



Lab Decommissioning and Equipment Clearance Procedure

Purpose

The purpose of this document is to provide specific procedures and guidance for proper closure (including relocations within campus) and decommissioning of all VCU laboratories and other related areas. The process will be based off of the ANSI/ASSE Z9.11 – 2016 Standard for Laboratory Decommissioning and the [Environmental Health and Safety and Risk Management Policy](#) adopted in 2016.

- Proper closure/decommissioning prepares a laboratory to be called “Safe and Compliant”.
- Proper laboratory closure:
 - Ensures that the vacated space is in a stable and known condition, safe for individuals unfamiliar with the laboratory to enter (Facilities personnel, movers, etc.)
 - Reduces disposal costs associated with unwanted and unknown hazardous materials, and
 - Encourages sustainability through redistribution of unwanted, useable laboratory equipment and supplies

Ultimate responsibility for preparing a laboratory to be safe and compliant lies with the principal investigator/laboratory director and departmental management.

Scope

The laboratory clearance procedure is mandatory for all lab moves and closures to ensure the safety of university staff, movers and contractors. The transportation of hazardous materials over the road by untrained staff subjects VCU and individuals to significant legal and financial risk. The cost of disposal, transport and decommissioning is the responsibility of the academic unit/department initiating the move.

Overview

Resources:

Lab Decommissioning and Equipment Clearance Procedure

Appendix 1: Laboratory Clearance Request Form

Appendix 2: Equipment Clearance Request Form

Appendix 3: Clearance and Decontamination Checklist for Researchers

Appendix 4: Clearance Tag (to be affixed to equipment or labs by Environmental Health & Safety (EHS) after decon./clearance)

Appendix 5: ANSI/ASSE Z9.11-2016 Compliance information and decontamination specifications

What EHS-OSH can help with:

Disposal of unwanted chemicals, biologicals or radiological materials

EHS-OHS: Industrial Hygienist

The Industrial Hygienist will be responsible for the following:

1. Conduct all IH surveys based on the initial risk assessments
2. Make recommendations on mitigation procedures including PPE requirements
3. Continuous monitoring during assessment if necessary
4. Post Mitigation Sampling
5. Provide written documentation for all IH surveys

EHS-OHS: Radiation Safety

The Radiation Safety group will be responsible for the following:

1. Review all radiation hazards that were discovered during the initial risk assessment
2. Provide mitigation support for all radiological hazards
3. Clear decontaminated equipment through the Facilities Surplus and Mover's procedures (See Appendix 2) for equipment contaminated with radioisotopes
4. Provide written documentation for all radiological surveys

Principle Investigator/Research Staff (See Appendix 3 for PI/Department Instructions/Checklist)

The laboratory occupants will be responsible for the following:

1. Initiate the decommissioning process by contacting EHS at least two months prior to scheduled leave or move date
 - a. The PI or designee can complete the Lab Decommissioning Form (Appendix 1) and return it to EHS at dohs@vcu.edu
2. Provide historical data regarding all the equipment used
3. Provide historical data regarding laboratory hazards and contamination
4. Perform cleaning and decontamination
5. Consolidate, label, and appropriately segregate chemical hazards for pick up by EHS
6. Will cover decommissioning costs including waste disposal and decontamination

Department(s) (See Appendix 3 for PI/Department Instructions/Checklist)

The department whose laboratory belongs to will be responsible for the following:

1. Covering costs for decommissioning that the laboratory PI does not cover
2. Provide assistance for abandoned labs in the form of historical knowledge
 - a. If the PI fails to complete the Lab Closeout form, the Department will be responsible for completing the laboratory decommissioning form and sending it to EHS at dohs@vcu.edu
3. Provide assistance with initial consolidation of chemicals and preliminary cleaning of the lab in the event of a sudden lab abandonment

Facilities Management: Zone Superintendents and Campus Coordinators

Zone superintendents and Campus Coordinators will be responsible for the following:

1. Provide assistance as necessary in remediation projects



2. Provide assistance and information in regards to building function and HVAC use
3. Work with and notify building occupants in the event of HVAC shut down
4. Follow the established procedure for lab equipment moves and surplus

