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SOP Owner:	Susan Leite	Approval: EHS: Lou DiBerardinis; Safety Program: Peter Bochnak

Moving a Laboratory: Preparation, Decontaminating, Decommissioning and Cleaning

1. Purpose / Background

Laboratory renovations, repair and maintenance, moves, or change of occupancy, often call for laboratory equipment and spaces to be decontaminated and moved prior to opening the space for future activities. These decontamination procedures and steps for moving a lab are conducted to ensure the safety of future personnel who are required to perform activities in the space.

This SOP identifies the actions to be taken by the EHS Office, contractors, and DLC personnel to safely manage decontamination. This SOP also outlines practical considerations in preparing to move a lab, of which cleaning/decontamination is one step. This SOP does not cover all the necessary steps that need to take place when moving several labs or an entire building. If a large move is planned please contact the EHS Office immediately to begin preparation.

To supplement the procedures outlined in Section 4, a number of useful planning documents and examples of forms that are to be completed are included as Appendices. A guide to the Appendices is as follows:

Appendix A: Matrix of EHS-Related Tasks and Responsible Parties During a Laboratory Move, Decontaminating, Decommissioning and Cleaning

Appendix B: Sample Laboratory Move/Decontamination/Decommissioning Timeline

Appendix C: Procedure for Determining Need for Decontamination

Appendix D: Key Decontamination Steps

Appendix E: Recommended Moving Practices for Laboratories Utilizing Biological Materials

Appendix F: Biological Laboratory Decontamination Certification

Appendix G: General Considerations for Move Preparation

Appendix H: Equipment Preparation

Appendix I: Chemical Hazards and Decontamination/Decommissioning

Appendix J: Sample Equipment Decontamination Sticker Record

Appendix K: MIT EHS Notice of Laboratory Decommission


Appendix L: MIT EHS Notice of Non-Clearance

Appendix M: Planning Estimate Guidelines

2. Scope

This SOP applies to all laboratories on MIT's Cambridge campus where there is a history of radiological, chemical or biological material use that may need to be decontaminated to ensure the safety of future occupants.

The extent to which a lab is "cleaned" before the next occupancy is often determined by the current use of the lab versus the next use, if known. This is often phrased as "how clean is clean"? At a minimum, the space must be decontaminated of all EHS hazards (radiological, biological, and hazardous chemical). Conversion of a space to an occupancy which requires a more pristine environment (e.g., a semiconductor clean room) will necessarily require removal of any residual dust and dirt. If a space being vacated will be renovated or will otherwise have construction or maintenance activity performed (e.g., painting, replacement of a fume hood, new flooring, etc.) will not require cleaning for removal of

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dirt. Occupants are, however, expected to remove all trash from the present work area and not leave behind equipment or materials.

3. Prerequisites

Prior to implementing this SOP, it is the DLC's responsibility to verify that the area or equipment to be decontaminated is free of all chemicals or other hazards. All items remaining in the area or in the equipment will be considered disposable, unless discussed with the EHS Office prior to commencement of decontamination activities.

Where chemicals have been identified for disposal, the Environmental Management Program will arrange for their proper collection, packaging, and disposal. In order to encourage regular lab maintenance, it is current EHS policy to assume the costs of chemical disposal related to "normal lab activity". Bulk disposal of chemicals is a departmental cost. This departmental expense can be minimized by strategic inventory management and consultation with EHS well in advance of the move. Refer to the SOP, *Hazardous Waste Removal and Disposal (EHS-0003)*.


4. Procedures

4.1 Forming the Move Team

- 4.1.1 The laboratory move team will typically consist of a Project Manager (PM) from the Department of Facilities (DoF), members of the Principal Investigator (PI) lab groups, the EHS Coordinator for the Department, Lab, or Center (DLC) and representatives from the EHS Office. Many DLCs also opt to hire a Move Coordinator - typically an outside contractor - to arrange move logistics.
- 4.1.2 Within the EHS Office, multiple individuals will often be involved in the Lab Move, since decontamination and decommission activities often involve more than one type of EHS hazard (e.g., there can be both radiological and biological contamination). The EHS representatives on the move team, therefore, include one person representing each of the affected programs.
- 4.1.3 The EHS Lead Contact team for the DLC is the default group responsible for planning how the laboratories and/or spaces will be decontaminated and decommissioned for various EHS hazards. The EHS Lead Contact for the DLC is therefore responsible for coordinating the tasks of this group (as summarized in Appendix A), and working with the Project Manager, Move Coordinator and DLC EHS Coordinator to develop a move timeline (see Appendix B); in some ways, this function can be considered the "Decon/Decom Project Manager". In agreement with the EHS Coordinator for the DLC, the EHS Lead Contact may delegate this responsibility to another Program representative in EHS.
- 4.1.4 A representative from the EHS Laboratory and Facility Design, Construction and Renovation Service (LFDRCRS) Team or designated EHS Project Liaison is typically involved in the move team. This representative, together with the Facilities Project Manager, shall ensure that at least the DLC EHS Lead Contact is present at the Lab Move preparation meetings.

4.2 Move Preparation


- 4.2.1 Department of Facilities, Project Management notifies the EHS Laboratory and Facility Design and Construction Review Services (LFDRCRS) Team of an impending move.

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- 4.2.2 Once notified, the EHS Office will communicate with the DLC to make the DLC aware of its responsibilities regarding clearing spaces by meeting with the appropriate DLC members including EHS Coordinator, EHS Representatives, Administrative Officer, PIs, and Project Manager to address EHS issues related to the move, such as disposal of waste materials and other unwanted lab materials or equipment, clearing the vacated spaces according to EHS requirements, including decontaminated equipment and spaces, and expected time frames for space clearance. All laboratory moves now require a chemical inventory to be completed. The inventory shall consist of those chemicals that the laboratory will either move to the new location and/or will have on hand at the time of the move.
- 4.2.3 It is the responsibility of DLCs to review their lab spaces for specific hazards that must be addressed and to work through their EHS Coordinator, EHS Lead Contact, Project Management and Move Coordinator (if one is appointed) to ensure that the cleaning and decontaminating are completed. The EHS Office will in turn coordinate with the necessary EHS Office Programs (EMP, RPP, BSP, IHP, and SP). Refer to Appendix A.
- 4.2.4 Various types of laboratory equipment require actions to be taken to ensure that equipment is not damaged or causes damage while it is being moved. Refer to Appendix A.
- 4.2.5 DLCs notify service contractors of equipment or systems that will be moved.

4.3 **Cleaning/Decontaminating Laboratory Equipment and Space**

- 4.3.1 The EHS Office, through the Lead Contact / Team, EHS Coordinator, and the EMP's Hazardous Waste Manager, shall coordinate the procedures outlined in the Sections that follow and Appendix A. The Laboratory/Facility Design, Construction, and Renovation Service (LFDCRS) Team provides oversight of laboratory and facility decommissioning procedures.
- 4.3.2 If the Facilities Project Manager hires a chemical vendor to move hazardous materials and/or conduct decontamination of the space, fume hoods, and/or biosafety cabinets, then EHS shall be involved in the planning process. The respective EHS Programs shall review the following elements of the contractor request for proposals or bid submittals/quotes:
 - 4.3.2.1 The Environmental Management Program (EMP) shall review the scope of work with environmental/chemical vendors for chemical moves and space decontamination.
 - 4.3.2.2 The Biosafety Program shall review the scope of work and vendor for decontamination of biosafety cabinets and spaces designated with a Biosafety level (BL) sign.
- 4.3.3 The Move Coordinator communicates the dates of both the equipment move and the chemical move to the labs, EHS Coordinator and EHS Lead Contact Team.
- 4.3.4 Once the Move Coordinator establishes the move dates, the DLC EHS Lead Contact Team shall identify/review the materials to be moved (radiological, biological, and chemical). Items of particular concern include perchloric acid hoods, areas of other significant chemical concern (e.g., water reactives, peroxides, ethers, hydrofluoric acid, asbestos, mercury, lead and polychlorinated biphenyls -PCBs) areas where radioactive materials have been used, and spaces that have been registered for the use of biological materials. This information will be collected from the users, or with the assistance of the DLC's EHS Coordinator.

