitrate                                    |
|   |   |
| <b>Other chemicals requiring approval:</b>  |   |
| -Explosives   |   |
| -Poisonous, Flammable and/or Corrosive gases (cylinders)  |   |
| -Pyrophoric chemicals   |   |
| -Chemicals with high degree of acute toxicity   |   |
| -Peroxide Formers   |   |
| -Controlled substances/DEA listed items   |   |
| -Any material listed as a Packing Group I material (refer to SDS)   |   |
| -Laboratory synthesized chemicals for which a Safety Data Sheet does not exist and there is no hazard information available |   |

**UNIVERSITY OF HAWAII AT MANOA  
PROCUREMENT AUTHORIZATION FOR HAZARDOUS MATERIALS**

|   |  |                                   |  |
|---|--|-----------------------------------|--|
| <b>Name<br/>(Principal Investigator):</b> |  | <b>Date:</b>                      |  |
| <b>Department:</b>                        |  | <b>Email:</b>                     |  |
| <b>Building/Room<br/>Number:</b>          |  | <b>Phone<br/>Number:</b>          |  |
| <b>Chemical Name:</b>                     |  |                                   |  |
| <b>CAS Number:</b>                        |  | <b>Quantity or<br/>Unit size:</b> |  |
| <b>Purchasing From?</b>                   |  | <b>Physical<br/>State:</b>        |  |
| <b>Hazardous<br/>Characteristics:</b>     |  |                                   |  |

|   |   |
|---|---|
| 1. Do you have the proper storage for this chemical? Explain where chemical will be stored:   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No         |
| 2. Will there be any waste generated from using this chemical?  | <input type="checkbox"/> Yes<br><input type="checkbox"/> No         |
| 3. Do you agree that if any waste generated from this chemical or if unused material is remaining and needs to be disposed of, it may be at the cost of the user/department?                    | <input type="checkbox"/> Agree<br><input type="checkbox"/> Disagree |
| 4. Chemical will be added to the lab's chemical inventory and maintained annually?  | <input type="checkbox"/> Yes<br><input type="checkbox"/> No         |
| 5. Training on the safe handling of this chemical will be conducted by the PI to lab members who may be working with the chemical. A SOP will be created for safely working with this chemical. | <input type="checkbox"/> Yes<br><input type="checkbox"/> No         |
| 6. The SDS of this chemical will be on file and available?  | <input type="checkbox"/> Yes<br><input type="checkbox"/> No         |
| 7. The lab will ensure this chemical will be properly labeled and maintained in good condition.   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No         |

- The requested purchase is approved by EHSO and the order may be placed.
- The requested purchase is denied by EHSO.

\_\_\_\_\_  
Signature of Principal Investigator

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Department Chair

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of UH Hazardous Materials Management Officer

\_\_\_\_\_  
Date

## ATTACHMENT 2

### 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 visible residue remaining in a container of P-coded material
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 Waste No. | Chemical Abstracts No. | Chemical Name                     |
|---------------------|------------------------|-----------------------------------|
| 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                |
| P007                | 2763-96-4              | 5-(Aminomethyl)-3-isoxazolol      |
| P008                | 504-24-5               | 4-Aminopyridine                   |
| P009                | 131-74-8               | Ammonium Picrate                  |
| P119                | 7803-55-6              | Ammonium Vanadate                 |

| <b>Hazardous Waste No.</b> | <b>Chemical Abstracts No.</b> | <b>Chemical Name</b>  |
|----------------------------|-------------------------------|---|
| P099                       | 506-61-6                      | Argentate (1-), bis(cyano-C-), potassium  |
| P010                       | 7778-39-4                     | Arsenic acid (H <sub>3</sub> AsO <sub>4</sub> )   |
| P012                       | 1327-53-3                     | Arsenic oxide (As <sub>2</sub> O <sub>3</sub> )   |
| P011                       | 1303-28-2                     | Arsenic oxide (As <sub>2</sub> O <sub>5</sub> )   |
| P011                       | 1303-28-2                     | Arsenic pentoxide   |
| P012                       | 1327-53-3                     | Arsenic trioxide  |
| P038                       | 692-42-2                      | Arsine, diethyl-  |
| P036                       | 696-28-8                      | Arsenous dichloride, phenyl-  |
| P054                       | 151-56-4                      | Aziridine   |
| P067                       | 75-55-8                       | Aziridine, 2-methyl-  |
| P013                       | 542-62-1                      | Barium cyanide  |
| P024                       | 106-47-8                      | 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]-  |
| 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                       | 7740-47-7                     | 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   |
| P189                       | 55285-14-8                    | Carbamic acid, [(dibutylamino)-thio]methyl-,2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester   |
| P191                       | 644-64-4                      | Carbamic acid, dimethyl-, 1-[(diethylamino)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  |