Facilities Management: Planning and Design and Construction

Planning and Design and Construction will be responsible for the following:

1. Verify all labs are decommissioned prior to or in conjunction with initiating lab space renovation planning
2. Work with EHS to establish a timeline for decommissioning project completion
3. Review appropriate lab decommissioning documentation prior to entering or initiating lab space renovations

References

1. ANSI/AIHA Z9.11- Laboratory Decommissioning Guidelines
2. Biosafety in Microbiological and Biomedical Laboratories, 6th Edition
https://www.cdc.gov/labs/pdf/SF_19_308133-A_BMBL6_00-BOOK-WEB-final-3.pdf
3. Committee on Prudent Practices for Handling, Storage, and Disposal of Chemicals in Laboratories, Board on Chemical Sciences and Technology, Commission on Physical Sciences, Mathematics, and Applications, National Research Council,. 2007. Prudent Practices in the Laboratory: Handling and Disposing of Chemicals, National Academy Press: Washington, D.C.
4. EPA Environmental Management System Standard - 40 CFR 262.105 (b)(8)
5. OSHA Laboratory Standard 1910.1450 (Occupational Exposure to Hazardous Chemicals in the Lab) - 1910.1450



APPENDIX 1

Laboratory Clearance and Decommissioning Request Form

(Complete this form at least two months in advance of lab closure or lab move)

In order to ensure the safety of university staff and other personnel, all laboratories that are closing or moving must undergo a decommissioning process to ensure the vacated space is safe for other individuals. This process begins with the submission of this form to the Department of Occupational Health and Safety (email at dohs@vcu.edu)

A specialist from the Laboratory, Biological, or Radiation Safety, will contact the principal investigator or designee to schedule an on-site visit to discuss applicable university laboratory closeout policies and procedures.

Contact Information

Principal Investigator:	Phone:	E-mail:
Designee (if applicable):	Phone:	E-mail:
Building(s)/Room(s):		Department:
Anticipated Closure/Move Date:		Dept. Index Code:

Please check applicable box:

Laboratory Closure <input type="checkbox"/>		
Laboratory Relocation <input type="checkbox"/>	New room(s) location:	
Temporary Move for Remodeling <input type="checkbox"/>	New room(s) location:	Date returning:

- Yes No Does the lab have any Bio Registration or IACUC protocols?
If yes enter number(s): IACUC: _____ IBC: _____
- Yes No Does the lab have any biological materials/infectious agents?
- Yes No Does the lab have any Refrigerators, Freezers, Biosafety Cabinets?
- Yes No Does the lab have any Hazardous Chemicals such as flammables, oxidizers, toxins, corrosives, reactives, organic peroxides, explosives?
- Yes No Does the lab have an updated chemical inventory?
- Yes No Does the lab have a fume hood or other areas designated for the use of Highly Reactive or Highly Toxic Chemicals?
- Yes No Does the lab have any Drug Enforcement Agency (DEA) and/or Virginia Board of Pharmacy (VBOP) controlled substances?
- Yes No Are Radiological Materials used in the laboratory (Radioisotopes as well as equipment with radioactive sources)?
- Yes No Does the lab have any equipment used for research that needs to go to surplus or that needs to be moved to another campus facility or laboratory?
- Yes No Will the laboratory require assistance with disposal or moving hazardous chemicals or other hazardous materials to another laboratory/facility?



APPENDIX 2

Procedures for Clearing Research Equipment from a Laboratory for Moving or for Surplus

1. PI or designee must put in a work order in QuikFM and select “Surplus –Lab” or “Move – Lab”.
2. PI or designee must contact EHS at dohs@vcu.edu to initiate the equipment clearance process.
3. PI or designee must complete the Laboratory Equipment Form
4. PI or designee is responsible for properly decontaminating equipment
 - a. Environmental Health and Safety can give guidance as to the appropriate decontamination for certain pieces of equipment
 - b. The PI or designee may choose to contract this process to a certified contractor
5. Once the Equipment is decontaminated, the PI or designee must contact EHS at dohs@vcu.edu and schedule a date for clearance
6. EHS will clear the equipment, collect the equipment form and submit it to Physical Plant for the moving phase.