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- 4.3.5 The DLC EHS Lead Contact Team shall schedule visits to the labs/spaces for equipment decontamination, survey, and moving.
- 4.3.6 Laboratory spaces or equipment identified for radioactive material use must be approved for decontamination activities by the Radiation Protection Program (RPP) prior to decontamination taking place. RPP approval is based on the results of a radiation survey of the area or equipment to be decontaminated. RPP schedules a walk through and meeting with each affected lab, and establishes a “stop work” date that is typically 2-3 days before the move date. The survey and analysis take approximately 24 hours before the area is released for decontamination. If there is residual radioactive material or radiation levels in the area the RPP will work with the Laboratory to clean the area prior to it being released for decontamination.
- 4.3.6 Once RPP clears and releases the area, the space will be cleaned and decontaminated.
- 4.3.7 Laboratory spaces that are registered for biological materials must be decontaminated according to Biosafety Program protocols. Equipment that may be contaminated with biological material (e.g. biosafety cabinets, centrifuges, incubators) shall also be decontaminated in accordance with these protocols. Refer to Appendix E, “Recommended Moving Practices for Laboratories Utilizing Biological Materials” for these protocols. The Biosafety Program also requires DLCs to complete a Laboratory Decontamination Certification for those spaces where biological materials are used. Appendix F contains the Biological Laboratory Decontamination Certification form.
- 4.3.8 All equipment that has been decontaminated shall have an *MIT Equipment Decontamination Record* sticker affixed to it. A sample sticker appears in Appendix J. Any stickers indicating “Biohazard” shall be removed.
- 4.3.9 Once the area is cleaned, decontaminated, and decommissioned, the *EHS Notice of Laboratory Decommission* sign will be completed by the EHS Office and posted outside the laboratory to notify the new occupants or contractors that the space, and all identified articles therein, is safe for their activities. The notice appears in Appendix K.
- 4.3.10 The DLC EHS Team, Move Coordinator, and lab rep shall walk through the lab to determine if the lab is ready for the movers, checking that drawers, cabinets, shelves, etc. are empty and decontaminated.
- 4.3.11 If the Facilities Project Manager hires an outside vendor to decontaminate the old laboratory/space, the respective EHS Programs will verify that the work was done adequately.
- 4.3.12 Custodial services (Department of Facilities) may be brought in to a final cleaning of the lab prior to the next move in. Cleaning refers to removal of dust and dirt that may accumulate on floors and horizontal work surfaces such as lab benches, workstations, and desks.
- 4.3.13 Project Managers and DLCs are encouraged to review Figure 1 in this section for a summary of EHS requirements that shall be met during the laboratory move process.

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**Figure 1
Lab Move and Decontamination Checklist**


Lab Move/Decontamination Tasks to be Completed	Yes	No	N/A
1. Has radioactive material been used in lab equipment or space?			
2. If the answer to item 1 is yes, has the Radiation Protection Program surveyed the room?			
3. If the answer to item 2 is yes, has an RPP Officer approved decontamination of the space and released it for general decon?			
4. Are biological materials used in the space?			
5. If the answer to item 4 is yes, has a Biological Laboratory Decontamination Certification been completed and returned to the Biosafety Program?			
6. If the answer to item 5 is yes, has the Biosafety Program approved the decontamination of the space?			
7. Have perchlorates been known to be used in the fume hoods?			
8. If the answer to item 7 is yes, has Industrial Hygiene deemed the fume hoods to be properly decontaminated?			
9. Has a chemical inventory been completed?			
10. Does the lab have any surplus chemicals?			
11. If the answer to item 9 is yes, has EMP been contacted to arrange for disposal of chemicals and payment?			
12. Are there any non-returnable lecture bottles or gas cylinders?			
13. If the answer to item 11 is yes, has EMP been contacted to arrange for their disposal and payment?			
14. Has EMP approved general decontamination of the space?			
15. Has the MIT Equipment Decontamination sticker been placed on all pieces of equipment requiring decontamination?			
16. Is the EHS Notice of Laboratory Decontamination posted on the lab door?			
17. Have all radioactive, biological, chemical, and MIT non-regulated wastes been properly packaged for collection?			
18. Have biosafety level labels, radioactive labels, green cards, or other signs/labels been removed from the lab door?			
19. For lab moves, has all equipment been drained or otherwise prepared for moving per Appendix D, E, H and I?			
20. Does the lab door have a sign noting the new location?			
21. Have plumbing and electrical needs been coordinated through Facilities and the Move Coordinator for lab relocations?			
22. If the lab is moving, have all keys have been returned to the EHS Coordinator, Administrative Officer, or other designee?			

5. Roles & Responsibilities

See Appendix A for responsibilities of parties involved with the move and decommissioning. In addition:

EHS Coordinator - Primary contact between the DLC and the EHS Lead Contact. Initiates preplanning with the EHS Office and within the DLC. Acts as point of contact within DLC throughout the preparation and decontamination process.

EHS Lead Contact - Primary contact between the DLC's EHS Coordinator and the EHS Office. Initiates EHS services and coordinates services within the EHS Office to perform the above tasks.

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Environmental Management Program, Hazardous Waste Manager – Primary contact within EHS and with outside contractors as necessary, and will provide final EHS approval of the decontaminated space in collaboration with the EHS Lead Contact, EHS Coordinator, and EHS Program Offices.

Laboratory and Facility Design and Construction Review Services (LFDQRS) Team – Provide oversight of laboratory and facility decommissioning procedures and responsible for the contents of the *Moving a Laboratory: Preparation, Decontaminating, Decommissioning and Cleaning* SOP.

Radiation Protection Program (RPP) – Must provide approval either through closeout survey or special survey prior to the continuation of decontamination activities.

Industrial Hygiene Program (IHP) – Conducts perchlorate and other chemical testing as needed and oversees asbestos testing, removal, and management. For demolition and renovation projects, IHP may also conduct testing for lead and polychlorinated biphenyl (PCB) action levels.

Biosafety Program (BSP) – Approves the decontamination of spaces and equipment that are known to handle biological materials.


Department, Lab, or Center (DLC) – Responsible for reviewing their lab spaces for specific hazards that must be addressed and to work through their EHS Coordinator, EHS Lead Contact and if one is appointed, Move Coordinator, to ensure that the cleaning and decontaminating are completed. The DLC is also responsible for completing a chemical inventory. Each DLC will be responsible for providing a workspace free of clutter. DLCs are also responsible for ensuring that equipment not moved to the new location is deactivated with the Property Office and decontaminated of EHS Hazards. Refer to the SOP “Equipment Decommissioning and Deactivation.”

Department of Facilities – Address issues pertaining to electrical and plumbing connections as well as laboratory hoods and trash collection.

Project Manager (Facilities) – Provides overall responsibility for planning and conducting a new building, space renovation or demolition, including arranging for a Move Coordinator with the affected DLC(s).

Move Coordinator – when retained by the DLC, facilitates the logistics of having equipment and materials moved from the current space to the new space. The Move Coordinator’s primary role in interacting with EHS is to ensure that move timelines allow for appropriate surveying and decontamination of the lab spaces, and to ensure that this is done with minimal disruption to the DLC.

Decon/Decom Project Manager – individual within the EHS Office, either the DLC EHS Lead Contact or designee, who coordinates the decontamination and eventual clearance and release of spaces with EHS hazards. The Decon/Decom Project Manager works with the Move Coordinator to ensure that use of outside contractors for certain decontamination and decommissioning activities occurs at appropriate checkpoints in the overall decontamination and decontamination process (see Appendix A).

