



Laboratory Chemical Waste Management Practices

1.0 Purpose / Background

Research, teaching, and clinical laboratories produce a variety of waste chemicals that may be subject to regulatory management standards and, if improperly managed in the laboratory, could pose a safety risk to laboratory personnel and the environment.

2.0 Scope

This practice applies to teaching, research, and clinical laboratories at Duke University and Duke University Medical Center.

3.0 Procedures

Any laboratory that generates waste chemicals must be familiar with the Duke University/Medical Center “Chemical Waste Policy” prior to producing chemical wastes and must register with the Occupational and Environment Safety Office prior to requesting a waste pickup. Procedures to obtain a generator’s ID can be found at <https://www.safety.duke.edu/environmental-programs/hazardous-waste/chemical-waste>. Waste chemicals generated in a *laboratory* must be managed in accordance with the following practices:

- 3.1 **Accumulation of Waste Chemicals:** Waste chemicals accumulated either during the operation of a process or otherwise accumulated in the laboratory must be placed into containers that are in good condition and compatible with the collected waste.
- 3.2 **Container Labeling and Marking:** Any container used to collect or accumulate waste chemicals must be labeled and marked with the following information using the label shown in Attachment 1:
 - **Container Contents** - Containers used to accumulate waste chemicals must be clearly marked with the words “**Waste (name of chemical)**”, any hazard(s) that will help identify the contents of the container and it must be marked or labeled with the date waste is first placed into the container.
 - **Waste Collection Dates** - Containers must have an “open date” listed on the container label and, when full or no longer being filled, a “fill date”. The “open date” is the earliest date that waste is placed in the container whereas the “fill date” is the date when the container has been filled and will no longer be used to accumulate waste.



- ***Small or Odd Shaped Containers*** – Small or odd shaped containers used to store chemical waste for pick-up or used to store chemical wastes during a laboratory clean out may use the label illustrated in Attachment 2. If the container is too small for a label, place the container in a larger container, seal, and then properly label the larger container.

3.3 **Container Management** – Containers used to collect or accumulate waste chemicals must be managed in the following manner:

- ***Closed Containers*** - Containers must be kept closed except when adding or removing wastes.
 - Chemical waste collected during processing (e.g., chromatography) on a continuous basis must be collected via tubes that are fed through the cap or container closure so that the container is closed.
 - Containers used to collect waste chemicals on a frequent, routine basis (e.g. solvent washes) must be closed at all times except when adding or removing waste.
- ***Clean Containers*** - Containers should be kept clean with no visible contamination on the outside of the container and markings or labels on the container must be readable and not defaced.
- ***Secondary Containment*** - Areas where waste chemicals are accumulated must have secondary containment sufficient to collect incidental spills that might occur when adding waste to containers.
- ***Full Containers*** - Containers should not be overfilled. “Full containers” should have at least a 10% head space to allow for expansion.

3.4 **Chemical Waste Stored in the Laboratory** - Containers used to accumulate chemical waste, unused or unopened chemicals or unknown chemicals that are temporarily stored awaiting removal by OESO must be managed in the following manner.



- 3.4.1 **Container Management** - Containers used to store waste chemicals in the laboratory:
- ❑ Must be labeled and marked as outlined in paragraph 3.2,
 - ❑ Must be kept closed and clean with no visible contamination of the outside of the container. Markings and labels on the container cannot be defaced such that they are no longer legible.
 - ❑ All containers must have secondary containment sufficient to hold the volume of the container should an accidental spill occur during storage.
- 3.4.2 **Container Storage** - Containers must be stored in a secure area under the control of the operator.
- 3.4.3 **Removal of Chemical Wastes** -Containers of chemical wastes must be removed from the laboratory within **12 months** of the accumulation start date or the date the chemical becomes a waste. In addition, no more than **55 gallons** of chemical waste may be stored in a laboratory at any one time.
- 3.5 **Acutely Hazardous Chemicals in the Laboratory**
- 3.5.1 **Acutely Hazardous Chemical Identification**
- 3.5.1.1 ***Chemical Identification*** - Commercial chemical products that are considered “acutely” hazardous when discarded are labeled as “P-List” waste by the US EPA and are subject to additional regulatory requirements. A list of these chemicals is included as [Attachment 3](#).
- 3.5.1.2 ***Container Management*** - “P-List” chemicals must be segregated into separate containers, clearly marked with the words “**Waste (name of chemical)**”, label or mark appropriate hazard(s) and label with the date waste is first placed into that container.
- 3.5.1.3 ***Container Inventory*** -An inventory ([Attachment 4](#)) of the amount (in pounds) of “P-List” waste accumulated in the laboratory must be maintained by laboratory personnel. The inventory must be included with the Chemical Waste Pick-Up Request. *Laboratories must not accumulate more than 2 pounds or 1 quart of “P-List” waste at any time.*
- 3.5.1.4 ***Waste Containers*** - Containers and inner liners that have held acutely hazardous wastes (P-listed) are deemed empty if the containers or inner liners have been triple rinsed with appropriate rinsate and no residue can



be removed from the container. The rinsate is considered a hazardous waste mixture and must be managed accordingly. If the container is not rinsed out prior to disposal, then the container and the contents must be managed as a hazardous waste and submitted to OESO.