APPENDIX 3

Researcher's Checklist for Lab Decommissioning

Paperwork – Two Months Prior to move/close out

Complete the *Laboratory Clearance and Decommissioning Request Form* and submit to EHS at dohs@vcu.edu

- Provide a Chemical Inventory and Chemical Hygiene Plan
- Provide any information regarding potential contamination of surfaces and equipment

Laboratory preparation for closure:

Consolidate all hazardous materials in the laboratory.

- For hazardous chemical disposal
 - Make sure all chemicals are properly labelled and segregated for disposal
- For biological hazard/regulated medical waste disposal
 - Make sure all biological hazards/infectious agents and other biological materials are placed in appropriate biological hazard waste containers or packed in the incineration boxes.
 - Make sure all sharps are in appropriate and sealed sharps containers
- For Radiological hazards contact Radiation Safety for disposal

Decontaminate surface areas such as bench tops or equipment that has come in contact with hazardous biological, chemical or radiological material. EHS can provide guidance.

- For biological material decontamination: In general 10% bleach solution made fresh will suffice. Spray on surfaces or equipment and let air dry.
- For chemical material decontamination: Wash surfaces with soap and water unless water reactive chemicals are involved.

Laboratory Equipment for surplus or for moving to another VCU lab

Put in a work order in QuikFM

- For Surplus items select “Surplus – Labs” under for Problem Type
- For Equipment moves select “Move –Labs” under the Problem Type
- **NOTE: A separate work order must be put in for non-laboratory equipment (furniture, etc.)**

Contact EHS to discuss Decontamination and Clearance procedures

Complete the Laboratory Equipment Form, provided by EHS

Appropriately decontaminate the equipment

- If equipment requires a contractor for decontamination, contact EHS for help selecting an appropriate vendor
- EHS may be able to provide small scale decontamination of general lab equipment

Once Equipment is decontaminated, contact EHS in order to schedule an appointment for a final clearance inspection



APPENDIX 4

Lab and Equipment Clearance Stickers



VCU

Finance and
Administration

LABORATORY EQUIPMENT CLEARANCE

This unit has been inspected and cleared by OEHS
for chemical and biological hazards

Date of Clearance: _____
(mm/dd/yyyy)

OEHS Representative: _____
Please contact OEHS at (804) 828-1392 or dohs@vcu.edu if you
have any questions

APPENDIX 5

ANSI/ASSE Z9.11-2016 Compliance information and decontamination specifications

The decommissioning process consists of five major components/phases:

1. Analysis/Planning and Scoping
2. Risk Assessment
3. Remediation and Mitigation
4. Verification
5. Documentation

Analysis/Planning and Scoping

The process begins with a pre-project analysis/planning and scoping process in order to determine a scope and a plan for decommissioning. An initial assessment is done and information shall be collected to determine the extent of decommissioning that will be needed:

1. Historical Review of the lab (hazards associated with the laboratory, equipment, etc.)
2. Next use of the lab
3. A review of surveys conducted in the past (Radiation, IH, etc.)
4. Regulatory review (Controlled Substances, etc.)
5. Stakeholders' roles and responsibilities
6. Acceptance Criteria
7. Funding and Budgeting
8. Acquisition and disposal/removal strategy
9. Construction/Renovation or process management

Risk Assessment and Characterization of Contamination

Risk assessment and characterization is an assessment of the space and identification of potential process contaminants by Laboratory Safety, Biosafety and Radiation Safety personnel as applicable. If the initial assessment in the scoping phase does not reveal any evidence of potential process contamination, a full risk assessment is not required. The purpose of a full risk assessment is to evaluate the potential risk of contaminants that are identified during the initial assessment. Each potential contaminant of concern is identified along with specific risk criteria and cleanup/decontamination process. This may include any or all of the following to determine the extent of contamination and whether or not it exceeds established criteria for decontamination:

1. Sampling
2. Monitoring
3. Other Analysis (i.e. analytical lab analysis of samples)
4. Visual inspections

5. Interviews with lab personnel
6. Review of all EHS assessment and incident reports
7. Chemical inventory and Chemical Hygiene Plan Review

Remediation and Mitigation

Remediation and mitigation is the process of decontaminating a space and includes decontamination and analysis. Decontamination is the process to reduce the risk from hazardous substances to an acceptable level. Remediation is the act or process of correcting an existing risk, and mitigation is the step taken to prevent future risk.