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6. Training

Anyone engaged in work or research that involves radiological, biological, or chemical materials is required to complete the EHS Training Needs, at https://web.mit.edu/training/my_profile.html, to determine their applicable training requirements. Arrange orientation and training to cover safety changes in new space.

7. Monitoring Requirements

N/A

8. Record Management

All EHS survey results, decontamination and decommission records and the *EHS Notice of Laboratory Decommission* are maintained in the EHS Office. Copies of the *EHS Notice of Laboratory Decommission* are also provided to the DLC EHS Coordinator. Disposition of these documents are to be maintained in accordance with the *EHS Records Retention SOP*.

9. References

9.1. Standards

N/A

9.2. Other SOPs/ SOGs

Deactivating and Decommissioning Equipment SOP

Hazardous Waste Removal and Disposal SOP

Radiation Protection Program's laboratory survey protocols

EHS Records Retention Program

Laboratory Start-Up

Leaving MIT: Closing Out a Laboratory

Lab Relocation Procedures - DLC, PMD and EHS Responsibilities, R-CRSP, 8/1/07

9.3. Supplementary Documents

MIT Equipment Decontamination Record

EHS Notice of Laboratory Decommission

Radiation Protection Program survey logs

EHS Fact Sheet: PCBs found in caulking material, 7/25/07, revision 3

10. Definitions

Cleaning: Removal of non-hazardous materials from surfaces or equipment to render it aesthetically acceptable.

Decommissioning: A process to ensure a facility and its associated infrastructure meets EHS requirements for its next use.

Decontamination: Removal of contamination of a hazardous substance from a surface or equipment to reduce the risk to an acceptable level.

Appendix A

Matrix of EHS-Related Tasks and Responsible Parties during Laboratory Move and Decontaminating, Decommissioning and Cleaning

The following matrix can be modified by a DLC to meet its own additional requirements.

EHS-Related Tasks and Responsible Entities during Laboratory Moves, Decontaminating, Decommissioning and Cleaning	
TASK	Responsible Entity
0. General Considerations	
0.1 Identify who must be notified about the move: EHS Office, outside regulatory agencies if necessary.	PI
0.2 Authorizations/permits, new or changes, for moves to a new space, including completion of a chemical inventory: Contact specific EHS Program. Refer to Task 5.0.	PI
0.3 Notify service contractors of equipment/systems to be moved and new location information. Inform the Move Coordinator of instruments under contract and/or requiring moving service. Service contractors will need new location information.	PI
0.4 Inform Move Coordinator of equipment needing special handling.	PI
0.5 Disconnect alarms on refrigerators, freezers, incubators.	PI
0.6 Trash: Leave outside of lab, labeled <i>TRASH</i> . Contact Custodial Services about large amounts. Make every effort to recycle cardboard, paper, metals and plastics.	PI
0.7 Broken glass and sharps placed in appropriate containers removed from lab.	PI
0.8 Remove BL signage and green cards from lab doors, walls. Refer to Task 4.	PI
0.9 Remove RPP signage. Refer to Task 4.	EHS-RPP
Equipment that has been cleaned/decontaminated must be labeled with an MIT Equipment Decontamination Record sticker. <i>Note: See Appendix G, General Considerations for Move Preparation, for additional information.</i>	PI
EHS-Related Tasks and Responsible Entities during Laboratory Moves, Decontaminating, Decommissioning and Cleaning	
TASK	Responsible Entity
1. Preparing Specific Equipment and Spaces for Move	
Move Coordinator or DLC person assigned to be Coordinator in conjunction with EHS Coordinator, PI Groups, DLC Management, and EHS schedules chemical, material, and equipment moves including waste handling.	Move Coordinator, EHS Coordinator, PI, DLC, EHS
Communications between EHS, Project Manager, PI Groups, and DLC.	EHS Coordinator
1.1 Equipment and spaces contaminated with radioactive materials:	
1.1.1 Survey to identify contamination and certification of decontamination performed by RPP. RPP will specify whether or not an equipment item being moved needs to be decontaminated. In some cases, equipment may just need to be packaged in a way that assures movers handling the equipment will not come in contact with contamination.	EHS-RPP
1.1.2 Any necessary equipment and space decontamination (EHS-RPP can assist the lab personnel). Note: Notify EHS-RPP of any liquid scintillation counters that are being moved along with their new location. EHS-RPP will survey the counter prior to the move. The liquid scintillation counter is extremely delicate and must be handled with care during the move.	PI
1.2 Equipment and spaces contaminated with biological materials:	
1.2.1 Equipment and spaces that may be contaminated with biological materials will need cleaning and/or decontamination. Decontamination means the use of a disinfectant to	PI or Lab Rep

EHS-Related Tasks and Responsible Entities during Laboratory Moves, Decontaminating, Decommissioning and Cleaning	
TASK	Responsible Entity
remove viable biological materials that were part of research activities in the lab. The PI or designated lab rep is responsible for assuring the cleaning and decontamination is done and for signing forms or stickers attached to equipment that decontamination has been done. Biohazard stickers must be removed after decontamination.	
Note: Use BSP protocols/procedures for cleaning/decontamination (Appendix E)	
1.2.2 Research equipment being moved to new building (centrifuges, microtomes, microscopes, liquid scintillation counters, etc.) that has a biohazard sticker, or is identified as being contaminated by PI or lab personnel, or that looks contaminated, must be decontaminated on the outside. For the inside of equipment, if it does not require emptying, draining, or dismantling, per Appendix E, Recommended Moving Practices for Laboratories Utilizing Biological Materials, it can be sealed shut and moved. If equipment requires additional processes to prepare for moving, e.g., equipment requires emptying/draining/dismantling by BSP protocol, this equipment will need decontamination as specified in the guidance.	PI
1.2.3 Research equipment being left behind must be thoroughly cleaned and decontaminated using appropriate disinfectant. Equipment that has been cleaned/decontaminated must be labeled with an MIT Equipment Decontamination Record sticker.	PI
1.2.4 Biosafety cabinets: decontamination must be arranged with an outside contractor.	Project ¹ , Decon/Decom PM
1.2.5 Fume hoods: no cleaning unless special circumstances require disinfectant. Fume hoods: if EHS determines that a fume hood requires decontamination beyond that reasonably expected by a lab.	PI Project ¹ , Decon/Decom PM
1.2.6 Lab benches/moveable cabinets/shelves/floors/walls/ceilings: <ul style="list-style-type: none"> • Lab benches/moveable cabinets/shelves: clean with disinfectant. • Floors: clean with disinfectant. • Walls/ceilings: no cleaning necessary. 	PI
1.2.7 Plumbing: sink traps disinfected with bleach and flushed with water. Also, see Lab Drain traps under Additional Tasks	Project ¹ , Decon/Decom PM
1.2.8 HVAC ducts: no cleaning. Also, see HVAC Ducts under Additional Tasks.	Project ¹ , Decon/Decom PM
1.3 Equipment and spaces contaminated with hazardous chemicals:	
1.3.1 Equipment and spaces that may be contaminated with hazardous chemicals will need cleaning. For some very specific circumstances, decontamination may be needed. Decontamination means a specific chemical of concern is known to be present at an unacceptable level, and testing is done after cleaning to determine it has been removed, or is present at levels that will not be hazardous to personnel or environment. One example is areas or equipment where ethidium bromide has been used. UV light can be used to find crystals of ethidium bromide. Another example is mercury, when it is reported that a spill has occurred or when there is evidence of a spill of mercury by visible examination. In specific instances, regulatory standards prescribe the method and the extent of cleanliness. In areas where PCBs have been historically used, or if a spill involving PCBs has occurred, then the cleanup protocol pursuant to 40 CFR 761 must be followed.	Decon/Decom PM, EHS

