

 Environmental Health and Safety TITLE: Laboratory Environmental Management Procedures	Effective Date: 09/12/2023	Procedure Number: EMS-WP-001
	Revision: 1	Page 1 of 14
	Responsible Authority: Director, Environmental Health and Safety	

APPLICABILITY/ACCOUNTABILITY

The following procedures are applicable to all laboratory personnel working with chemicals. The laboratories covered under this procedure include, but are not limited to, those in departments and research centers in:

College of Engineering: CECS, EECS, FSI, IEMS, MMAE, SWMA
College of Medicine: BSBS, Molecular Biology and Microbiology, Pegasus Health
College of Optics and Photonics: CREOL, FPCE, TLI
College of Science: Anthropology, Biology, Chemistry, NCFS, Physics
Office of Research: AMPAC, FSEC, NSTC
UCF Faculty Clusters

The Department of Environmental Health and Safety (EHS) is the designated office in charge of ensuring compliance and administration of this procedure.

PROCEDURE STATEMENT

The University of Central Florida (UCF) has assessed the potential environmental impacts related to chemical use in research and academic laboratories. The following procedures have been established to minimize these impacts and to ensure laboratory operations are in compliance with applicable environmental laws, rules, and regulations.

DEFINITIONS

Environmental Health and Safety Assistant (EHSA): The integrated web-based software system that manages EHS related data from laboratory identification and space assignment, principal investigator chemical use permits, laboratory hazard analysis tools, chemical inventory, laboratory worker identification and training records, and inspection results and history.

Laboratory Manager: Person assigned by a department or individual Principal Investigator as the point of contact for departmental or individual laboratory issues.

Laboratory Personnel: Faculty, staff, graduate students (i.e., teaching assistants, research assistants, and laboratory assistants), contractors, and visitors performing duties or tasks physically situated in a UCF laboratory facility.

Principal Investigator (PI): Person assigned as point of contact for departmental or individual laboratory space. This person is in charge and responsible for all operations and activities performed in the laboratory.

Shared laboratory space: A room used for multiple research or academic interests that is not under the control of one principal investigator.

RCRA (Resource Conservation and Recovery Act) hazardous waste: Waste that meets the definitions of listed or characteristic hazardous wastes.

Non-regulated laboratory waste: Wastes that do not meet the definition of RCRA waste but still are considered toxic or environmentally unfriendly.

Satellite Accumulation Areas (SAA): Areas in individual laboratories where waste is collected for removal to the main accumulation area at Building 48. Wastes must stay in the area (laboratory) where they have been generated, be under control of the operator of the process which generated the waste, and contain no more than 55 gallons of hazardous waste or 1 quart acutely hazardous waste.

In line Waste Collection: Any system that accumulates laboratory wastes automatically, periodically, or continuously, and is associated with a chemical or instrumental operation in a laboratory.

PROCEDURES

1. Identification of Laboratory Activities and Responsibility

Each department or research center covered under by this document is responsible for updating the Laboratory Identification form to notify EHS when chemical laboratory room use or space assignments to specific PI's change.

Information included in the Laboratory Identification Form: department name, name of chair or director, name of laboratory manager, name of central purchasing agent, lab number, assigned principal investigator(s), and type of activities.

Updates must be reported prior to reuse of space from chemical to non-chemical, significant renovations, and reassignment of space between departments or PI's.

Laboratory Manager Appointment: Each department shall assign a departmental laboratory manager or require principal investigators to assign a dedicated laboratory manager for their individual lab(s). Chairs or PI's shall assign roles under their permit in EHSA.

The Lab Manager will serve as point of contact for laboratory issues and attend the additional EHS training classes as outlines in *Training Requirements for Potentially Hazardous Activities*.

2. Laboratory Close-Out

Each area is responsible for following guidelines in Laboratory Close-out Procedures whenever a lab worker permanently leaves an assigned lab as a result of graduation, resignation, termination, or transfer or in the event of a lab move or renovation.

3. Hazardous Materials Procurement Methods

Each department should identify a centralized purchasing agent. This centralized agent will use current UCF Purchasing Department guidelines for hazardous material purchases. The name of this individual should be listed on the Laboratory Identification Form.

Procurement cards are not to be used for hazardous material purchases per [University policy 3-107](#).