| <b>Hazardous Waste No.</b> | <b>Chemical Abstracts No.</b> | <b>Chemical Name</b>  |
|----------------------------|-------------------------------|---|
| 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 (202CuCN)  |
| 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 (CNCl)  |
| 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,8abeta)-   |
| 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,8abeta)-  |
| 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,2aalpha,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   |

| <b>Hazardous Waste No.</b> | <b>Chemical Abstracts No.</b> | <b>Chemical Name</b>   |
|----------------------------|-------------------------------|--|
| 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                       | 298-0404                      | 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, & 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, mercuric salt   |
| 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')-   |

| <b>Hazardous Waste No.</b> | <b>Chemical Abstracts No.</b> | <b>Chemical Name</b>  |
|----------------------------|-------------------------------|---|
| P196                       | 15339-36-3                    | Manganese dimethyldithiocarbamate   |
| P092                       | 62-38-4                       | Mercury, (acetato-O)phenyl-   |
| P065                       | 628-86-4                      | Mercury fulminate   |
| 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-  |
| P118                       | 75-70-7                       | Methanethiol, trichloro-  |
| P198                       | 23422-53-9                    | Methanimidamide, N,N-diemthyl-N'-{3-<br>[[[(methylamino)-carbonyl]oxy]-phenyl]-,<br>monohydrochloride   |
| P197                       | 17702-57-7                    | Methanimidamide, N,N-dimethyl-N'-{2-methyl-4-<br>[[[(methylamino) carbonyl]oxy]phenyl]-                 |
| P050                       | 115-29-7                      | 6,9,-Methano-2,4,3-benzodioxathiepin,<br>6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-<br>hexahydro-, 3-oxide |
| P059                       | 76-44-8                       | 4,7,-Methano-1H-indene, 1,4,5,6,7,8,8-<br>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                       | 315-08-4                      | Mexacarbate   |
| P072                       | 86-88-4                       | alpha-Naphthylthiourea  |
| P073                       | 13463-39-3                    | Nickel carbonyl (NiCO)  |
| P074                       | 557-19-7                      | Nickel cyanide (NiCN)   |
| 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 <sub>2</sub> )   |
| P081                       | 55-63-0                       | Nitroglycerine  |
| P082                       | 62-75-9                       | N-Nitrosodimethylamine  |
| P084                       | 4549-40-0                     | N-Nitrosomethylvinylamine   |
| P085                       | 152-16-9                      | Octamethylpyrophosphoramide   |
| P087                       | 20816-12-0                    | Osmium Tetroxide (OsO <sub>4</sub> )  |



| <b>Hazardous Waste No.</b> | <b>Chemical Abstracts No.</b> | <b>Chemical Name</b>  |
|----------------------------|-------------------------------|---|
| 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  |
| 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)-, methylcarbamate                                     |
| P201                       | 2631-37-0                     | Phenol, 3-methyl-5-(1-methylethyl)-, methylcarbamate                            |
| 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                |
| 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 (KCN)   |

| <b>Hazardous Waste No.</b> | <b>Chemical Abstracts No.</b> | <b>Chemical Name</b>  |
|----------------------------|-------------------------------|---|
| 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   |
| 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 (thallous) salt  |
| P103                       | 630-10-4                      | Selenourea  |
| P104                       | 506-64-9                      | Silver cyanide (AgCN)   |
| P105                       | 26628-22-8                    | Sodium azide  |
| P106                       | 143-33-9                      | Sodium cyanide (NaCN)   |
| P108                       | 57-24-9                       | Strychnidin-10-one, & salts   |
| P018                       | 357-57-3                      | Strychnidin-10-one, 2,3-dimethoxy-  |
| P108                       | 57-24-5                       | Strychnine & salts  |
| P115                       | 7446-18-6                     | Sulfuric acid, dithallium (thallous) salt   |
| P109                       | 3689-24-5                     | Tetraethyldithiopyrophosphate   |
| P110                       | 78-00-2                       | Tetraethyl lead   |
| P111                       | 107-49-3                      | Tetraethyl pyrophosphate  |
| P112                       | 509-14-8                      | Tetranitromethane   |
| P062                       | 757-58-4                      | Tetraphosphoric acid, hexaethyl ester   |
| P113                       | 1314-32-5                     | Thallic oxide   |
| P113                       | 1314-32-5                     | Thallium oxide (Tl <sub>2</sub> O <sub>3</sub> )  |
| P114                       | 12039-52-0                    | Thallium (I) selenite (thallous selenite)   |
| P115                       | 7446-18-6                     | Thallium (I) sulfate (thallous sulfate)   |

| <b>Hazardous Waste No.</b> | <b>Chemical Abstracts No.</b> | <b>Chemical Name</b>   |
|----------------------------|-------------------------------|--|
| P109                       | 3689-24-5                     | Thiodiphosphoric acid, tetraethyl ester  |
| P045                       | 39196-18-4                    | Thiofanox  |
| P049                       | 541-53-7                      | Thioimidodicarbonic diamide (H <sub>2</sub> NCS) <sub>2</sub> NH                         |
| 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 <sub>2</sub> O <sub>5</sub> ) 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')-,   |
| P121                       | 557-21-1                      | Zinc cyanide [ Zn (CN) <sub>2</sub> ]  |
| P122                       | 1314-84-7                     | Zinc phosphide (Zn <sub>3</sub> P <sub>2</sub> ) when in concentrations greater than 10% |
| P205                       | 137-30-4                      | Ziram  |