EHS-Related Tasks and Responsible Entities during Laboratory Moves, Decontaminating, Decommissioning and Cleaning	
TASK	Responsible Entity
<p>1.3.2 Research equipment being moved (centrifuges, microtomes, microscopes, liquid scintillation counters) /refrigerators/freezers: If equipment has been identified by PI, lab rep, or area survey as having a history of chemical use or potential for chemical contamination, the outside must be cleaned, or the equipment must be packaged in some way to assure movers will not come in contact with contaminants. If the equipment requires no additional prep for moving, it can be sealed shut. If the equipment requires prep, the inside or parts may need cleaning as well. Equipment not being moved must be thoroughly cleaned, inside and out. EHS should be notified of any special contamination concerns.</p> <p><i>Note: Materials of particular concern: explosive materials, e.g., azides, picric acid; peroxides; perchlorates; heavy metals; select toxins; controlled substances.</i></p>	PI
<p>1.3.3 Fume hoods: clean with strong detergent, no decontaminating unless special circumstances require decontamination. If fume hood is to be moved or discarded, surveys may need to be completed for asbestos and perchlorates depending on the age of the hood and use. Assessment performed by EHS.</p> <p>Fume hoods: if EHS determines that a fume hood requires decontamination beyond that reasonably expected by a lab.</p>	PI, EHS (for assessment) Project ¹ , Decon/Decom PM
<p>1.3.4 Lab benches/moveable cabinets/shelves/floors/walls/ceilings:</p> <ul style="list-style-type: none"> • Lab benches/moveable cabinets/shelves where chemicals were stored, drawers where chemicals were stored, drawer fronts and cabinet door fronts, and cabinet interiors where chemicals were stored: no cleaning necessary unless special circumstances require decontamination. • Floors: clean with strong detergent. • Walls/ceilings: no cleaning necessary unless special circumstances require decontamination. 	PI
<p>1.3.5 Plumbing: no cleaning unless special circumstances require decontamination. Special precautions needed for sink traps. Also, see Lab Drain traps under Additional Tasks.</p>	Project ¹ , Decon/Decom PM
<p>1.3.6 HVAC ducts: no cleaning unless special circumstances require decontamination. Also, see HVAC Ducts under Additional Tasks.</p>	Project ¹ , Decon/Decom PM
<p><i>Note 1: Disconnect power and release or restrain any stored energy before cleaning/decontaminating.</i></p> <p><i>Note 2: Use care if water reactive materials or other materials potentially incompatible with cleaning solutions were stored.</i></p> <p><i>Note 3: See Appendix C, Procedure for Determining Need for Decontamination and Appendix D, Decontamination Procedures for more details.</i></p> <p><i>Note 4: See Appendix H, Equipment Preparation and Appendix I, Chemical Hazards and Decontamination/Decommissioning for additional information.</i></p> <p>¹See Appendix M, Planning Estimate Guidelines</p>	
2. Preparing Materials for Move	
2.1 Radioactive materials:	
<p>2.1.1 Package all radioactive materials and label in accordance with RPP procedures. Arrange for pickup of radioactive waste through RPP.</p> <p><i>Note: No radioactive materials can be left behind in old space.</i></p>	PI, EHS-RPP
2.2. Biological materials:	

EHS-Related Tasks and Responsible Entities during Laboratory Moves, Decontaminating, Decommissioning and Cleaning	
TASK	Responsible Entity
<p>2.2.1 See Appendix D, Recommended Moving Practices for Laboratories Utilizing Biological Materials and contact BSP <i>Note: No biological materials can be left behind in old space.</i></p>	PI
2.3 Chemicals:	
<p>2.3.1 All chemical containers should be properly labeled and closed. Unknowns cannot be packed or moved. <u>Complete chemical inventory.</u></p> <ul style="list-style-type: none"> Laboratory glassware should be emptied and cleaned before moving or disposal. Chemicals stored in the cold need to be stabilized at room temperature (24 hours in fume hood) before removal. Any labs disposing of PCB analytical standards shall contact EHS-EMP. 	PI
<p>2.3.2 For Dark Rooms, drain tanks and collect the photographic solutions for disposal. Contact EHS-EMP.</p>	PI/Vendor/EHS-EMP
<p>2.3.3 Pack and move chemicals. <i>Note: No chemicals can be left behind in old space.</i></p>	Vendor
<p>2.3.4 For any chemicals not moving, inform EHS-EMP to manage as chemical waste. Chemicals in original, unopened containers in good condition may be offered to other labs.</p>	Vendor
<p>2.3.5 Gas cylinders should be closed, capped and regulators removed before returning or moving. Identify contents of gas cylinders. <i>Note: The gas vendor (MIT Partner Vendor) prefers to pick up all cylinders and deliver new cylinders to the new location.</i></p>	Vendor
<p>2.3.6 Old non-returnable cylinders/lecture bottles removed as hazardous waste.</p>	Vendor
<p>2.3.7 Remove all materials from chemical fume hoods, biosafety cabinets, and remaining areas of laboratory.</p>	PI
3. Cleaning / Decontaminating / Decommissioning of Old Space	
<p>3.1 See Preparing Specific Equipment and Spaces for Move section.</p>	
<p>3.2 Additional tasks prior to next use of space, renovation / demolition work in old space:</p>	
<p>3.2.1 Lab Drain Traps: Inspect for mercury and other hazards. If contaminated, seal drain in plastic for disposal. In an effort to avoid spills of mercury, care should be taken when disconnecting and removing lab sink traps and adjoining pipes. For demolition work, remove and inspect all traps before initiating demolition. Contact EHS-EMP. <i>Note: For traps marked with a Possible Internal Radioactive Contamination sticker, contact EHS-RPP before opening or removing traps.</i></p>	Project, Decon/Decom PM
<p>3.2.2 HVAC and Local Exhaust Systems: Check for perchlorates, azides, fiberglass, hazardous particulates. Contact EHS-IHP.</p>	Project, Decon/Decom PM
<p>3.2.3 Asbestos: Inspect and review records for asbestos containing materials. All work associated with asbestos must be done by state licensed or certified workers following approved methods. Contact EHS-IHP.</p>	Project, Decon/Decom PM
<p>3.2.4 Lead Paint: A survey should be performed to determine if there is any lead paint on building surfaces. Contact EHS-IHP.</p>	Project, Decon/Decom PM
<p>3.2.5 PCBs: Perform survey to determine the presence of any equipment or building materials that may contain PCBs. EHS-EMP and EHS-IHP coordinate surveying and sampling. <i>Note: Cleanup of spaces where PCB compounds have historically been used or where a PCB spill may have occurred must be carried out in accordance with 40 CFR 761. Renovations of areas where PCB caulk will be removed and where there may be the potential for soil contamination must also be done in accordance with 40 CFR 761.</i></p>	Project, Decon/Decom PM