Chemicals should be ordered in the smallest possible quantities to reduce waste disposal costs and minimize storage in overcrowded labs.

Whenever possible, less toxic alternatives should be purchased. Purchases of thermometers, sphygmomanometers, manometers, and barometers must be non-mercury containing unless required by individual research methods.

Donations of chemicals or equipment containing chemicals must be reported on the In-Kind Gift Donation form and approved by EHS prior to accepting the materials.

4. Hazard Communication and Inventory Requirements

No container shall be accepted without an adequate identifying label. Labels on chemical containers must state the chemical name, the manufacturer name, and hazard information.

Chemical manufacturers are required to send a Safety Data Sheet (SDS) when a chemical shipment is ordered. Departments are required to keep a hard-copy or electronic version of all SDS in their chemical inventory.

All laboratories are required to maintain their chemical inventory on the University online chemical inventory database in accordance with *Chemical Inventory Procedures*. This includes a requirement to perform a review for expired/unwanted/unlabeled chemicals at least annually.

Unknowns and expired chemicals must be disposed through EHS and unwanted, but usable, chemicals should be processed through the chemical redistribution system.

5. Waste Determination

Initial waste determinations should be performed on all waste streams to determine whether they need to be managed as regulated hazardous waste or not and to provide guidance on segregation of waste storage.

The waste determination should be performed using laboratory personnel knowledge of the process, Safety Data Sheets, Waste Determination Flowchart , or other reference materials. EHS recommends documentation of this waste determination.

Laboratory personnel are responsible for identifying all components of the waste stream and performing initial waste determination.

EHS personnel are responsible for assisting laboratory personnel with waste determinations. EHS may remove containers previously identified as waste from laboratory operations if it is determined that the material transferred to another area for use.

6. In-Laboratory Waste Storage Area Requirements

Hazardous waste must remain at or near the point of generation. Individual labs must designate an area in each laboratory space where chemical wastes are being generated for storage of waste. This space is called the Satellite Accumulation Area (SAA).

Laboratories with SAA's must be locked when personnel are not present.

SAA's must have containment trays that can be used to segregate the hazard classes and contain potential spills.

Avoid locating SAA's in fume hoods to minimize loss of usable fume hoods space and the potential for decreased hood effectiveness. Avoid locating SAA's near laboratory exits.

7. SAA Storage Limits

Each lab may temporarily hold a total of 208 liters (55 gallons) of individual waste streams with the exception of RCRA acutely hazardous (p-listed) waste. Quantities of unused p-listed waste are limited to 1 quart or 2.2 pounds.

When 55 gallons has been collected, or the p-listed quantity exceeded, the waste must be transferred from the lab to the EHS storage area within 72 hours.

Fire Code storage limits of hazardous materials are typically much less than 55 gallons. EHS recommends that labs request waste collection when individual containers are full.

8. Hazardous Waste Container Labeling

All laboratory waste must be labeled with a hazardous waste or non-regulated waste label. The label must include the chemical name of all hazardous constituents with estimated percentage in the mixture. Do not use chemical formulas as the chemical name.

If the container is too small to hold a label, the label shall be placed on a larger secondary container (for example, a tray, larger bottle, or plastic bag).

If the label is too small to hold the list of components, laboratory personnel should maintain a log of wastes added to the container.

Printed labels can be obtained from EHS.

9. Hazardous Waste Container Requirements

Chemical waste must be in a sealed container that shows no sign of leakage or damage. Spills and residues on the outside of the container must be cleaned up immediately.

Containers sealed with broken or loose caps, stoppers, films, or are otherwise unsealed are prohibited.

Containers must not be overfilled to account for expansion. Generally, fill to within 3 to 5 inches of the mouth of the bottle.

Choose container materials that are compatible with your waste stream. Corrosives and halogenated solvents must be in glass or plastic containers. Do not use food or beverage containers for hazardous waste collection.

Halogenated solvent waste must be collected and stored in separate containers from other solvent waste.

Containers of waste must be securely closed at all times except when wastes are being added to (including during in-line waste collection) or removed from the container. If there is a risk of pressurization of the container, leave the cap loosely closed and the container in the fume hood until the reaction is complete. After the reaction is complete, tightly close the lid and move the container to the SAA.

It is the individual department or research unit's responsibility to provide waste collection containers. EHS does not stock empty containers for SAA waste collection.