The remediation component is implemented as assessment results indicate it is necessary.

Verification

Verification consists of visual inspections, document review, testing of assumptions, confirmatory testing, comparison to original scope and relevant standards, identification of deviations from scope and standards, and resolution of deviations from original scope and standards. This step must be done in accordance to a pre-approved written plan.

Documentation

Documentation is the final component of decommissioning, but needs to be thoroughly maintained throughout the process. Regulatory and legal documentation must be kept at a minimum. Documentation serves as the historical record and the lessons learned for the project. During the scoping phase, decisions must be made about the following:

1. When documentation will begin
2. The sources of the documentation
3. The level of documentation that is needed,
4. The responsible parties for collecting and maintaining the documentation,
5. The identification of a documentation coordinator.

Analysis Planning and Scoping

Pre-project planning is critical to determining the efficacy of scoping and proceeding with the decommissioning plan. Researchers who want to close a lab or move a lab must inform EHS at least two months prior to the closure date. Upon receipt of request for lab decommissioning, EHS staff will initiate the decommissioning process by conducting an initial assessment of the laboratory. This includes meeting with stakeholders (Laboratory Staff, Departmental Staff, and Physical Plant). It will also include a written initial assessment of the laboratory:

1. Develop a preliminary scope
 - a. Quick initial assessment
 - b. Departments involved
 - c. Types of lab waste that requires disposal
 - d. Determination of whether full risk assessment is required



- e. Determination of whether a contractor will be used for decontamination
- f. Budget/Index Codes
- g. Preliminary Timeline
- 2. A Decommissioning Assessment Plan shall be created after the preliminary scope is approved by the laboratory staff, physical plant and EHS and initial funding for project planning is secured. The Assessment Plan shall include the following information:
 - a. Purpose of initial facility assessment
 - b. Relevant data/information to be collected and documented
 - i. IH Surveys
 - ii. Radiological Surveys
 - iii. Biological Surveys
 - iv. Analytical Testing Reports
 - v. Incident reports
 - vi. Lab Safety Assessment Reports
 - vii. Chemical Hygiene Plan
 - viii. Chemical Inventory Lists
 - ix. Biological Hazard/Infectious Agents Inventory Lists
 - x. IBC/IACUC Protocols
 - xi. Laboratory Equipment List and Maintenance Records
 - 1. All laboratory equipment must go through the Physical Plant equipment clearance process regardless of whether decontamination is required (see Appendix 1)
 - 2. Non-laboratory equipment (chairs, desks, etc.) must also go through a Physical Plant work order system
 - xii. Final Clearance criteria
 - c. The types of contaminants anticipated and general areas that may be contaminated
 - i. Equipment
 - ii. Surfaces
 - iii. Floor
 - d. Decontamination Requirements:
 - i. Biological decontamination
 - ii. Chemical decontamination
 - iii. Radiological decontamination
 - iv. Specific equipment procedures
 - e. Information regarding the use of Contractors if deemed appropriate by EHS
 - f. Hazardous and Biological Waste Disposal Procedures
 - g. Emergency Response procedures
 - h. Regulatory Reporting Requirements for contaminants if applicable
 - i. Decommissioning clearance criteria and documentation to be released to physical plant
 - j. Projected Timeline for Scope



Risk Assessment

Once it is determined that a Risk Assessment needs to be conducted in the laboratory, EHS will do the following:

1. Information shall be collected to determine the extent of decommissioning that will be needed:
 - a. Determination of next use
 - b. Historical Review
 - c. Regulatory Review
 - d. Stakeholders' roles and responsibilities
 - e. Acceptance criteria
 - f. Funding
 - g. Budget cycle
 - h. Acquisition strategy and construction or process management
 - i. Identification endpoint
2. Documents for review shall include:
 - a. Facility Records
 - b. Laboratory inspection reports
 - c. Laboratory incidents and spills reports
 - d. IBC/IACUC protocols
 - e. Chemical Hygiene Plan/Hazardous Communication Plans
 - f. Laboratory SOPs
 - g. Chemical Inventories
 - h. Exposure Monitoring Reports
 - i. Equipment maintenance records
 - j. Any records deemed appropriate for contaminant or lab use information
3. Interviews of occupants and other knowledgeable people:
 - a. Building Managers
 - b. Operation and Maintenance personnel
 - c. Chemical Hygiene Officers
 - d. Principle Investigators
 - e. Laboratory Directors
 - f. Research Staff
4. Visual Inspection of the Facility or Laboratory
 - a. Hazardous materials: current uses
 - b. Hazardous materials: indications of past uses and releases
 - c. List of locations of potentially hazardous items found
 - d. Evidence of contaminated areas and locations
 - e. Current waste management practices
 - f. Notation of areas that could not be inspected
 - g. Evidence of changes or damage to structural components, electrical distribution, lighting, ventilation plumbing, gas or other utilities
5. Special Notations
 - a. Reactive Chemical Use (Perchloric acid, picrates and azides)



- b. Radioactive materials
- c. Pest Management
- d. Other hazards
- 6. Sampling to determine presence of contaminants
 - a. Develop a Sampling and analysis plan
 - i. Monitoring
 - ii. Sampling
 - iii. Analysis of materials
 - iv. Sampling/Monitoring Report
- 7. Risk Assessment Report
 - a. Purpose of Report
 - b. General Building history
 - c. Project preliminary scope of work
 - d. Pertinent records
 - e. Sampling Results
 - f. Results of interviews
 - v. List of personnel interviewed (names, title and department)
 - g. Visual Inspection Results
 - h. Regulatory requirements, industry decontamination standards and risk reduction goals
 - i. Conclusion regarding actual and potential contamination
 - j. Preliminary risk assessment regarding the need for performing decommissioning
 - vi. EHS recommendations
 - vii. Requirements for outside contractors if any
 - viii. Recommendation for performing or not performing decontamination
- 8. Written Decommissioning Scope of Work
 - a. The scope of work will describe the process for and extent to which the decommissioning project, as assessed, shall be executed
 - b. The scope of work shall contain a general understanding of the project:
 - i. Description and intent of proposed project
 - ii. Buildings, areas and systems to be renovated/demolished
 - iii. Occupancy and use after project completion
 - iv. Occupancy and use during project work
 - v. Other facilities, systems and resources potentially impacted (HVAC, electricity, etc)
 - vi. Preliminary project schedule and/or phasing concepts
 - vii. Preliminary cost estimate
 - viii. Potential sources of services for implementing project work
 - 1. Contracted
 - 2. In House
 - ix. Desired endpoints
 - c. The Scope of Work will contain details about the following:
 - i. Preparation of plans and schedule of contaminated areas
 - ii. Listing of and compliance with applicable regulatory standards



- iii. Preparation of Overall Safety Plan
- iv. Obtaining permits if necessary
- v. Listing of decontamination criteria to be employed
- vi. Building occupant and worker protection
- vii. Monitoring and Sampling Plan
- viii. Decontamination Procedures
- ix. Waste management and recycling
- x. Verification procedures
- xi. Required inspections and approvals
- xii. Documentation and deliverables
- xiii. Personal Protective Equipment

Remediation and Mitigation

The goal of remediation and mitigation shall be to reduce risk from hazardous substances to a level determined to be sufficient per scope (acceptance criteria). The following processes will take place during remediation and mitigation:

1. Determine the physical boundary of the projects (rooms, areas, etc.)
2. Determine and list all equipment requiring decontamination
3. List or determine any unknowns
4. Use appropriate standards or consensus guidelines to determine acceptable threshold levels regarding remediation and mitigation to ensure occupational and environmental safety
5. Asbestos/lead hazards must be mitigated prior to any cutting, removal, sanding, etc. of materials suspected of having asbestos or lead
 - a. Surface decontamination must be done prior to asbestos or lead mitigation
6. Waste disposal process is developed
7. Remediation Plan Process
 - a. Coordination with design and construction and/or contractors
 - b. Consider unforeseen hazards
 - c. Review and approve of all remediation plans prior to commencing
 - d. Establish communications process for remediation work
 - e. Initiate Remediation plan
 - i. Decontaminants
 - ii. Areas of decontamination
 - iii. Equipment
 1. Once decontaminated, all equipment to be moved or going to surplus must follow the Physical Plant Surplus/Move Procedures (see appendix 1)
 - f. Demolition as needed
 - g. Waste generation/disposal
 - i. Waste water collection
 - ii. PPE
 - iii. Porous materials, etc.