EHS-Related Tasks and Responsible Entities during Laboratory Moves, Decontaminating, Decommissioning and Cleaning	
TASK	Responsible Entity
<i>Contact EHS-EMP for evaluation and scope of cleanup.</i>	
3.2.6 Mercury: Check for mercury contamination. Since mercury is a liquid at room temperature it can find its way into sink drains and collect in the trap. It may also “roll” behind benches and under floors. Mercury has a very low vapor pressure and once it becomes covered with dust or water it will not evaporate until disturbed. Mercury can also be found in fluorescent lights, manometers, thermometers, heating thermostats and electrical switches. Care should be taken when cleaning spaces to avoid breaking any mercury-containing device. Contact EHS-IHP.	Project, Decon/Decom PM
3.2.7 Perchlorates: All perchloric acid fume hoods and ductwork scheduled for decontamination, moving or dismantling should be tested for perchlorates. Contact EHS-IHP.	Project, Decon/Decom PM
4. EHS Notice of Laboratory Decommission	
4.1 Before EHS final review, DLC Management for the departing DLC must conduct a walkthrough of all vacated spaces and corridors as soon as possible after the move and sign off that the spaces have been left in the condition agreed upon ahead of time, with respect to EHS issues, disposition of unwanted property, cleanliness, removal of hazardous waste, decontamination of equipment and space, etc. <i>Note: See Appendix I, Chemical Hazards and Decontaminating and Decommissioning</i>	DLC
4.2 In a timely manner, after the move and after the DLC’s own walkthrough/review, the designated EHS move/review team from all the relevant EHS Programs needs to conduct a coordinated inspection of all vacated spaces.	EHS
4.3 If space is not cleared, the <i>Not Cleared by Environment, Health and Safety Office</i> form (see Appendix L) (EHS Office has supply of forms) should be posted on the lab door. EHS will follow up with EHS Coordinator, PI, Project Management and DoF to remedy situation in a timely manner. EHS will compile a written inspection report, which designates the problems identified, room numbers, names of PIs responsible for the spaces, specific corrective actions and reasonable deadlines for correction. The report will be sent to the parties involved.	EHS
4.4 Once space is cleared of all equipment, hazardous materials and remaining equipment and space has been cleaned/decontaminated, the <i>EHS Notice of Laboratory Decommission</i> form (see Appendix K) should be signed off by EHS and posted on the lab door. A copy of the form should be sent to the EHS Office. The EHS Office has supply of forms.	EHS
4.5 Decommission rooms in Space Registration Database AND check that all door signs (e.g. radioactive materials, BL designation) have been removed.	EHS Coordinator
4.6 Secure lab entries.	Project
5. Preparing New Space	Responsible Entity
5.1 Lab Start-up	
<i>Note: Also refer to Laboratory Start-Up SOP</i>	
5.1.1 All fire alarms, fire suppression, life safety, and lab emergency systems are operational ²	Project
5.1.2 All areas are free of construction debris, dust	Project
5.1.3 Complete equipment layout and appropriate equipment hookups are present	PI
5.1.4 Emergency showers, eyewashes, fire extinguishers, other safety equipment present and commissioned (certified, tested, flushed, etc.) ²	Project
5.1.5 Chemical fume hood certification ²	Project
5.1.6 Biosafety cabinet certification ²	Project
5.1.7 Appropriate BSP, RPP signage, MIT Emergency Response Guide posting in labs ²	EHS Coordinator, EHS
5.1.8 Chemical spill kits, doff-it kits available in each lab group ²	PI, EHS Coordinator
5.1.9 Exit signage, evacuation floor plans posted ²	Project

EHS-Related Tasks and Responsible Entities during Laboratory Moves, Decontaminating, Decommissioning and Cleaning	
TASK	Responsible Entity
5.1.10 Written Emergency Preparedness Plan ²	EHS Coordinator, EHS Reps
5.1.11 Written Chemical Hygiene Plan including procedures for access to Material Safety Data Sheets (MSDS) ²	EHS Coordinator
5.1.12 Complete space registration for all laboratories	EHS Coordinator, EHS Reps
5.1.13 Arrange orientation and training to cover safety changes in new space.	EHS Coordinator
5.1.14 Ensure laboratory is stocked with antidotes (hydrofluoric acid-HF, cyanide) and specialized spill kits (HF, mercury) where needed ³	PI, EHS Coordinator
5.2 Code/permitting issues	
5.2.1 Flammable/combustible liquids, gases, solids permit/license ³ <ul style="list-style-type: none"> • Name, class and amount (inventory) per control area per floor. • Flammable storage cabinets available. 	EHS-SP PI/EHS Coordinator
5.2.2 Affidavit stamped and signed by Massachusetts Registered Professional Engineer/Architect that hazardous materials storage and use in building is compliant with 780 CMR Sections 307 and 417. ³	Project
5.2.3 Building plans with fire control areas marked and other emergency information in secure location with fire department key access (e.g., “knox box”) available in building Fire Control Center or near Fire Alarm Panel ³	Project
5.2.4 NFPA 704 diamond posted at chemical storage locations ³	Project
5.2.5 Inspection by Cambridge LEPC ³	EHS Coordinator, EHS-SP
² Required by Cambridge Local Emergency Planning Committee (LEPC)	
³ Required by Cambridge Fire Department and LEPC	
Responsible Parties Key: Project: Responsible for planning/conducting construction, renovation or demolition Decon/Decom PM: Decontamination/Decommission Project Manager (from EHS) Vendor: Outside contractor hired by Project to perform a task PI: Principal Investigator EHS: Environment, Health and Safety Office RPP: Radiation Protection Program BSP: Biosafety Program EMP: Environmental Management Program SP: Safety Program IHP: Industrial Hygiene Program DLC: Department, Lab or Center	

Appendix C

Procedure for Determining Need for Decontamination

- PI Group reviews equipment
- DLC creates/updates comprehensive list of equipment used by each PI Group
- DLC identifies equipment to be moved versus equipment for disposal or recycling
- PI Group supplies information on type of research and type of materials used
- EHS Coordinator and EHS Team review space to determine if equipment and space need to be cleaned/ decontaminated.
 - Check for PI identified, visual signs, or history of contamination
 - Check for equipment that may need to be emptied, drained or dismantled
 - Determine levels of cleaning/ decontamination required for each lab
- If equipment not contaminated or never used with hazardous materials, check “No Hazardous Materials” block, complete *MIT Equipment Decontamination Record* sticker (EHS Office has supply of stickers) and attach to equipment.
- If equipment is contaminated, see **Appendix D: Key Decontamination Steps**.

Appendix D

Key Decontamination Steps

- Identify contaminant (either observation, interview or testing)
- Select appropriate decontamination method
- Conduct decontamination
- Verify decontamination complete (either observation or testing)
- Complete *MIT Equipment Decontamination Record* sticker and attach to equipment
- Remove any bio- and/or radioactive hazard stickers.
- Document the results of this procedure.

Note definitions:

Cleaning: Removal of non-hazardous materials from surfaces or equipment to render it aesthetically acceptable.

Decommissioning: A process to ensure a facility and its associated infrastructure meets EH&S requirements for its next use.

Decontamination: Removal of contamination of a hazardous substance from a surface or equipment to reduce the risk to an acceptable level.

Appendix E

Recommended Moving Practices for Laboratories Utilizing Biological Materials

1. Read and follow the attached information.
2. Remember to affix *MIT Equipment Decontamination Record* stickers to **all** equipment prior to moving. Also, place stickers on any equipment that will be discarded or placed in storage. Moving personnel will **not** move equipment lacking the decontamination sticker! NOTE: Stickers are available from the MIT EHS Office and Biosafety Program (BSP), in N52-496, your moving coordinator, administrative officer, EHS Coordinator, or facility officer.
3. Remove any biohazard stickers.
4. Complete the attached certification form and return to BSP **after** removing all **biological materials and** decontaminating surfaces, (i.e., lab bench tops). Upon receipt of certification form, BSP personnel will tour the indicated area(s) to verify the information and remove all BL1/BL2 door signs.
5. Please also indicate any new lab area(s) so that BSP personnel may affix the appropriate BL1/BL2 door sign to these new areas.
6. Call BSP at 2-3477 if you have any questions, or require assistance with biological decontamination issues.

Considerations For Moving Regulated Biological Materials Regulated biological materials include all genetically engineered microorganisms, recombinant plants and seeds, human and/or animal tissue, blood or body fluids, tissue culture cells, Risk Group 2 and higher organisms. General move considerations are outlined below. Call BSP at 2-3477 for additional information or assistance.