Most containers, with the exception of 5-gallon carboys that contain solvents that can be consolidated into 55-gallon drums, will not be returned to you.

In-line waste collection systems must be constructed to prevent the release of laboratory waste into the environment. These systems must provide for sealed containment of the waste as it is being collected.

10. Disposal of Waste from the Laboratory

Waste is ready to be removed from the laboratory when the containers are full, the lab has reached its waste accumulation limits, or the laboratory requests removal.

Check condition of the container for leaks, drips, and make sure the container is completely sealed.

Check to make sure the waste label is accurate and complete.

Go on-line to EHSA and enter the waste pickup request details (www.ehs.ucf.edu).

If your lab is located on UCF Main Campus and certain Research Park Facilities, EHS will pick up your waste in 30 business days. Off-site locations will have waste collected directly from the laboratory by the UCF hazardous waste vendor within six months of request.

11. Disposal of Unknowns and Gas Cylinders

Containers with unidentified contents present potential hazards and are expensive to dispose. Departments should not allow students/staff to vacate a laboratory without first identifying all containers. Follow the Laboratory Close-Out Procedures to avoid future accumulation of unknown materials.

EHS will collect unknowns only during scheduled campus pick-ups by our hazardous waste contractors. If unknowns are listed on the online request, you will be notified when the contractor will be on campus.

When labeling unknowns for disposal, use a hazardous waste label and state "waiting waste determination" along with as much information you have about the process or chemical as possible.

Contact the gas cylinder vendor for removal and disposal. If the vendor cannot be identified or if the vendor will not accept the cylinder for disposal, create an EHS waste pickup request. EHS will collect gas cylinders during scheduled campus pick-ups by our hazardous waste contractors.

12. Empty Containers and Broken Glass

UNLESS a container has held an acutely hazardous (p-listed) waste, the container is considered empty and not a regulated hazardous waste if:

All wastes that can be removed have been removed using conventional methods (pouring, scraping, e.g.) and

No more than 2.5 centimeters remain on the bottom of the container or

No more than 3 percent of the capacity of a container equal to or less than 119 gallons remain or

No more than 0.3 percent of the capacities of a container greater than 119 gallons remain.

Containers with acutely hazardous (p-listed) residues must be labeled with a **hazardous waste label** reading "Container contaminated with _____" (state name of highly toxic residue) and follow the disposal procedures.

Containers considered RCRA empty, but which still contain some free material, should not be recycled. This can present a hazard to recycling workers, and the receiving facility doesn't want containers still holding hazardous materials. These containers should be managed by EHS as hazardous waste. An example of a container which would fall into this category is a metal solvent can, which is difficult to empty entirely.

Disposing of Empty Chemical Containers

Chemical containers, when emptied of their hazardous contents, can be triple rinsed out and disposed of through normal municipal trash or recycling.

The Triple Rinse Process

Once you have removed as much product as possible through traditional means, your empty chemical container can be rinsed and disposed of or reused to store another chemical/waste product.

Using a solvent capable of removing the contaminant (water, acetone, etc.), rinse out the inside of the container.

Pour off the solvent/contaminant rinse into a hazardous waste container. You can combine compatible wastes into 1 container, being sure not to combine too many waste streams (*waste containers are not a science experiment!*).

Repeat this two more times for a total of 3 rinses. Three is the absolute minimum. If chemical residues remain, you may repeat this process as many times as necessary.

When the container is empty (criteria below) and ready to be discarded, the label should be defaced and a "**Triple Rinsed**" sticker should be affixed.

If containers have been **triple rinsed and are completely emptied** of their contents they may be sent out through recycling or the regular trash. Laboratories managed by UCF Facilities Operations can recycle their empty containers by placing them in the regular recycling.

Be sure to:

Deface the chemical name and all hazard symbols on the manufacturer label. **The chemical name and hazard pictograms should be illegible.**

Write the word "**Empty**" on the container label.

Remove the chemical from the **online EHSA Chemical Inventory**.

Remove or deface the **bar code sticker** on the container.

Laboratories not managed by UCF Facilities Operations should follow the above steps, but should check with their laboratory manager for container recycling procedures specific to their location.

