

LABORATORY CLOSURE AND DECOMMISSIONING POLICY

Yale University is committed to the health and safety of its students, faculty, staff and visitors as well as the surrounding community and environment in which Yale personnel conduct their studies, scholarship, and work. The goal of this Policy is to ensure safe and compliant transitions in laboratory occupancy. More specifically, in order to protect others when an investigator vacates laboratory space, this Policy requires that none of the investigator's research materials may be left behind in the laboratory. Further, the Policy requires that the investigator assure that proper laboratory decommissioning has been conducted, e.g., that all laboratory equipment, fixtures, furniture and space are properly cleaned and decontaminated.

Principal Investigators, Departments and Project Managers are equally responsible for complying with advanced notification and other requirements. These overlapping requirements are necessary because—depending on the situation—only one of these entities will have the ability to comply with this Policy.

This Policy will be administered by Yale Environmental Health and Safety (EHS).

APPLICABILITY

This Policy applies to:

- Research and teaching laboratories owned by Yale or occupied by Yale students, faculty or staff.
- Laboratories that use chemicals, radioactive materials, biologicals, human pathogens, controlled substances, compressed gases, large equipment, mercury containing monitors, etc.
- Laboratories or ancillary research spaces (e.g., cold rooms, freezers in hallways) that are vacated by an investigator.
- Laboratory space that is to be reused by a different investigator, as well as laboratory space that is to be converted to another use.
- Movement of safety critical equipment.

BACKGROUND

This Policy is necessary for the following reasons:

- EHS oversight of laboratory decommissioning and transfer ensures transportation and licensing compliance. If EHS is not contacted in advance of a laboratory closure, there is a high risk of unsafe and/or noncompliant transport of research materials.
- The U.S. Environmental Protection Agency generally requires:
 - Within three days of vacating a laboratory, all chemicals must be removed.
 - Prior to vacating a laboratory, laboratory personnel (who are most knowledgeable) must properly label and/or identify all remaining chemicals, samples and containers.
- Prior to vacating a laboratory, the U.S. Nuclear Regulatory Commission requires removal of all radioactive materials and waste. No radioactive material or waste may be unsecured.
- Prior to vacating a laboratory, the U.S. Drug Enforcement Agency and the State of Connecticut requires removal of all controlled substances. No controlled substance may be unsecured.
- Prior to vacating a laboratory, the State of Connecticut requires removal of all human pathogens and infectious waste from research with human pathogens.

- Laboratory equipment, fixtures, furniture and space that has not been properly cleaned and decontaminated may pose a hazard to EHS staff, movers, construction and renovation personnel and future occupants.
- Research materials (e.g., chemicals, biologicals, radioactive materials, needles) left in a vacated laboratory pose hazards to EHS staff, hazardous waste contractors, construction and renovation personnel, and future occupants. These are extreme hazards when such materials are unlabeled, unidentified, unstable, improperly stored, contaminated or improperly contained. When unsecured in a vacant laboratory, these research materials are also at risk of theft, diversion and misuse.
- Research materials that are not promptly removed from a vacated laboratory are ineligible for redistribution or recycling making disposal the only viable option. Disposal costs are dramatically more expensive than recycling/redistribution costs due to extra characterization and necessarily conservative handling.
- To ensure safety, safety critical equipment must be certified in place. Prior to use, EHS must recertify all safety critical equipment that has been moved.

The Principal Investigator and his or her laboratory staff are primarily responsible for complying with this Policy because they are most knowledgeable (and may have the only knowledge) of the identity, character and hazard of materials and contamination in their laboratory.

EHS RESPONSIBILITIES

When an investigator vacates laboratory space, EHS is responsible for verifying that the space is free of hazardous materials and contamination. EHS will complete this verification in a timely manner, and will provide a written approval to the department (for new occupancy) or project manager (for space to undergo construction/renovation).