7. Plan to minimize liquid volume and weight of transported materials. In addition, reduction of active materials should be planned the week prior to the move.
8. Provide new location information to BSP. Notify the United States Department of Agriculture (USDA) if you hold Veterinary Service or Plant Service Permits. Permits are location specific. The move can trigger inspections by the USDA or other agencies that regulate biological research at MIT (e.g., National Institutes of Health).
9. All biological materials must be packaged prior to the move to prevent spills, leaks, breakage and exposure. Proper packaging consists of a primary sealed container placed within a secondary sealed unbreakable container, with enough absorbent material in between to contain and absorb any spill. Some examples are: Petri dishes in a plastic sleeve within a plastic lined box using paper towel spacers, stabs in sealed Tupperware® container with paper towels to cushion vials, sealed tubes in rack placed into plastic sealable container with enough paper towels to absorb any spilled

contents, tissue culture dishes placed into a plastic lined dishpan or a sealable cardboard box with an absorbent. Freezers can be moved intact, provided all contents are in sealed, unbreakable containers, and the freezer is sealed and remains closed during shifting. Because shifting of contents may occur, enclose loose items in boxes, or fix in some other way to avoid breakage and spills when the freezer is reopened. Other equipment, such as fermenters, refrigerators, incubators, and biosafety cabinets must be empty and decontaminated prior to the move. Any questions concerning packaging, or movement of equipment or materials, please contact BSP.

10. Once packaged, all biological materials must be properly labeled. Labels **must** include: Name, Principle Investigator (PI), new location, ID of agent, biosafety level, telephone number for assistance in the event of any breakage, and a FRAGILE notice if applicable. Also use the Universal Biohazard label whenever packaging a biosafety level 2 or higher agent. If you are not sure of the biosafety level of your biologicals, or need biohazard labels, call BSP at 2-3477.
11. Spills and injuries can be minimized by using proper packaging and lifting techniques. Overloaded or overweight boxes can contribute to spills and back injuries. Know the proper way to lift boxes to prevent back injury. Place boxes on carts when loading to minimize lifting. A spill kit consisting of disinfectant, paper towels, plastic bags, tongs or dustpan and brush, lab coat, gloves, and safety glasses must be available during the move. Report all spills to the PI and BSP. If a Biosafety Level 2 or higher agent spills, evacuate the area before calling. For personal injury, or direct contact involving biological materials, wash the affected area with soap and water, and report to the Medical Department, E23-1st floor desk. Accident reports are filed through the Medical Dept. and your Supervisor.
12. Collect all packaging items needed prior to the move date. Carts, plastic bags, toweling or other cushioning absorbent materials, dish pans, boxes, labels, (Fragile, Universal Biohazard, ID, location), sturdy tape, and spill kit should be readily available. Do not cut corners when packaging and labeling your biological materials. Plan ahead.
13. Move only during the designated hours. BSP emergency response personnel are available 24 hours a day by calling x100; however, commuting time slows response after office hours, 9 am to 5 pm. Also, Medical Department skeleton crews work after 5 pm.

Appendix F Biological Laboratory Decontamination Certification

I certify that the cold/warm rooms and laboratory rooms at the following locations previously used by my laboratory, have been emptied of biological materials:

The surfaces in these rooms have been decontaminated with:

All sink traps have been bleached and flushed with water; use one cup of concentrated bleach, wait 20 minutes, then thoroughly flushed with water.

Please note location(s) of new laboratory area(s):

Date: _____

Signature of Principal Investigator: _____

Print Name: _____

New Laboratory Telephone Number: _____

Return completed form to the Biosafety Program, N52-496 or fax it to 8-6831.

Appendix G

General Considerations for Move Preparation

KEYS

Any items under lock and key will need to be opened on moving day. Make sure you have the keys for these items, such as solvent cabinets, individual offices, etc. Do not lock any files or desks unless you have the key. If not, put masking tape over the lock so it does not lock accidentally.

SERVICE CONTRACTS

Inform the move coordinator of instruments under contract and/or requiring moving service. Service contractors will need to be informed of new location information.

SPECIAL HANDLING

If you are concerned about any equipment not under service contract but still in need of servicing and/or special handling, please inform the move coordinator.

SURPLUS CHEMICALS

If you have any chemicals you are **not moving**, please inform the Environmental Management Program, (EMP) at x2-3477 of any leftovers so they may be managed as chemical waste. Where practicable, laboratories are encouraged to donate surplus chemicals to other researchers on campus.

PLUMBING AND ELECTRICAL WORK

Inform the move coordinator of concerns about special plumbing and electrical connections.

TELEPHONES

Do not pack your phones. IS&T will come in the day of your move to remove your telephones and reinstall them in the building. Because your phone could be out of service for some of the move day, forward your line to the voice mail system. For instructions on forwarding, refer to page 4 of the [MIT Faculty and Staff Directory](#) or go to <http://web.mit.edu/ist/tel/functions.html>.

BOXES

Save small boxes to use for packing the small items in refrigerator and freezers.

FURNITURE CONCERNS

Inform your move coordinator if there is any furniture of particular concern, (fragile, valuable, require dismantling), not already mentioned. File cabinets must be locked and/or emptied.

SURPLUS FURNITURE AND EQUIPMENT

If you have any additional items not moving, please arrange for pick-up prior to the move. **Surplus equipment must be decontaminated.** Any equipment containing concentrations of polychlorinated biphenyls (PCBs) in concentrations greater than 50 parts per million (ppm) shall be labeled with the yellow "CAUTION: Contains PCBs" tag per 40 CFR 761. Equipment that is likely to contain PCBs includes: a) equipment containing transformers and/or capacitors that was manufactured before July 2, 1979; b) electrical equipment manufactured before July 2, 1979 that uses heat transfer, dielectric, or hydraulic fluids where it is not known if the fluids have been replaced with non-PCB substitutes. Equipment with an unknown date of manufacturer and that utilizes transformers, capacitors, dielectric - , heat transfer- or hydraulic fluids must be assumed to contain PCBs unless testing or other documentation demonstrates otherwise. PCB concentrations must be known as the time of disposal.

WASTE HANDLING - PURGING AND CLEANING

Clean out and recycle as much as possible, throwing away only what can not be treated as regulated waste or managed through the campus recycling program or Institute material equipdo not wait until the last week to clean and purge. Do not move anything that you do not have a place for in your new lab or office. Remember your lab must be left absolutely clean with nothing on the floor.

Wastes should be classified according to the following categories:

- *Trash*
- *Recyclable materials* (e.g., cardboard, pipette tips, other plastics, empty bottles, paper, commingles, peanuts/EPS/other packing materials)
- *Sharps*
 - Chemically contaminated sharps (i.e., chem. sharps)
 - Biologically contaminated sharps (i.e., bio sharps)
 - Radiological sharps (i.e., rad sharps)
 - “Clean” sharps (no chemical, biological, or radiological contamination)
 - Bio/Rad sharps
 - Bio/Chem. sharps
 - Chem./Rad sharps
- *Pathological wastes* (animal carcasses)
- *Chemical waste*
 - Hazardous waste
 - Non-hazardous waste
- *Registered Biological Hazard Labs*
 - Solid materials (e.g., petri dishes, agar, etc.)
 - Liquid materials
- *Radiological Waste*
 - Solid lab materials contaminated with P32 (e.g., animal bedding)
 - Solid lab materials contaminated with sulfur or iodine
 - Solid lab materials contaminated with C14 or H3
 - Solid lab materials contaminated with mercury and P32
 - Liquid or aqueous waste that is readily dispersible; research that generated liquid allows drain disposal in accordance with the SOP “Wastewater Practices”
 - Liquid or aqueous that is readily dispersible; research that generated liquid DOES NOT allow drain disposal in accordance with the SOP “Wastewater Practices”

Arranging for Recycling:

- Coordinate with the Department of Facilities to get the necessary containers and the prompt removal of all materials deemed recycling. See also “SURPLUS CHEMICALS” and “SURPLUS FURNITURE and EQUIPMENT” in this section.
- Ballasts marked “non-PCB” or known to be manufactured after July 2, 1979 may be recycled through Grounds.