- iv. TCLP and other Hazardous Waste Characterization may need to be conducted for all waste water and non-decontaminated waste.
 - h. Sampling analysis/observation
 - i. Review
 - j. Acceptance
 - k. Describe potential risk/hazard to workers during remediation
 - 8. Remediation Plan Elements/Scope of Work: This may be written by the contractors
 - a. Scope
 - b. Environmental Health and Safety Plan
 - i. Sampling requirements
 - 1. Mercury
 - 2. PCBs
 - 3. Asbestos
 - 4. Perchloric hoods
 - 5. Lead Shielding
 - 6. Porous debris
 - 7. Non porous debris
 - 8. Radiological contamination
 - 9. Biological materials
 - 10. Other
 - ii. Protection levels for groups within the remediation zone
 - iii. Requirements for management of bulk storage materials
 - iv. Requirements for management of contaminated materials (cannot be decontaminated and must be removed)
 - v. Detection methods and protocols for sampling and verification shall be selected
 - vi. Quality Assurance/Quality Control
 - 1. Appropriate certification of vendors
 - 2. Outside contractors for sampling and analysis
 - 3. Destination records (manifests for waste)
 - vii. Procurement of remediation contractors
 - viii. Receive/review/initiate remediation plan
 - ix. Site release process
 - 1. Inspections of site
 - 2. Sampling
 - 3. Final documentation of remediation

Verification

Verification is an iterative process and takes place after decontamination and remediation. Requires a comparison of current status to local, state and federal or industry standards for future use, and a comparison to best practices and organizational requirements.

- 1. Verification occurs at the following times in the decommissioning process:
 - a. Before the final status report



- b. At any regulatory update
- c. At release of the area for future use
2. There are four major elements of decommissioning verification:
 - a. Verification of decontamination
 - b. Verification of sampling and analysis
 - c. Verification of compliance to original scope
 - d. Verification of compliance to relevant standards
3. Primary Steps
 - a. Visual inspection
 - b. Document review
 - c. Testing assumptions
 - d. Confirmatory sampling (done after decontamination of the lab)
 - e. Comparison to original scope and relevant standards
 - f. Identification of deviations from scope and standards and pre-defined acceptance criteria
 - g. Identifying further needs for decontamination or sampling
 - h. Worker protection
 - i. Maintaining regulatory compliance
 - j. Resolution of deviations from original scope and standards

Documentation

Documentation required for a facility or space decommissioning shall consist of the decommissioning plan, a decommissioning report and a statement of risk by a qualified individual to determine parameters for an unrestricted release of the facility.

1. Decommissioning Plan
 - a. Project Scope
 - b. Site History
 - c. Site Description
 - d. Site Contacts
 - e. Deactivation
 - i. Completion of operations
 - ii. Disposition of materials
 - iii. Cleaning/decontamination
 - iv. Disposition of equipment
 - v. Disposition of records
 - f. Clearance Sampling
 - g. Documentation
 - i. Location and contact information for records
2. Decommissioning Report
 - a. Decommissioning Plan
 - b. The actions taken to implement the decommissioning plan
 - c. Clearance sampling results and interpretation of data
 - d. Ancillary documents



- i. Site maps
- ii. Photographs
- iii. SDS
- iv. Hazardous materials inventories
- v. Hazardous waste manifests
- vi. Contractor qualifications
- vii. Contractor work instructions etc.
- viii. Worker training and PPE
- ix. Equipment disposition inventories
- x. Pre-decommissioning facility surveys
- xi. Risk assessment Criteria

3. Final Clearance

- a. A written statement of acceptable level of risk for an unrestricted release shall be made by Environmental Health & Safety upon a determination that based on decommissioning activities, conditions within the decommissioned facility pose no significant health risk to occupants.