Do NOT place broken glass in the recycle or trash bins. Broken glass **grossly contaminated with chemical residue** or with biohazardous or radioactive material should be disposed of in a rigid, puncture proof container and labeled for proper disposal in the appropriate waste stream.

Only broken glass that is **NOT** grossly contaminated with chemical residue can be handled in the following manner: the glass should be carefully picked up using forceps or a broom and dust pan and placed in a container such as a cardboard box (or other designated substantial container such as a plastic container designated for broken glass) and clearly labeled as broken glass. Please do not place broken glass in ordinary trash containers as it presents a potential risk to those that handle it. Please check with your department on their policy and procedure for disposal of broken glass. Sealed boxes with broken glass must be labeled "Broken Glass" and can be placed within the regular trash for building custodial or placed directly in the dumpster.

13. Contaminated Lab Debris

Chemically contaminated lab debris (gloves, paper towels, wipes, absorbent paper, gels) must be evaluated for proper disposal. Pipette tips and other transfer vessels are considered containers; see section 12 for disposal guidelines.

In general, lab debris does not have to be collected as hazardous waste as long as it is not grossly contaminated with hazardous chemicals (no free liquids or solids) unless it falls into one of more of the following categories:

- Contaminated spill clean-up materials.

- Debris contaminated with p-listed chemicals.

- Debris contaminated with over the regulated quantities of TCLP contaminants.

Collect debris that is either grossly contaminated or falls into one of the above categories separately from non-hazardous debris and dispose as hazardous waste. Contain the debris in a sealed bucket, can, or hazardous material bag compatible with the waste stream. Label appropriately.

14. Disposal or Transfer of Laboratory Equipment Containing or Contaminated with Hazardous Materials.

Equipment that has been used to store or handle hazardous materials must be free of hazards prior to disposal, transfer to another campus location, or transfer to Surplus property. The equipment owner is responsible for draining oil, removing hazardous components (batteries, switches), discharging

capacitors, depressurizing, etc. unless the equipment is being sold for reuse and needs to remain operable. If the equipment was used to store chemicals, biological material, or radioisotopes the user shall decontaminate the equipment prior to EHS assessment. Decontamination shall be per EHS's *Laboratory and Equipment Decontamination Procedures* . Once decontaminated contact EHS to provide an assessment of the equipment prior to surplus or disposal per the *Environmental Assessment of Equipment Prior to Surplus, Salvage or Disposal procedure*.

15. Treatment and Evaporation of Hazardous Wastes

Laboratories are allowed to adjust the pH of corrosive waste streams by neutralizing in container as long as the waste does not exhibit any other hazardous waste characteristic.

Laboratories are prohibited from all other hazardous waste treatment intended to render the waste non-hazardous including deliberate evaporation or dilution of the hazardous waste.

16. Drain Disposal

Collect all chemical waste for disposal through EHS. Drain disposal of laboratory chemicals is restricted in the followings cases:

More than *de minimis* (residual) amounts of RCRA hazardous waste from rinsing empty containers or cleaning glassware or

Any amount of RCRA acutely hazardous (p-listed) hazardous waste or

Those that exceed the local pollutant limits set by the City of Orlando (Chapter 30 Pretreatment of Wastewater)

City of Orlando (Chapter 30 Pretreatment of Wastewater), Local Pollutant Limits:

Constituent	Maximum Uniform Concentration Limit (mg/l)
Antimony	0.35
Arsenic	0.35
Barium	9.5
Beryllium	0.15
Boron	1.0
Cadmium	0.25
Chlorides	250
Chromium (Total)	0.50
Cobalt	0.65

Constituent	Maximum Uniform Concentration Limit (mg/l)
Copper	0.75
Cyanide	0.35
Fluoride	7.5
Lead	0.25
Lithium	0.50
Manganese	2.50
Mercury	0.001
Molybdenum	0.25
Nickel	1.1
PH	5.5 to 10.5
Phenols (Total)	3.0
Selenium	0.20
Silver	0.12/BMP
Sodium	300
Zinc	1.40

17. Transportation

EHS will remove hazardous waste based the “Hazardous Waste Pick Up Calendar” found on the EHS website. No laboratory workers can take laboratory waste to the main accumulation area, unless authorized by EHS.

Hazardous wastes **must** stay in the SAA at the point of generation until collection by EHS or the approved hazardous waste vendor.