3.6 Unused, Unopened or Unknown Chemicals in the Laboratory

3.6.1 Container Labeling and Marking

3.6.1.1 *Unused or Unopened Chemicals* – Containers holding unused or unopened chemicals no longer needed by the laboratory should be labeled as waste with the date that the chemical is considered to be no longer needed. Notify OESO to collect and remove from the laboratory.

3.6.1.2 *Unknown Chemicals* – Containers holding chemicals that cannot be identified by chemical name, chemical constituents, or waste generating process by laboratory personnel should be labeled as **Waste Unknown** and with the date that they are considered to be no longer needed.

3.6.1.3 *Expired Chemicals* – Containers of chemicals with expired dates should be labeled as waste and submitted for removal from the laboratory once found to be no longer useful. Some chemicals become more dangerous with time and improper storage. Peroxide forming chemicals that are expired should be immediately labeled and submitted as waste so they may be removed from the laboratory before peroxides have formed.

3.6.2 Removal of Unused, Unopened or Unknown Chemicals – Chemicals identified by the Principal Investigator or designated laboratory personnel as no longer needed by the laboratory and that are unused, unopened, or unknown **must be removed from the laboratory no later than 30 days after being designated as no longer needed.**

3.7 **Obsolete Chemicals or Substances** – An obsolete chemical or substance is a chemical or substance that will no longer be used for its intended purpose, or will not be used again and needs to be discarded.

3.7.1 Laboratories should conduct routine reviews of inventories and chemical stocks to identify any obsolete chemicals or substances at least once per quarter.



- 3.7.2 Any obsolete chemical or substance should be removed from shelves or other storage and placed into the laboratory's chemical waste accumulation area.
- 3.7.3 Containers holding obsolete chemicals or substances in waste accumulation areas must be labeled and marked as outlined in paragraph 3.2 of this Practice. If the chemical or substance is "unknown" as defined in paragraph 3.6.1.2 of this practice, the container should be labeled as "Waste Unknown", dated, and submitted to OESO for waste determination within 30 days following the date that the chemical was placed into the accumulation area in the laboratory.

3.8 Chemical Inventory

Principle Investigators or designated laboratory personnel should develop and maintain a chemical inventory as a matter of practice. The inventory should be reviewed quarterly and chemicals identified as expired or no longer needed by the laboratory should be removed from the laboratory within 30 days by contacting OESO to request a waste pick-up.

3.9 Laboratory Shutdowns or Close-Outs:

Whenever there is a significant process change in a laboratory that will generate waste chemicals or whenever a laboratory is shutdown or closed out the principal investigator must, before leaving that laboratory, notify OESO and ensure that all waste chemicals are properly identified, labeled and marked so that they can be properly removed from the laboratory. Laboratory close-out procedures, including a close-out inspection by OESO, can be found in Section 5 of the Laboratory Safety Manual at https://www.safety.duke.edu/sites/default/files/Section_5_UseofLaboratoryAnimals.pdf.

4.0 Roles & Responsibilities

The following key personnel will participate in the implementation of this practice:

Principal Investigators/Laboratory Directors – Principal Investigators or Laboratory Directors are responsible for ensuring that this practice is implemented in laboratories. They may choose to assign or designate a laboratory waste manager to implement the practice.



Laboratory Waste Manager – The laboratory manager, supervisor or other designated individual must implement the procedures outlined above in the laboratory or laboratories over which they have been assigned control.

OESO – OESO will provide support and oversight to the laboratories through education, training, routine assessments of laboratory performance, and scheduled chemical waste pick-ups.

5.0 Training

Laboratory chemical waste managers or other persons responsible for the management of waste chemicals in a laboratory must complete a “Laboratory Chemical Waste Management Practices” on-line OESO course at the time that they are designated to be the laboratory chemical waste manager and annually thereafter. Training records will be maintained and updated by OESO and searchable on our websites [online training portal found here](#).

6.0 Spill Response

Despite solid efforts at prevention, accidents will happen. Since a goal of our division is to prevent the release of chemicals that are harmful to human health or the environment, the OESO provides a 24-hour, 365-day per year spill response service to the Duke community. The Laboratory Emergency Response & Incident Reporting Guide. <https://www.safety.duke.edu/laboratory-safety/other-helpful-links>

7.0 References

- **Standards** -
40 CFR Parts 260- 262. – Hazardous Management Standards for Generators

40 CFR Parts 261 and 262 Subpart K - Standards Applicable to Generators of Hazardous waste; Alternative Requirements for Hazardous Waste Determination and Accumulation of Unwanted Material at Laboratories Owned by Colleges and Universities and Other Eligible Academic Entities Formally Affiliated with Colleges and Universities
- **Other Policies/Practices** -
“Chemical Waste Policy – Duke University/Medical Center”, Occupational, Environmental Safety Office.

Attachment 1 - Sample Container Label:



Waste Accumulation Container

Waste: _____

Hazard(s) Check All That Apply

Toxic _____ Ignitable _____

Corrosive _____ Reactive _____

Oxidizer _____ Irritant _____

Open Date: _____ **Fill Date:** _____

Attachment 2 - Small Container Label:

WASTE: _____

Hazard(s) Check All That Apply

Toxic _____ Corrosive _____ Flammable _____ Reactive _____

Oxidizer _____

Date: