

THE 2025 MANAGEMENT PLAN FOR CHEMICAL AND RADIOACTIVE WASTES

I. Introduction

The Chemical and Radioactive Wastes Management Plan defines the mechanisms for oversight in controlling potential exposures to chemical and radioactive wastes in the workplace. The related policies and procedures are developed to provide guidance for worker safety and protection of the environment and the public when handling chemical or radioactive wastes. The policies are based on regulatory requirements or current safety guidelines.

II. Organization of Participants

The administration and oversight for handling chemical and radioactive wastes is primarily the responsibility of the Environmental Programs (EP) Division of the Occupational and Environmental Safety Office (OESO). Specific responsibilities for members of this Division include:

Rotational Duties:

Hazardous Waste Operations Manager	Mr. M. Scott
Waste Collection and Sorting	Mr. C. Ragan/J. Harrel
Pharmaceutical Waste Management	Mr. C. Ragan
Pharmaceutical Waste Management (Clinics)	Mr. C. Ragan
Radioactive Wastes Management	Mr. M. Scott/C. Ragan
Chemical Wastes Management	Mr. M. Scott/J. Harrel
Spill Response Management	Dr. M. Stiegel
Coordination, Evaluation, Monitoring	Dr. M. Stiegel

III. Management

a. Policy Development and Review

The primary policies for managing chemical and radioactive wastes are the Chemical Waste Management Policy, which is addressed in the policies found in Section VII (Chemical Waste Management) and Supplement Q of the Duke University Safety Manual; and the Radioactive Waste Management Policy, found in Section VII and Supplement R of the Duke University Safety Manual. Both policies, as well as their related supplements are reviewed and modified when necessary or on a triannual basis, whichever is more frequent. All additions or modifications are submitted to the Duke University Safety Committee and/or the Medical Center Radiation Safety Committee for review and approval.

b. Planning Objectives

The Hazardous Waste Operations Manager is responsible for the development of annual Planning Objectives for the Division. These objectives are developed in accordance with the mission of the Institution and the OESO, any applicable laws or regulations, and all relevant accreditation standards. These planning objectives define the focus for resource commitment by the Division. Where objectives include measurable outcomes, they are considered for establishment of performance standards. Planning Objectives are submitted to the Duke University Safety Committee for review and approval. The

Planning Objectives for the Environmental Programs Division are incorporated into the Planning Objectives for OESO.

IV. Environmental Programs Management Activities

a. Reporting

Specific reporting responsibilities include:

- Seeking Duke University Safety Committee review and approval of the planning objectives of the EP Division. The DUSC also approves any Performance Improvement Plan for the Division, along with periodic reporting of monitoring results, and routine reporting of safety management activities.
- Quarterly reporting to the Radiation Safety Committees on the status of radioactive waste management.
- Biannual reporting to the State of North Carolina DENR on the status of chemical waste management.
- Periodic reports to the Duke University Safety Committee on the occurrence of spills, impact of spills, and corrective actions implemented to prevent similar spills in the future.

b. Chemical and Radioactive Wastes

Chapter VII-1 and VII-2 of the Duke University Safety Manual detail the requirements for the collection, storage, treatment, disposal and tracking of chemical and radioactive wastes generated in laboratories and other operations or activities of the University. Each department generating chemical or radioactive waste is responsible for labeling, marking, and safely accumulating wastes in the laboratory or work area until collected by the Environmental Program staff. The Environmental Program staff has a number of internal SOPs to assure proper handling, storage, and packing of hazardous chemical and radioactive wastes for shipment to a treatment, storage or disposal facility.

c. Incident Reporting/Emergency Response

Emergency Response. Information regarding spills of hazardous materials or wastes is provided in the Incident Reporting and Spill Response Guide. This flip chart guide is distributed widely across the entire Duke community.

The EP Division coordinates the chemical spill response team; the protocol and SOP's for this program are available through EP. This program covers spills of chemical materials and wastes. Radioactive material and wastes spills are managed by the Radiation Safety Division of OESO.

d. Training

Policies and procedures for responding to hazardous materials spills are included in new employee Orientation and annual update training programs. Update training programs utilize information gathered from audits, exposure data, and PI projects that reflect experience with changes in risk or control procedures. Training for chemical and radioactive waste management is specialized and therefore conducted at two levels. Initial in-service training is conducted in each area identified as generating chemical or radioactive waste with the person designated to manage those wastes. This in-service training includes a copy of the applicable policies and handout materials that specifically spell out their duties.

For EP Division personnel, the training needs are more complex. Each employee receives a battery of initial training to meet regulatory requirements with annual refreshers. In addition, a comprehensive on-the-job training program is in place. This training is shown in the following table:

Initial Training	Annual Refresher
24 hour HAZWOPER	Attend 8 hours of update training per year
Resource Conservation and Recovery Act	Annual refresher and as needed task specific training using written Standard Operating Procedures, which are attached.
Department of Transportation shipping regulations for hazardous materials and radioactive materials	Alternating between general hazardous materials and radioactive materials. DOT refresher course is offered once every 3 years, whereas radioactive training is offered every other year.
Radioactive Materials Training with written test	Annual refresher and as needed task specific training using written Standard Operating Procedures, which are attached.

V. Performance Monitoring

a. Performance Improvement Plan (Continuous Quality Improvement)

The Hazardous Waste Operations Manager is responsible for development of the Performance Improvement Plan, which is based on the objectives and priorities set by the Institution, OESO, and the Duke University Safety Committee. All plans are developed in coordination with the Accreditation and Regulatory Affairs Office to assure that all activities are appropriately integrated into the Performance Improvement Plan for Duke University Hospital. The DUSC approves the Plan each year and any PI activity is reported at least quarterly to the DUSC.

b. Effectiveness Monitoring

In addition to the PI activities and reporting, the effectiveness of the chemical and radioactive waste management program is assessed through a number of audits and inspections. All hospital inpatient units, clinics, and support departments are subject to a comprehensive safety audit on a biannual basis. These audits (EOC Walkthrough Surveys) assess the hazards, the control measures, and employee knowledge regarding chemical and radioactive waste in the workplace.

Clinical laboratories are audited and inspected annually and/or prior to CAP inspections to assess compliance with chemical and radiological waste policies. Department performance regarding chemical and radiological waste is again reviewed during the safety policy review at least every two years.

Waste management areas are inspected by the North Carolina Department of Environment and Natural Resources. The Division of Waste Management inspects chemical waste management facilities at least once each year. The North Carolina Department of Health and Human Services' Radiation Protection Section inspects the radioactive waste functions as part of the routine broad scope license inspections. The Radiation Safety Division of the OESO inspects the radioactive waste areas on a monthly basis. The Environmental Programs Division of the OESO conducts two weekly self-

inspections. These are a wipe test to detect any radioactive contamination and a walkthrough of the waste processing and storage areas.

VI. Management Plan Evaluation

The Hazardous Waste Operations Manager will evaluate this management plan annually for its scope, objectives, performance, and effectiveness. Any changes in scope will be addressed during the annual update of the plan, and any changes in the application or interactions will be incorporated into the update.

Annual planning objectives will be developed through interactions with the OESO Director and DUSC members. These objectives will address the primary operational initiatives for maintaining and enhancing the safety of the Environment of Care. Progress toward accomplishing these objectives will be reported at least in a year-end summary of effectiveness.

The performance of the plan will be assessed in part through progress in achieving the PI standards defined herein. The annual evaluations, updates, and planning efforts will be presented for DUSC review and action during the first quarter of the new calendar year.

APPENDIX A. Elements of Performance (Hazardous Waste Management):

- a. **Hazardous Waste Inventory.** A comprehensive inventory of all chemical and radiological wastes generated, stored, and disposed of is maintained in interactive databases maintained and managed by OESO. Waste chemicals are classified by hazard category and hazard characteristic to ensure compliance with EPA and DOT requirements. Radiological wastes are classified by isotope, activity and physical state to meet NRC and State of North Carolina requirements.
- b. **Hazardous Waste Management Processes.** Processes and procedures for handling, storing, transporting, and disposing of chemical, radioactive, and pharmaceutical wastes are outlined in the relevant chapters/sections of the Duke University Safety Manual.
- c. **Space Allocation for Hazardous Waste Handling and Storage.** Hazardous chemical, pharmaceutical and radiological wastes generated in hospital, clinical laboratories, or research laboratories are routinely collected by Environmental Programs, transported to the OESO waste facility in the Environmental Safety Building where wastes are processed for storage, accumulation, decay, lab packing, and treatment.
- d. **Hazardous Gases and Vapors.** Hazardous gases in cylinders or lecture bottles are generally used completely, with no disposal. Cylinders are either returned to the gas manufacturer or distributor or shipped for disposal through our hazardous waste vendor. Valves are removed from lecture bottles prior to disposal.
- e. **Emergency Procedures.** The OESO Spill Response Team responds to all chemical spills. A Contingency Plan has been developed and updated for implementation in the case of a spill or release of a hazardous waste. Spill Response personnel, and hazardous waste handlers initially receive 24 hours of training (OSHA HAZWOPER) and 8 hours of refresher training each year. Specific procedures including protective equipment requirements are contained in OESO Standard Operating Procedures.

- f. **Documentation.** All permits, licenses, reports, and other records related to waste management are maintained in OESO files. All records, permits, or licenses are maintained for 10 years past the term of the permit or license.
- g. **Manifests.** Copies of all hazardous shipment manifests are retained by OESO and maintained in files in the Occupational and Environmental Safety Office for a period of at least 3 years following waste shipment.
- h. **Hazardous Waste Labeling.** Chemical waste generated in laboratories or other areas are to be properly labeled as waste until collected by OESO. At that time, waste will be properly labeled according to DOT, EPA, and/or NRC/DENR requirements. Laboratory responsibilities are covered in “*The Chemical Waste Policy for Duke University/Medical Center*”, Supplement Q to the Duke University Safety Manual, “*Radioactive Waste Management Procedures for Duke University/Medical Center*”, Supplement R to the Duke University Safety Manual and “*Management and Disposal of Pharmaceutical Waste*”, Duke University/Duke University Medical Center.
- i. **Waste Areas.** All chemical, radiological, and pharmaceutical wastes are collected by OESO and accumulated for processing in the Environmental Safety Building.