

# DECOMMISSIONING OF LABORATORIES AND LABORATORY EQUIPMENT

## INTRODUCTION

This procedure was created to validate the safety of laboratory space when a university laboratory is being closed, vacated, relocated, renovated or demolished. The intent is to ensure the area, furniture and related equipment are free from all physical, chemical, biological or radioactive hazards such that the laboratory is left in a condition which is safe for the next occupant, or for construction/renovation workers.

This same requirement for ensuring hazards are addressed applies to individual pieces of research equipment which are being transferred, disposed or sent for repair, maintenance or calibration.

Failure to take steps to properly address these hazards could create unsafe conditions for workers or future occupants. Hazardous materials left could expose Carleton University to significant liability under environmental and/or health and safety related regulations if not appropriately addressed.

Principal investigators and Departments are responsible for all additional costs incurred in the process of identification and disposal of wastes not managed through the appropriate decommissioning process.

Mishandling of hazardous materials can result in citations, fines and/or loss of right to use hazardous materials. Adverse publicity is also a frequent result. Any regulatory action or fines resulting from improper management or disposal of hazardous materials will accrue to the responsible department.

## SCOPE

The following procedure must be implemented by any principal investigator, researcher, or instructor who is decommissioning a laboratory, laboratory area or laboratory equipment. Decommissioning is required prior to leaving the University, relocating, or renovating their laboratory. It is also required prior to sending laboratory equipment for disposal, repair, maintenance or calibration.

## RESPONSIBILITIES

### Dean

The Dean is to ensure that all departments are aware of and comply with this procedure.

### Departmental Chair

The Departmental Chair must ensure that all principal investigators in their department are aware of and comply with this procedure.

The Departmental Chair must notify the Office of Environmental Health and Safety if a principal investigator is leaving the University, transferring a laboratory to another location, performing renovation to lab space or closing down a laboratory and equipment decommissioning is required.

The Departmental Chair will be responsible for any cleanup costs, regulatory actions or fines resulting from non-compliance with this procedure.

#### Principal Investigator (PI) or Laboratory Supervisor

The Principal Investigator must adhere to this procedure to ensure the laboratory is in a condition which is safe for the next occupant or for construction/renovation workers and to ensure laboratory equipment is safe for the next person who may come into contact with it. This can include service technicians, housekeeping, and facilities staff.

The Principal Investigator or designate must

- ensure the proper disposal of all waste equipment and hazardous materials used in the laboratory.
- provide any information on location and/or equipment uses related to chemical, biological, radioactive and physical hazards.
- not transfer equipment or hazardous materials without prior consultation with the Environmental Health and Safety Office.
- assign one PI as the designate who shall be responsible in the event of a closure with multiple PIs
- complete and maintain the required documentation outlining the closure activities for the lab space and will submit requests for final closeout once activities have been completed (laboratories and equipment).
- take responsibility of the costs associated with the decontamination of equipment and facilities. Exceptions may be made by the Departmental Chair.

#### Environment Health and Safety (EHS)

Upon being notified of the laboratory closure, and/or requirement for equipment decommissioning, EHS shall ensure that the laboratory conditions and hazards are reviewed with the PI or designate prior to any work or removal being done.

EHS shall assist the PI or designate with technical guidance to ensure the closure is performed in accordance with regulations, with the goal of minimizing cost and impact. EHS will provide final sign-off on the decommissioning of laboratories and equipment.

## **PROCEDURE**

The Departmental Chair must notify EHS of a planned lab closure or renovation with a minimum of four weeks' notice for all planned closure or renovations.

The PI is responsible for cleaning and decommissioning laboratories and workplaces that they vacate, so that they are left in a safe manner and are free from hazards.

Workplaces shall not be turned over to new occupants for use or to contractors for renovation or demolition until they have been inspected and approved by the PI or Departmental Chair, and EHS.

The Environmental Health and Safety Office will be notified prior to the transfer of any hazardous materials to other areas or facilities. Any chemicals or materials that are not being transferred must be properly disposed. (In addition to the decommissioning timeline below, refer to the Appendix for additional decommissioning details).

1) Four Weeks prior to Closure

A survey of the Laboratory can be carried out by EHS and the PI or designate. If renovations are involved, Facilities Management and Planning (FMP), specifically Facilities Engineering and Construction, must be involved in the initial survey.

2) Two Weeks prior to Closure

The PI or designate will circulate a list of all identified hazards involved in the closure to EHS and their Departmental Chair. EHS are to be advised of any equipment or resources to be offered to other PIs at the University, as well as any planned transfers external to the University.