Arranging for Trash Removal:

Coordinate with the Department of Facilities to get the necessary containers and the prompt removal of all materials deemed trash.

PEST CONTROL

If desired, request prior treatment of equipment and new location to minimize pest transfer. Call BSP at 2-3477 for further assistance.

NOTIFICATION of NEW LOCATION

Post signs in your old space stating your new location.

SITE VISIT

Schedule a visit to the new lab to see shelving, utility hook-ups, or check space for additional items.

ARCHIVAL DOCUMENTS

If you come across any information you no longer need, but may be of interest to the MIT Archives Department, please contact them, as they may want these items.

Appendix H

Equipment Preparation

If applicable to your lab, the following must be completed before move day:

ALARMS

Alarms on refrigerators, freezers, incubators, and any other sensor alarms must be disconnected by lab personnel on or before the day of your move. Be sure you have keys and combinations to locks readily accessible.

BIOLOGICAL MATERIALS and CULTURES

Packaged prior to move per Appendix C.

BIOLOGICAL SAFETY CABINETS

A vendor should be contacted for decontamination of the cabinets prior to the move. Arrange for a time for beginning decontamination procedures. The sealed and decontaminated hoods will be opened and vented prior to the move. If formaldehyde has been used, the formaldehyde will be allowed to “off-gas” for 4 hours before the hood is moved.

CAGES

Must be decontaminated.

CENTRIFUGES

Decontaminate and remove rotors. Contact service contractors for special preparation.

COLUMNS and RACKS

Must be disconnected and decontaminated by lab personnel prior to moving.

COMPRESSED GAS TANKS and CYLINDERS

- Have old tanks collected prior to move, and arrange future tanks to be delivered to new location. If not, regulators must be removed and caps secured. Label **FULL** or **IN USE**. If empty, return and label **EMPTY**. Lecture bottles should be returned to the vendor. If they are not accepted, then the lab must contact EMP for removal and will be charged accordingly.
- To schedule a pick up of empty or unwanted gas cylinders, contact AirGas at x3-4761 or send a fax to x3-4968. Specify the number of cylinders, room location, your contact name and phone number, intended pick up date and any other relevant information.
- If cylinders will need to be used right up until the move, then schedule PICK UP for those cylinders in the current space for a DAY AFTER the move. Make arrangements with AirGas ahead of time. Remove regulators and secure cylinder caps.
- Plan compressed gas needs for the new space – submit requisitions via SAPWeb to AirGas at least a week before the desired date of delivery to the new lab space (be sure to provide the new lab room number). Verify that the new location has brackets for securing the cylinders.
- If there is equipment that requires gas cylinders in place ahead of time (e.g., liquid nitrogen cryo-freezers, glove boxes, incubators fed by gas cylinders), then schedule DELIVERY for a DAY BEFORE the main move. Confirm dates with the Move Coordinator before scheduling.
- Do not schedule deliveries for the same day as the lab move. Schedule compressed gas delivery for either shortly before or shortly after the move.
- **Dewars – submit requisition through SAP for pick up and delivery to the new lab; large dewars typically are not moved.**

COMPUTERS

Back up all data prior to move. Make sure keys are available for computer anchor pads or other such security devices.

COUNTER TOP EQUIPMENT

Equipment that is not sensitive will be transported via carts. Fragile counter top equipment will be boxed. If applicable, disconnect, roll up and secure wires. Put a moving label on all components. All counter top equipment using radioactive materials must be surveyed by the RPP, and if necessary, will be moved by them.

DARK ROOMS

Drain tanks and collect the photographic solutions. Contact EMP to have the solutions picked up for disposal or for guidance on moving the solutions to the new lab location.

FERMENTERS

Must be empty and decontaminated.

FISH TANKS

Water must be drained.

FPLC and HPLC

Must be disconnected into separate pieces by lab personnel. All liquids must be removed. If flammable vapors are contained, let air out.

FREEZERS (moved full) and REFRIGERATORS (moved empty)

Pack tightly to avoid internal breakage, decontaminate outside; coordinate locking with the movers. Refrigerators shall be defrosted.

GAMMA and BETA COUNTERS

Counters must be emptied of all samples. Call the Radiation Protection Program (RPP) at 2-3477 for certification to note reference source is secure.

FUME HOODS

Fume Hoods - Contact IHP at 2-3477 for decontamination instructions.

INCUBATORS

Water-jacketed incubators need to be drained and decontaminated by lab personnel. Remember to avoid algae growth, have water conditioners on hand upon refilling.

MICROSCOPES

Microscopes needing special preparation must be identified.

RADIOACTIVE MATERIALS

The Radiation Protection Program will move all radioactive materials including radioactive waste containers. Any equipment that was used to handle or store radioactive materials (pipettors, shields, bench top centrifuges, speed vacs, sealer units, etc.) will be surveyed by the RPP prior to the move.

THERMOMETERS

Must be removed from refrigerators, water baths and incubators prior to equipment movement.

VACUUM PUMPS

Oil must be drained if not sealed. If sealed and no chance for leakage, okay to leave oil in pump.

WATER BATHS

Must be emptied, decontaminated, and the outside wiped. Remove thermometers.

Appendix I

Chemical Hazards and Decontamination/Decommissioning

CHEMICALS

1. All chemical containers should be properly labeled and closed. Laboratory glassware should be emptied and cleaned before moving or disposal.
2. Refrigerators, autoclaves and any contaminated equipment should be decontaminated following recommended guidelines before disposal or reuse. A label as shown in Appendix G should be placed on the equipment. Chemicals stored in the cold need to be stabilized at room temperature before removal.
3. Lab bench tops and hood work surfaces should be washed with a solution of soap and water. For information on specific decontamination procedures contact the Environment, Health, and Safety Office or the chemical manufacturer.
4. Gas cylinders should be closed and capped before returning or moving. Moving gas cylinders any distance should be done by experienced personnel. Try to identify contents of gas cylinders; unknown gas cylinders can cost thousands of dollars for disposal.
5. Before any demolition work begins all laboratory drain traps should be removed and inspected for mercury and other hazards.

CHEMICAL-SPECIFIC HAZARDS

Asbestos

All work associated with asbestos must be done by state licensed or certified workers following approved methods. All suspect materials should be sampled and analyzed for type and amount of asbestos present. All State and Federal laws must be followed during the removal and disposal of any asbestos material.

Lead

A survey should be performed to determine if there is any lead paint on building surfaces. If present appropriate work practices will need to be followed during demolition for worker protection. The presence of lead in construction waste may affect the disposal of the material. To help in this determination a toxic characteristic leaching procedure (TCLP) may need be done.

Mercury

Laboratory plumbing systems contaminated with mercury is not uncommon. Over the years there were many uses of mercury in labs. Since mercury is a liquid at room temperature it can find its way into sink drains and collect in the trap. It may also "roll" behind benches and under floors. Mercury has a very low vapor pressure and once it becomes covered with dust or water it will not evaporate until disturbed. In an effort to avoid spills of mercury care should be taken when disconnecting and removing lab sink traps and adjoining pipes. For demolition work, remove and inspect all traps before initiating demolition. Mercury can also be found in fluorescent lights, manometers, thermometers, heating thermostats and electrical switches. Care should be taken when cleaning spaces to avoid breaking any mercury-containing device.