- EHS staff will provide detailed instructions and guidance to investigators and their staff in advance of all laboratory moves, closures and decontamination, including requirements for labeling and identification of research materials.
- EHS staff will evaluate and provide guidance for the movement of research materials. The EHS Research Materials Shipment Request form can be found at the following link: <http://www.yale.edu/ehs/hazmatshiplogon.htm>. If the materials in question are to be moved on city streets and lab staff are not trained to properly package and/or ship these items, EHS will provide a trained individual to assist in this process. Each Principal Investigator will be responsible for the cost of the shipping containers as well as all incurred shipping charges.
- EHS will pay for the removal and ultimate disposal of all properly labeled and classified research materials. If research materials are inappropriately left after the space is vacated, EHS will arrange for the proper disposal and decontamination. The costs of these activities, including labor charges to properly segregate and label hazardous materials, will be charged directly to the investigator.

PRINCIPAL INVESTIGATOR RESPONSIBILITIES

Each investigator is responsible for:

- **30 Day Notification of Laboratory Vacancy:** To ensure proper characterization and disposition of research materials and decontamination of laboratory equipment, fixtures, furniture and space, investigators must notify EHS 30 days prior to vacating laboratory space. EHS notification is required even if only a single room is to be vacated, and even if the space is to be used by another investigator.

- The safety of materials and equipment, including the safety and compliance of materials and equipment left behind in a vacated laboratory, even if the laboratory is to be used by another Principal Investigator.
- Adherence to established Yale Environmental Health and Safety procedures for safe and compliant disposal and decontamination of research materials. If these procedures are not followed, EHS will arrange for the proper disposal and decontamination, as it deems necessary. The costs of these activities, including labor charges to properly segregate and label hazardous materials, will be charged directly to the investigator.
- Ensuring that research material cleanouts are performed by staff knowledgeable of hazards and trained in all required safety disciplines.
- Informing EHS prior to the shipment or movement of any hazardous materials especially those requiring transportation on city streets. The EHS Research Material Shipment Request form can be found at the following link: <http://www.yale.edu/ehs/hazmatshiplogon.htm>.
- Notification of EHS whenever they plan to move any of the following safety critical equipment, even if the move is across a room or from one room to another (see Attachment 2 for detailed clearance requirements):

Autoclaves

Automated film processors

Biological safety cabinets

Clean Benches (Horizontal or Vertical Laminar

Flow)

Compressed Gas manifold delivery systems

Electron microscopes

Ethylene oxide sterilizers

Fume hoods

Gamma counters (or gamma detectors)

Glove boxes

High Magnetic Field Equipment

Lasers - Class IIIb or IV

Liquid scintillation counters (LSC)

Refrigerators/Freezers

X-ray equipment

DEPARTMENTAL RESPONSIBILITIES

Department Chairs and Business Managers are responsible for:

- **30 Day Notification of Laboratory Vacancy:** To ensure proper disposal of research materials and decontamination of laboratory equipment, fixtures, furniture and space, Departments must notify EHS 30 days prior to vacating laboratory space. EHS notification is required even if only a single room is to be vacated, and even if the space is to be used by another investigator.
- The costs of decontamination and disposal of research materials in situations where there has been a failure to meet the requirements listed in the Investigator Responsibilities section and those costs cannot be recovered from the investigator.
- Securing written approval from EHS before reassigning vacated laboratory space.
- Securing written approval from EHS before initiating construction or renovation in vacated laboratory space.
- Ensuring that research material cleanouts be performed by staff knowledgeable of hazards and trained in all required safety disciplines, including temporary hires on an as needed basis.

PROJECT MANAGER RESPONSIBILITIES

Project Managers who are assigned laboratory renovation projects are responsible for:

- **60 Day Notification of Laboratory Vacancy:** To ensure proper disposal of research materials and decontamination of laboratory equipment, fixtures, furniture and space, Project Managers must notify EHS 60 days prior to vacating laboratory space. EHS notification is required even if only a single room is to be vacated, and even if the space is to be used by another Principal Investigator.
- The costs of laboratory renovation projects that relate to decontamination and research material disposal.
- Ensuring that vacated laboratory space is re-occupied without prior written approval from EHS.
- Ensuring that construction or renovation not commence in vacated laboratory space without prior written approval from EHS.

SUPPLEMENTARY GUIDANCE AND REFERENCES

Yale Environmental Health and Safety procedures can be found on its web site:

- “Clearances/Decons,” Yale EHS, <http://www.yale.edu/ehs/decons.htm> .
- “Hazardous waste disposal procedures,” Yale EHS, <http://www.yale.edu/ehs/waste.htm>.
- “Research Material Shipping Info.,” Yale EHS, <http://www.yale.edu/ehs/hazmatship.htm>.