Reactive wastes unsuitable for transport will stay in the lab until the hazardous waste disposal vendor is on campus for a scheduled pick up.

Off-campus departments not approved by FDEP for UCF EHS collection will have the opportunity to have waste collected by UCF hazardous waste contractor on at least a bi-annual basis.

18. Chemical waste mixed with biomedical waste or radioactive waste

Do NOT use Biohazard, Biomedical, Sharps, or Radiation waste containers for chemical waste unless the waste displays both chemically hazardous and infectious or radioactive properties.

In the event the wastes types are mixed, label the biohazard or radiation container with a laboratory hazardous waste label. Keep the mixed waste separate from other biohazardous or radioactive materials and contact EHS for disposal information.

See the [Radiation Safety Manual](#) and [Biological Safety Manual](#) for additional disposal procedures.

19. Emergency Preparedness and Response Procedures

Incidental Spills

All laboratories are supplied with a spill kit to control small spills (4L or less) of known substances that are not acutely hazardous. The spill kits contain absorbent materials that can be used on a wide range of chemicals. Laboratories with hydrofluoric acid are required to purchase spill control materials specific to hydrofluoric acid.

Lab Personnel are expected to respond to small (4L or less) spills of chemicals as long as:

He/she has knowledge of the chemical's physical and health hazards.

The spill does not involve highly toxic, reactive, or multiple chemicals where the reaction by-products are unknown, and there has been no fire, explosion, or injury.

The clean-up procedures are known and appropriate materials are readily available.

Waste generated from spill response should be disposed in accordance of section 10 of this document.

Larger Spills

Contact your supervisor or lab manager and evacuate the area if the spill:

Is Larger than 4 L or

Involves multiple chemicals where the reaction by-products are unknown
or

Involves mercury or

The clean-up procedures are not known or appropriate materials are not readily available.

Call 911 and evacuate the area if the spill:

Involves injured personnel or

Involves a highly toxic or reactive material or

May endanger the environment

Call Work Control Center at 3-5223 after contacting appropriate emergency responders. **All spills must be reported to EHS.**

20. Training

All laboratory personnel receive initial and annual training commensurate with their job responsibilities in accordance with *Training Requirements for Potentially Hazardous Activities*. Specifically:

Anyone working with hazardous materials must complete the online Laboratory Safety Series and attend a Laboratory Safety Practical. Review of the online Laboratory Safety Series is required annually.

Additionally, laboratory managers must attend the annual advanced hazardous materials course.

21. Inspections and Audits

Annual laboratory audits will be performed by EHS in accordance with the [Laboratory Safety Manual](#). Periodic inspections will be performed by EHS during routine laboratory or SAA visits.

When violations are identified, EHS will notify the PI or laboratory manager with a request for corrective actions to be performed. The PI or departmental laboratory manager must provide corrective actions within 30 days. Any violation not resolved within 30 days will be submitted to the department chair/director. Violations not resolved in 45 days may be reported to the University provost.

Unscheduled inspections from outside regulatory agencies may occur at any time. Departments and individual researchers are responsible for fines incurred for improper environmental management practices in their assigned lab space including failure to provide adequate training to lab workers.

ASSOCIATED DOCUMENTS

Chemical Inventory Procedures
Chemical Release Procedures
Environmental Management Program
Environmental Assessment of Equipment Prior to Surplus, Salvage or Disposal Procedure

Hazard Communication Program
 Hazardous Materials Transportation Policy
 In-Kind Gift Donation
 Laboratory Close-out Procedures
 Laboratory and Equipment Decontamination Procedures
 Laboratory Identification Form
 Laboratory Safety Manual
 Possession of Prescription Drugs and Controlled Substances Procedures
 Radiation Safety Manual (link to FS page)
 Training Requirements for Potentially Hazardous Activities
 Waste Determination Flowchart

REFERENCES

40 CFR Parts 260-262
 City of Orlando Chapter 30 Local Pollutant Limits
[UCF Policy 3-107 Procurement, Use, and Possession of Hazardous Materials](#)

DOCUMENT HISTORY

Date	Revision number	Author	Modifications
09/07/2023	0	Franco Del Pino	New format based on EHS_SOP001
09/12/2023	1	Renee Michel	Added 30 days to pick up waste, SB added triple rinse empty bottles instructions.