Laboratories with Biosafety applications must complete required exit documentation with the Biological Safety Officer.

Laboratories with Radioisotope Permits must complete required exit documentation with the Radiation Safety Officer.

EHS will complete a risk assessment review to identify if specialised processes are required as part of the decommissioning.

3) Just before Closure

The PI or designate will place completed Chemical Waste labels on all chemical containers that are to be disposed of as waste.

All gas cylinders should be returned to the supplier and gas cylinders that cannot be returned must be reported for disposal approval.

Biological waste must be sealed, labeled and segregated before proper disposal.

Radioactive waste must be properly labeled and any additional unused supplies segregated before proper disposal.

All equipment with intrinsic hazards (i.e, chemically contaminated or chemical stored within) are to be rendered safe or appropriate steps taken to transport or safely dispose prior to the laboratory closure.

The PI or designate are to contact the Facilities Management and Planning Service Center, to schedule the removal of any **hazard free** equipment, recyclables or refuse once the decommissioning process is complete.

The PI or designate must have placed "**Safe-to-Remove**" tags on any laboratory equipment that FMP are expected to transport either for disposal, recycling or relocating. The tags are not finalized until EHS has provided final sign off.

4) Closure (when lab has been vacated)

The PI or designate and EHS will survey the lab space at time of the closure to confirm all hazards have been removed and handled properly and safely. The PI or designate will notify Departmental Chair that the laboratory is ready for renovations or new occupant.

The Facilities Management and Planning Service Center should be contacted regarding full and appropriate cleaning of the vacated space.

The PI or designate shall send copies of his/her detailed closure report to the Departmental Chair and EHS.

5) After Closure (when space is reoccupied)

The Departmental Chair, responsible for the area, should notify EHS when a new principal investigator will be occupying the lab space to initiate approval of relevant permits.

This notification must be done before any further renovations or moving in takes place.

## APPENDIX – DETAILED INSTRUCTIONS

### **Chemicals**

Chemicals are perhaps the most visible and easiest hazard for researchers to address when a laboratory move, shutdown or renovation is being considered. Unfortunately, it also is one of the most frequently ignored step in a laboratory decommissioning.

After consultation with EHS, determine which chemicals are suitable to be kept and transfer responsibility for these materials to another principal investigator who agrees to take charge of them. If a new user cannot be found, the materials must be disposed of.

If chemicals are being transferred to another location, external to the University, EHS will assist in ensuring that Transportation of Dangerous Goods and import/export regulations are adhered to.

All other chemicals must be prepared for disposal. Contact EHS and the appropriate faculty contact for the required hazardous waste procedures.

Once the chemicals have been transferred to another researcher, disposed of, or transported to another location, the Carleton University Chemical Inventory will be amended accordingly.

### **Controlled Substances**

Research involving the use of controlled drugs or narcotics is regulated by the Controlled Drugs and Narcotics Act, and requires a valid permit, issued by Health Canada, generally for a one year period, renewable. The permits are issued to a single researcher or principal investigator. When research using these controlled products ceases, disposal must be according to the regulations.

Controlled Substances Permits are issued by Health Canada to individual researchers. Transfer of controlled substances can only be authorized by Health Canada. To transfer without a valid authorization is a federal offense.

Any controlled substances which cannot be transferred to another researcher are to be disposed. Contact EHS for assistance.

### **Controlled Goods**

Research involving the use of Controlled Goods is regulated by the Defense Production Act and the Controlled Goods Regulations, and is permitted in accordance with stringent operating procedures for acquisition, examination, transfer and disposal.

Contact EHS for assistance.

## **Gas Cylinders**

Remove gas connections, replace cylinder caps, and return full and empty cylinders to designated storage areas. Only approved cylinder carts are to be used to transport cylinders.

## **Biological Material**

Research involving biological materials is regulated by the Public Health Agency of Canada. At Carleton University, all such research requires authorization from the Biosafety Committee. Each researcher is required to self-identify the correct disposal procedures for their biological materials, and consequently, these procedures should be applied for disposal. Nevertheless, below are listed some generic procedures to assist in disposal. The procedures are divided into pathological (animal and human tissues) and biomedical (microbiological samples).

### **1. Animal and Human Tissue**

All animal and human tissue is disposed of by incineration. Contact the University Biosafety Officer (BSO), for further information.

All samples on slides are to be placed in yellow sharps containers for disposal.

If samples are to be saved, responsibility for the tissues is to be transferred to another principal investigator, who will assume responsibility for them. The BSO is to be advised prior to transferring any tissues or samples to another researcher.