Laboratory Decommissioning Standard, ANSI Z9.11 (2008), American National Standards Institute

Yale Facilities Operations:

- “Facility Services,” Yale Facilities, <http://www.facilities.yale.edu/Who/FandO.asp>

COMMITTEE REVIEWS and APPROVALS:

Biosafety – 8/7/09

Radiation Safety – 6/8/09

University Safety – 8/11/09

Attachment 1

Laboratory Move Preparation Guide

Before any laboratory move or closure can occur, the following preparations must take place.

General – all laboratories:

1. Depending on the size and scope of the move, stop research activities 1-2 weeks prior to move. Contact your Safety Advisor or EHS to help estimate the time commitment.
2. Clean off all benches. Remove lab matting and clean any spilled materials. Wipe down all benches with an appropriate disinfectant.
3. Completely empty all drawers.
4. All razor blades, needles, syringes, pipette tips, etc. in drawers, on benches, shelves or the floor must be disposed of properly.
5. If research materials must be shipped to another location or institution, a hazmat shipping request form must be completed via the following link:
<http://www.yale.edu/ehs/hazmatshiplogon.htm>. Do not ship any material until contacted by EHS.

Radiation Safety Preparations:

1. Collect all radioactive waste and contact EAS to schedule a pick-up. Pick up requests can be emailed to waste.requests@yale.edu; it may take up to 5 business days for waste removal.
2. Items which will be moved by non-lab personnel or which will be discarded must be cleared by EHS.
3. For in-house moves in which items stay inside buildings and are moved by laboratory staff, no EHS clearance is necessary. Laboratory staff must should wipe test and meter these items.
4. Radiation which is moved inside buildings may be properly packaged in 2 sealed leak-proof containers, placed on a cart and taken to the new location by trained lab staff. Care must be taken to ensure that proper shielding is in place, if necessary. EHS personnel should be consulted if large amounts of isotope or isotope with significant dose rates are to be moved.
5. Do not deface labels on equipment to be checked by EHS until it is cleared.
6. Assemble all labeled items (large items may be left where they are) for EHS to clear.
7. Conduct a final monthly survey of the lab. Clean any contamination found and re-survey and document results.

Chemical Safety Preparations:

1. Clean any equipment used with hazardous materials.
2. Hazardous waste and unwanted chemicals must be labeled as hazardous waste and inventoried on a laboratory clean-out sheet. Contact EAS for pick up by emailing waste.requests@yale.edu.
3. Non-hazardous dry chemicals listed in Appendix E of the Hazardous Waste Policy and Procedures Manual (pg 39) may be properly packed and moved within buildings. All other chemicals must be evaluated by EHS or packaged and shipped by an EHS approved hazmat transporter.
4. Chemicals which are moving within University buildings must be placed in a leak proof secondary container. Chemicals may be placed on a cart and moved by lab personnel.
5. Have all gas cylinders removed by the vendor.

Biological Safety:

1. Use an appropriate disinfectant, prepared in accordance with manufacturer's instructions, to decontaminate all equipment. Post a "Biosafety Notice" on each item once decontamination procedures have been completed (See Attachment 3).
2. Properly autoclave/dispose of all infectious/biological waste.
3. Ensure biosafety cabinet (BSC) has been decontaminated. Call the BSC service coordinator at 737-2121 to schedule a decontamination appointment at least 7-10 working days prior to the anticipated move date. Decon should be performed at least 2 days pre-move.
4. Properly dispose of all sharps, including unused needles and syringes.
5. Biological material moved within building must be packaged in 2 sealed leak-proof containers and should be placed on a cart and moved to new location by lab personnel. Within University buildings, the moving company may move BL1 or BL2 materials in -80 freezers if the materials are properly packaged in 2 leak proof containers by the laboratory personnel.

Prior to moving company arrival:

- All chemicals must be removed from laboratory.
- All waste must be out of the laboratory. This includes chemical, biological and radioactive waste.
- All benches must be decontaminated.