# ATTACHMENT 3

## Excess Hazardous Materials and Hazardous Waste Turn in Form

Hazardous Waste Turn in Form may be downloaded on the UH Manoa EHSO website:

<http://www.hawaii.edu/ehso/hazardous-materials-management-materials-waste-forms/>

### EXCESS HAZARDOUS MATERIAL AND HAZARDOUS WASTE TURN-IN FORM - UH MANOA CAMPUS ONLY

This form is to be used for the turn-in of excess hazardous materials or hazardous waste to the Environmental Health and Safety Office (EHSO) for disposal. Please refer to the Hazardous Materials Management Program requirements for information on the types of materials accepted and the proper disposition of other materials. See Instructions below on completing the form. The form must be completed through this Excel sheet, and emailed to [hwaste@hawaii.edu](mailto:hwaste@hawaii.edu).

Department:  Date:

Name:  Phone:

Location of waste:   
(Bldg, Room, notes)

*Generator Certification: I certify that the information provided is complete and accurately describes, to the best of my knowledge, the material to be turned in. I am current in my UH Hazardous Waste Generator Training and able to sign this form and submit the following waste. By typing in my name, I agree it is equivalent to my handwritten signature.*

Generator's Signature:  Date Submitted:

EHSO APPROVAL:  Date Approved:

*Material Acceptance: The material submitted for turn-in has been inspected and determined to match the list below, and is packed in accordance with the University of Hawaii's Hazardous Materials Control and Hazardous Waste Disposal requirements.*

EHSO Representative:  Date picked up:

**INSTRUCTIONS (PLEASE READ):**

- List each individual waste container on one line (even if there are multiple items of the same waste)
- Mark each individual waste container with the corresponding Item No. # so its easily and visibly seen when EHSO picks up your waste.
- Include final concentrations or percentages of chemicals for mixtures. Include the pH if your liquid waste contains acids or bases.
- Record the amount of waste in gallons (liquids) or pounds (solids) only. See weight and volume conversion table on next tab.
- Type (sign) your name and date in the Generator's Signature box (above) to confirm waste submittal and current training.
- "Save as" (rename spreadsheet with submittal date in file name) and email this spreadsheet to [hwaste@hawaii.edu](mailto:hwaste@hawaii.edu)

| ITEM NO.<br># | Chemical Name (no abbreviations) | Amount<br>(in gallons or<br>pounds) | Gallons<br>or Pounds<br>(use drop<br>down menu) | Physical<br>State<br>(use drop<br>down menu) | For EHSO USE ONLY |     |        |
|---------------|----------------------------------|-------------------------------------|---|--|-------------------|-----|--------|
|               |                                  |                                     |   |  | DOT               | EPA | Drum # |
| 1             |                                  |                                     |   |  |                   |     |        |
| 2             |                                  |                                     |   |  |                   |     |        |
| 3             |                                  |                                     |   |  |                   |     |        |
| 4             |                                  |                                     |   |  |                   |     |        |
| 5             |                                  |                                     |   |  |                   |     |        |
| 6             |                                  |                                     |   |  |                   |     |        |
| 7             |                                  |                                     |   |  |                   |     |        |
| 8             |                                  |                                     |   |  |                   |     |        |
| 9             |                                  |                                     |   |  |                   |     |        |
| 10            |                                  |                                     |   |  |                   |     |        |

**INSTRUCTIONS FOR FILLING OUT THE EHSO EXCESS HAZARDOUS  
MATERIAL AND HAZARDOUS WASTE TURN-IN FORM FOR UH MANOA  
CAMPUS ONLY**