### **2. Microorganisms and Cultures**

All cultures are to be decontaminated prior to disposal. Liquid cultures or solid media are to be autoclaved according to standard decontamination guidelines. (Refer to the PHAC Canadian Biosafety Standards and Guidelines, 2013). Cultures preserved in glass ampoules are to be incinerated, as they are not adequately decontaminated by standard autoclave procedures.

If cultures are to be saved, they are to be transferred to another principal investigator, who will assume responsibility for them. The BSO is to be advised prior to transferring any cultures to another researcher.

## **Radioactive Materials**

Research involving radioactive materials is conducted under the terms of the University Consolidated Radioisotope License, managed by the Radiation Safety Officer (RSO). This permit is issued to individual researchers who are to comply with all conditions, including the disposal of radioactive material and instruments containing radioactive materials and the decommissioning of laboratories. Although several points are presented here, permit holders are to refer to the Carleton University Radiation Safety Manual and their permit conditions for further details.

The RSO is to be advised prior to the close-out of any radioactive materials laboratory or equipment. It is the responsibility of the authorized permit holder to do so.

1. All radioactive materials are to be depleted or disposed of. Disposal records are to be forwarded to EHS. Any remaining radioactive material could be transferred to another authorized user. The RSO must be advised prior to any transfer.
2. Contamination monitoring of any areas where radioactive materials were used or stored is to be performed and all records forwarded to the RSO.
3. Lead bricks and lead containers are likewise to be removed from the laboratory and returned to the RSO once they have been monitored for contamination.

### **Equipment and Surfaces**

Equipment and surfaces may have been contaminated with chemical, biological or radiological materials, whether through storage of these materials on or in the equipment, or through spills which may have arisen.

Alternatively, some pieces of equipment may contain hidden hazardous materials. This would include equipment such as scintillation counters with radioactive sources, vacuum pumps containing oils, equipment with mercury lamps or switches, gas standards, PCB containing ballasts and transformers.

All surfaces are to be free of hazardous contamination. This includes laboratory benchtops, storage cabinets, drawers, floors, areas under sinks, sinks, telephones and door handles. An effective means of decontamination is requisite.

Any equipment which will be relocated, including within the Department or Faculty, temporarily outside of the University such as for repairs, or for permanent move or disposal must be decommissioned, albeit temporarily. This is to ensure that workers moving the equipment are protected from exposures to hazardous materials.

Equipment decommissioning tags (**Safe-to-Remove** tags) (see Appendix II) must be visible on all such pieces of equipment. All levels of authorization must be completed prior to any equipment movement. **These same tags are to be placed on any equipment prior to repairs being performed by Facilities Management and Planning staff.**

All fume hoods must be free of chemical contamination prior to vacating the laboratories. This includes removal of all containers of hazardous materials. All accessible hood surfaces are to be cleaned with a suitable cleaner (mild soap, unless contraindicated due to chemical use in fumehood). Contact EHS for recommendations. If the fume hood has been previously used for radioisotopes, contamination monitoring will also be required.

All biological safety cabinets must similarly be free of contamination. All materials are to be removed. All accessible surfaces are to be cleaned with a suitable disinfectant (in most cases, a 70% ethanol solution will effectively decontaminate). The BSO will evaluate whether a professional decontamination is required.

All refrigerators and freezers are to be emptied prior to being moved, unless express permission has been obtained from EHS.

All equipment must be certified by the responsible individual/ principal investigator/ departmental chair, as free of hazards. Depending on the specific equipment, different procedures will be required. These may include radioactive contamination monitoring (wipe tests), 10% bleach (0.5% sodium hypochlorite) decontamination when biological materials were used, and/ or pH verification for storage areas.

All hazard signage on the equipment is to be removed prior to equipment removal or relocation. (Note: some hazard warning signage may be present within specific equipment items, and these must also be removed.)

### **Shared Storage Areas**

Shared storage areas are present throughout the departments and faculties. These may include shared ultra low freezers, liquid nitrogen storage containers, cold rooms or warm rooms, flammable storage cabinets, corrosive storage cabinets, and shared equipment rooms. Departing researchers must carefully survey any shared facility in order to locate and appropriately dispose of their hazardous materials. They must also ensure that contact information on remaining shared equipment is amended accordingly.

### **Keys and Identification Cards**

All keys and identification cards are to be returned to the departmental office and if in the Life Sciences Research Building, to Animal Care and Veterinary Services, prior to final laboratory decommissioning.