After the moving company has finished:

- Ensure that all sharps (razors, syringes, needles, pipette tips, etc.) have been removed from areas where equipment may have been, including draws and shelves

Attachment 2

Laboratory Move Checklist

Equipment	Required for Moves Within Buildings	Required for All Other Moves	Status
Biosafety Cabinet	<ul style="list-style-type: none"> <input type="checkbox"/> Users clean and surface decontaminate unit. <input type="checkbox"/> BSC formaldehyde decontamination and recertification managed by EHS. (Note: Formaldehyde decontamination, as well as gas and vacuum disconnection will be done prior to move.) 	Same	
Liquid Scintillation / Gamma Counters	<ul style="list-style-type: none"> <input type="checkbox"/> User removes and discards samples in approved waste containers. <input type="checkbox"/> External standards shipped separate from unit by EHS. <input type="checkbox"/> EHS surveys and prepares shipping papers for shipment. <input type="checkbox"/> Manufacturer preps unit for move. 	Same	
Ultra-Centrifuges	<ul style="list-style-type: none"> <input type="checkbox"/> Users clean, decontaminate and post “Biosafety Notice” tag on unit. 	Same	
Automated x-ray film processors	<ul style="list-style-type: none"> <input type="checkbox"/> Outside service provider removes chemicals, cleans unit, and packages for move. 	Same	
Compressed Gas Cylinders	<ul style="list-style-type: none"> <input type="checkbox"/> Researchers remove regulators and manifolds and cap all tanks. <input type="checkbox"/> Contact supplier to remove gas cylinders. 	Same	
Vibration Sensitive/Fragile Equipment (e.g. – confocal microscopes, balances)	<ul style="list-style-type: none"> <input type="checkbox"/> Users clean and decontaminate as necessary, and post “Biosafety Notice” tag on unit. <input type="checkbox"/> Strongly recommend involvement of a service company that is familiar with this equipment. 	Same	

Equipment	Required for Moves Within Buildings	Required for All Other Moves	Status
Incubators	<ul style="list-style-type: none"> <input type="checkbox"/> Users disconnect gas feed line. <input type="checkbox"/> Users must drain jacket. <input type="checkbox"/> Users clean, decontaminate and post “Biosafety Notice” tag on unit. 	Same	
HPLC	<ul style="list-style-type: none"> <input type="checkbox"/> Users disconnect chemical feed and waste lines. <input type="checkbox"/> Units used with radioactive material must be surveyed by EHS prior to move. 	Same	
UV Boxes / Transluminators/ Imaging stations	<ul style="list-style-type: none"> <input type="checkbox"/> Users clean, decontaminate unit and post “Biosafety Notice” tag on unit. 	Same	
Refrigerators/ Freezers	<ul style="list-style-type: none"> <input type="checkbox"/> Users Inventory/Identify contents of unit. <input type="checkbox"/> Users clean, decontaminate and post “Biosafety Notice” tag on unit where appropriate. Remove all liquids that could spill, hazardous chemicals and/or infectious materials. <input type="checkbox"/> Remove all radioactive materials; transfer to new space with assistance of EHS. EHS to survey external surfaces prior to move. <input type="checkbox"/> EHS to evaluate transportation procedures following hazard evaluation. <input type="checkbox"/> Dispose of all unwanted materials. <input type="checkbox"/> If defrosting units, use absorbent pads or lab matting to contain all liquid that is generated. 	<ul style="list-style-type: none"> <input type="checkbox"/> In addition to “Required for Moves within Buildings”, empty unit of all hazardous biological material. 	
Materials	Required for Moves Within Buildings	Required for All Other Moves	Status
Chemicals	<ul style="list-style-type: none"> <input type="checkbox"/> Lab staff should segregate non-hazardous and hazardous chemicals (Non-hazardous chemicals are listed on page 39 of the Hazardous Waste manual). <input type="checkbox"/> Dispose of all unwanted materials via EHS- Environmental Affairs Section – 432-6545 or online forms at: http://www.yale.edu/ehs/waste.htm <input type="checkbox"/> Non-hazardous chemicals can be transported by moving vendor. <input type="checkbox"/> Lab staff or EHS approved hazmat vendor moves hazardous chemicals to new location through halls. 	<ul style="list-style-type: none"> <input type="checkbox"/> Hazardous chemicals must be manifested and transported via DOT regulations by an EHS approved hazmat transporter. 	
Materials	Required for Moves Within Buildings	Required for All Other Moves	Status