PCBs

Reviewing old building records can help determine the presence of any electrical transformers that may contain PCB's. Fluorescent light ballast used to contain PCBs. It may be possible to identify PCB containing ballasts using the date of manufacture and serial numbers. If they are not identifiable they should be assumed to contain PCBs.

Any equipment containing concentrations of polychlorinated biphenyls (PCBs) in concentrations greater than 50 parts per million (ppm) shall be labeled with the yellow "CAUTION: Contains PCBs" tag per 40 CFR 761. Equipment that is likely to contain PCBs includes: a) equipment containing transformers and/or capacitors that was manufactured before July 2, 1979; and, b) electrical equipment manufactured before July 2, 1979 that uses heat transfer, dielectric, or hydraulic fluids where it is not known if the fluids have been replaced with non-PCB substitutes. Equipment with an unknown date of

manufacturer and that utilizes transformers, capacitors, dielectric - , heat transfer- or hydraulic fluids shall be assumed to contain PCBs unless testing or other documentation demonstrates otherwise. PCB concentrations must be known as the time of disposal.

Transformers, electrical switches and capacitors that are part of the power distribution network or are used as part of high voltage research and that are removed as part of a building renovation shall be reviewed for PCB concentration status. Any equipment that has not been tested within the last 10 years and is being removed for disposal shall have the PCB concentration verified. Transformers and capacitors bearing the manufacturer's "Non-PCB" designation do not require testing, and can be assumed to be non-PCB. If the equipment is to be stored, and it is suspected the equipment may contain PCBs, the EHS Office shall be contacted to ensure storage complies with the requirements of 40 CFR 761.

Department of Facilities Project Managers who are overseeing building renovations shall ensure that contractors provide notification of removal of PCB-containing equipment as this will trigger an update to the Institute's PCB Inventory. Serial numbers, manufacturer, and if known, date of manufacture shall all be provided to the EHS Office. If waste disposal is not handled through MIT's hazardous waste contractor, then the name of the name of the company transporting the waste and the manifest ID number shall also be provided to the EHS Office.

In the expected rare instance of spills involving PCB materials, the EHS Office shall be contacted to ensure cleanup complies with the requirements of 40 CFR 761.

Perchlorates

The use of perchloric acid, a very strong oxidizer, may react with organic matter to form explosive products. If perchloric acid was used in a laboratory hood, which was not equipped with a wash down system, explosive perchlorates can collect within the hood and ductwork. To avoid mishaps all perchloric acid hoods scheduled for dismantling should be tested for perchlorates. One test is the methylene blue qualitative test.

Miscellaneous Items

A number of other items should also be addressed when cleaning out a space prior to renovation or demolition. Among these items are:

1. The freon in window air conditioners will need to be reclaimed.
2. Incinerator ash typically contains heavy metals. A TCLP test will help determine the waste stream for the ash.
3. Many consumer products may need to be disposed of as hazardous waste including cleaning solvents, paints, paint thinners, oils and pesticides. Look to reuse these in other labs before disposal.
4. Sharps need to be properly disposed of to avoid any cuts or puncture wounds.

Appendix J

Sample Equipment Decontamination Sticker Record

EQUIPMENT DECONTAMINATION RECORD

Principal Investigator _____
name phone date

This piece of equipment was used with the following:

No hazardous materials Biologicals

Chemical PCB's surveyed by IHP _____
initials date

Radiation Surveyed by RPP _____
initials date

Other hazards (specify) _____

Decontaminated with _____

By (name) _____ Date _____

Equipment OK for removal or reuse: _____ YES _____ NO

REMOVE THIS LABEL BEFORE REUSING EQUIPMENT

Appendix K

(Print on green paper)

MIT EHS Notice of Laboratory Decommission



**Massachusetts Institute of Technology
Environment, Health and Safety Office**

Notice of Laboratory Decommission

Room:	Date(s) of Decommission:
EHS Contact:	Telephone Number: EHS Office: 617 452-3477

Room was not designated as a laboratory

EQUIPMENT

Equipment/materials have been decontaminated according to EHS Office protocols (**Note: MIT Equipment Decontamination record must be affixed to equipment**).

Radiological/Biological/Chemical materials have been removed.

Surfaces (where necessary) have been cleaned/decontaminated.

FUME HOODS and BIOSAFETY CABINETS (BSCs)

These fume hoods and biosafety cabinets have been decontaminated per EHS protocols

Hood Identification Number(s):

Biosafety Cabinet Identification Number(s):

All containers and non-essential apparatus, or otherwise obstructive materials have been removed from the interior and top of the fume hood. All residue cleaned from the walls, work surface, and sash of the fume hood.

The associated duct work has been tested by the Industrial Hygiene Officer for perchlorates

IHP Officer: _____
Date: _____

Associated hazards (BIOLOGICAL, CHEMICAL, RADIOLOGICAL) have been remediated

CERTIFICATIONS

Radiological Hazards have been remediated

RPP Officer: _____
Date: _____

Biological Hazards have been remediated

BSP Officer: _____
Date: _____

Chemical Hazards have been remediated

EMP Officer: _____
Date: _____

Appendix L

MIT EHS Notice of Non-Clearance

(Print on yellow paper)



**Massachusetts Institute of Technology
Environment, Health and Safety Office**

Not Cleared by Environment, Health and Safety Office

Date:
Reasons:
Indicate equipment/materials that have not been decontaminated:
Indicate radiological/biological/chemical materials that have not been removed:
Indicate surfaces (where necessary) that have not been cleaned/decontaminated:
Indicate fume hoods or biosafety cabinets that have not been appropriately decontaminated and what action needs to be taken: Fume Hood #: _____ Action to be taken _____ Biosafety Cabinet #: _____ Action to be taken _____
NOTE: Fume hoods / Biosafety Cabinets must not be used until ALL scheduled work is completed.
Other reasons:

For questions, contact _____ at 617 452-3477.

Appendix M

Planning Estimate Guidelines

Estimate for laboratory hazardous materials cleaning/decontamination

Biosafety Cabinet – decontaminate--\$200.00/cabinet; recertify--\$85.00/cabinet

Fume Hood – decontaminate--\$165.00/fume hood (3 hours at \$55.00/hour)

Clean chemical lab surfaces including bench tops, cabinets inside and out, floors; sink and fume hood drain traps; neutralization tanks; fume hoods – billed by hazardous waste vendor on time and material basis – approximately 4 labs/day (average size lab of 200 square feet) – approximately \$3.00/square foot of lab space (extrapolated from prior quotes)

Clean biological lab surfaces with bleach solution wipe down including bench tops, cabinets, floors; bleach in sink and fume hood drain traps; fume hoods; biosafety cabinets – approximately \$2.00/square foot of lab space (extrapolated from prior quotes)

For total decontamination of heavily contaminated areas, the National Institutes of Health uses \$25.00/square foot of lab space (includes chemicals, asbestos, lead, etc.)

Asbestos – assessment/abatement – depends on size and timing of project – may need licensed contractor for assessment – for pipe lines use approximately \$230.00/linear foot

Lead Paint – assessment/abatement – survey by licensed contractor

Removal of hazardous materials – packing and moving materials to another location and removing materials as hazardous waste – billed by hazardous waste vendor on time and material basis – approximately \$1,400.00/day (2 people and vehicle) plus disposal cost for hazardous materials.

Fume hood and biosafety cabinet ducts – if being removed or altered, check for perchlorates, azides, fiberglass, hazardous particulates – clean/decontaminate if necessary – billed by hazardous waste vendor on time and material basis

Mercury – assessment/abatement--check for mercury contamination

PCBs – assessment/abatement – survey by hazardous waste vendor to determine presence of any equipment or building materials that may contain PCBs--PCBs in window caulk – approximately \$2,000.00/window.

Note: These are rough estimates for initial planning purposes. Proposals from contractors/vendors should be obtained when developing project budget.