Updated July 2021

1. Department: Please indicate what department the waste was generated from (i.e. Chemistry, Engineering, Botany, Hawaii Natural Energy Institute).
2. Date: Today's date
3. Name: Name of the generator who signs the form must appear here. The name of the generator must be current in their Hazardous Waste Generator Training. Additional names can be listed if necessary for pickups arrangements.
4. Phone Number: Telephone number of the contact person.
5. Location of waste: Indicate what building and room the waste is located in. Include any details of where waste is located in the room (i.e. in flammable cabinet, where satellite waste accumulation area is located).
6. Generator's Signature: Type name of trained person responsible for the waste being submitted to EHSO, and include date. By typing in your name it is equivalent to your signature. This signature acknowledges your responsibility for the material.
7. Item No #: Mark each individual waste container in your lab/facility, with the corresponding Item No.# that is listed on the sheet. List each individual waste container on ONE line, even if there are multiple items of the same waste. Each waste container should have its own number. This will assist EHSO in matching the items to the list when we pickup the items and pack for disposal.
8. Chemical Name: This is the name on the container label. Do not use chemical formulas or abbreviations. If the material is not pure, then the concentration or percentage should be provided (e.g. 10% hydrogen peroxide solution, or 2M hydrochloric acid, or 60% isopropyl alcohol + 40% acetone). The more information that you can supply, the easier and less expensive it will be for us to handle the material. **Include the pH of any liquid waste that contains acids or bases.** If the chemical name is long, you can manually adjust the row height so the name will fit in the one cell.
9. Amount: Indicate the amount in gallons for liquids, and pounds for solids. For items less than 0.01 pounds (4.5 grams), report 0.01 pounds. For items less than 0.01 gallons (40 ml or 1.3 ounces), report it as 0.01 gallons. For gases, indicate the number of cylinders in the quantity block. For aerosol cans, indicate the amount in gallons (convert from ounces).

10. Gallons or Pounds or Other: Choose Gallons, Pounds, or Other to indicate the units of the amount.
11. Physical State: This identifies the type of material (solid, liquid, gas/aerosol) and is important as the hazard class or EPA class code may depend on the physical state of the material.
12. For EHSO Use Only Columns: Do not write in any of these columns please. For EHSO use only.
13. EHSO Approval: Once your form is submitted, the Hazardous Materials Management Officer will review the form for completeness and conformance with the regulations. If there are any problems or questions, we will contact the generator. Upon approval of the form, the generator will be contacted and a mutually convenient time for pickup of the material will be arranged by EHSO.
14. EHSO Representative: EHSO personnel will inspect the material upon pickup of the waste, prior to accepting it. Any material that does not match the material on the approved form or that does not conform to the requirements for labeling, packaging, and container condition will not be accepted. The EHSO Representative signature verifies that the generator has complied with the applicable requirements.
15. Save your spreadsheet as a new file name on your computer, with current date included in the file name so we know it is a current submittal. Email the waste form to [hazwaste@hawaii.edu](mailto:hazwaste@hawaii.edu)

\*Please pack all waste containers into a box (do not pack incompatibles together in same box) so it is easy for our EHSO personnel to pick up and transport your waste to our facility.

If you have any questions on the proper disposal of materials or with filing out the form, please contact EHSO at x63198.

## Weight and Volume Conversion Table

The following tables are provided for convenience to those using the waste turn in form. Numbers are approximations and have been rounded off.

### **1. Weights: grams to pounds      1 gram = 0.0022 pounds**

|     |   |     |                      |
|-----|---|-----|----------------------|
| <5  | grams.....0.01 pounds (per instructions all weights less than 5 grams or 0.01 pounds are to be reported as 0.01 pounds) |     |                      |
| 5   | grams.....0.01 lbs.   | 10  | grams..... 0.02 lbs. |
| 20  | grams..... 0.04 lbs.  | 30  | grams..... 0.07 lbs. |
| 40  | grams..... 0.09 lbs.  | 50  | grams..... 0.11 lbs. |
| 100 | grams..... 0.22 lbs.  | 500 | grams..... 1.10 lbs. |

### **2. Volumes: liters to gallons      1 liter = 0.2642 gallons**

|                |   |     |                              |
|----------------|---|-----|------------------------------|
| <u>&lt; 40</u> | ml..... 0.01 (per instructions volumes ≤ 40 ml are reported as 0.01 gal.) |     |                              |
| 50             | ml..... 0.01 gal  | 60  | ml..... 0.02 gal             |
| 100            | ml..... 0.03 gal  | 150 | ml..... 0.04 gal             |
| 200            | ml..... 0.05 gal  | 300 | ml..... 0.08 gal             |
| 400            | ml ..... 0.11 gal   | 500 | ml..... 0.13 gal             |
| 600            | ml..... 0.16 gal  | 700 | ml..... 0.18 gal             |
| 800            | ml..... 0.21 gal  | 900 | ml..... 0.24 gal             |
| 1.0            | liter.....0.26 gal  | 1.5 | liters.....0.40 gal          |
| 2.0            | liters.....0.53 gal   | 2.5 | liters.....0.66 gal          |
| 3.0            | liters.....0.79 gal   | 4.0 | liters.....1.06 gal          |
| 0.5            | pints (8 oz).....0.06 gallons   | 1.0 | pint (16 oz)... 0.13 gallons |
| 1.0            | quart (32 oz)... 0.25 gallons   |     |                              |