Radioactive Materials	<ul style="list-style-type: none"> <input type="checkbox"/> Radioactive material must be packaged and shipped by EHS. <input type="checkbox"/> No Radioactive waste to be transferred to new lab. <input type="checkbox"/> Dispose of all unwanted materials via EHS- Environmental Affairs Section – 432-6545 or online forms at: http://www.yale.edu/ehs/waste.htm 	Same	
Biological Materials	<ul style="list-style-type: none"> <input type="checkbox"/> Users clean, decontaminate and post “Biosafety Notice” tag (see Attachment 3) on all pieces of equipment to be moved. <input type="checkbox"/> Dispose of all unwanted materials via EHS- Environmental Affairs Section – 432-6545 or online forms at: http://www.yale.edu/ehs/waste.htm <input type="checkbox"/> BL-1 materials can be transferred by moving vendor within Refrigerators/Freezers. Primary containers must be closed and leak proof. If items are left in refrigerators and/or freezers packing material should be used to prevent breakage during transport. <input type="checkbox"/> Other Biological Materials – specific training is required, please refer to the “Transportation and Transfer of Biological Agents Training Guide.” 	Same	
Materials	Required for Moves Within Buildings	Required for All Other Moves	Status
Liquid Nitrogen	<ul style="list-style-type: none"> <input type="checkbox"/> Decontaminate the exterior and attach a Biosafety 	<ul style="list-style-type: none"> <input type="checkbox"/> When possible, it is best to ship 	

<p>Dewars With Biological Materials</p>	<p>Notice. Indicate on the Biosafety Notice that the interior remains contaminated. Can be moved by lab personnel within buildings.</p>	<p>items in DRY nitrogen shippers since they are exempt from the shipping regulations. However the regulations for the biological materials remain in place.</p> <ul style="list-style-type: none"> ❑ If it is necessary to ship a liquid nitrogen Dewar, the unit must be moved by the hazmat shipper for the move. ❑ Specific training is required; please refer to the “Transportation and Transfer of Biological Agents Training Guide.” 	
<p>Liquid Nitrogen Dewars with no other hazards</p>	<ul style="list-style-type: none"> ❑ Dewars containing liquid nitrogen can be moved by lab personnel within buildings. 	<ul style="list-style-type: none"> ❑ Completely empty liquid nitrogen Dewars can be shipped or moved at any time. ❑ When possible, it is best to ship items in DRY nitrogen shippers since they are exempt from the shipping regulations. ❑ If it is necessary to ship a filled liquid nitrogen Dewar, the unit must be moved by the hazmat shipper for the move. 	
<p>Controlled Substances</p>	<ul style="list-style-type: none"> ❑ Users must transport to new lab, ONLY AFTER State of CT DEA inspection of new facility has occurred. Contact the Controlled Substance coordinator at 785-3550 to coordinate state inspections. 	<ul style="list-style-type: none"> ❑ Contact the Controlled Substance coordinator to coordinate a controlled substance disposal with the State of CT DEA 	
<p>Unused Radioactive, Chemical and Biological waste containers</p>	<ul style="list-style-type: none"> ❑ EHS to remove and replace. 	<p>Dispose of all unwanted materials via EHS-Environmental Affairs Section – 432-6545 or online forms at: http://www.yale.edu/ehs/waste.htm</p>	

Attachment 3

Yale Environmental Health & Safety
BIOSAFETY NOTICE

This equipment's exterior and interior surfaces were decontaminated, and are free of any Biological Hazards. This notice does not apply to radiation or chemical hazards (if any).

This equipment is released for: (Circle one)

Service/Repair

Relocation

Discard

Decontamination performed by: _____

Chemical or disinfectant used: _____

Date of decontamination: _____

Location of equipment: _____

Lab telephone number: _____

Note: The following areas of this equipment remain contaminated and a biohazard warning label has been attached near the contaminated area. Additional forms are available through Environmental Health and Safety at 785-3550.

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