

California Institute of Technology

LABORATORY RELOCATION GUIDELINES



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TABLE OF CONTENTS

INTRODUCTION.....	3
CLEARANCE CHECKLIST FOR INVESTIGATORS MOVING FROM CALTECH LABORATORIES.....	3
GENERAL HOUSEKEEPING	3
BIOHAZARDOUS MATERIALS	3
RADIOACTIVE MATERIALS	3
CHEMICAL SAFETY	4
NEW AREA CHECKLIST FOR INVESTIGATORS MOVING INTO CALTECH LABORATORIES.....	4
GENERAL CONDITIONS.....	4
EMERGENCY EQUIPMENT	4
CHEMICAL WASTE AND STORAGE	4
FUME HOODS.....	5
BIOSAFETY ISSUES	5
RADIATION SAFETY.....	5
ONE MONTH BEFORE YOUR MOVE.....	6
OTHER THINGS TO CONSIDER.....	6
THREE WEEKS BEFORE YOU MOVE IN	6
AS YOU PACK AND BEGIN MOVING	6
PACKING CHEMICALS TO BE MOVED.....	7
MOVING PACKAGED CHEMICALS	7
PACKING AND MOVING BIOLOGICAL MATERIALS	8
GETTING YOUR NEW SPACE READY.....	8
COMMON CAUSES OF ACCIDENTS.....	8
HANDLING CHEMICAL EMERGENCIES.....	8
BACK INJURY PREVENTION	9
REPORTING INJURY OR ILLNESS	9
RADIATION SAFETY	9
BIOHAZARD SAFETY	10
COMPRESSED GASSES	10
HAZARDOUS MATERIALS IN LABORATORY EQUIPMENT	10

INTRODUCTION

This booklet provides safety guidelines for research groups relocating or closing laboratories. These guidelines will help you plan and execute an incident-free move of your precision instruments, equipment, and hazardous materials. Planning and preparing for your move is also the perfect time to:

- Update your chemical and equipment inventories.
- Clean out unusable and outdated materials.
- Repair or discard broken equipment.

While it is not possible to cover every situation which might occur we have tried to anticipate the most likely problems and provide basic accident prevention guidelines.

Think safety! If you have questions before, during, or after your move, please contact Environment, Health, and Safety at x6727 or via email: safety@caltech.edu.

CLEARANCE CHECKLIST FOR INVESTIGATORS MOVING FROM CALTECH LABORATORIES

Principal Investigators leaving Caltech or relocating within campus are responsible for vacating laboratories in a state suitable for re-occupancy or renovation. The following clearance checklist is to be completed by the laboratory and each applicable item initialed upon completion.

GENERAL HOUSEKEEPING

- All laboratory equipment and supplies are to be decontaminated before removal from laboratory (unless department arrangements have been made for storage or transfer to new occupants).
- Broken glassware and non-contaminated sharps removed from laboratory in rigid, puncture-resistant containers.
- Notify EH&S of move (x6727) and ensure new space is cleared for occupancy.

BIOHAZARDOUS MATERIALS

- Disinfect work surfaces that may be contaminated with biological agents.
- Disinfect all potentially Biohazardous waste and remove from laboratory, including sharps containers.
- Remove all media and supplies from drawers, shelves, and cabinets.
- Biological Safety Cabinets require professional decontamination prior to moving and re-certification after the move.
 - Contact EH&S for details.

RADIOACTIVE MATERIALS

- Survey facility and equipment for contamination by meter and then wipe test.
- Dispose of radioactive waste according to Caltech policy.
- Clean surfaces and equipment if contamination is detected above three times background. If non-removable contamination is detected, contact the EH&S Radiation Safety Division.
- Appropriately package radioactive wastes and [submit a request](#) for waste pickup.

CHEMICAL SAFETY

- All laboratory chemicals, including wastes, removed from laboratory.
- Remove all empty bottles and cans. The containers should be empty and clean, the label defaced, and the cap removed before placing in the regular trash.
- Remove bench coat and disposable liners/covers from work surfaces.
- Laboratory bench tops should be washed with soap and water.
- All debris should be removed from the fume hoods and the surface wiped down.
- Run water into all sinks and floor drains to fill traps.
- If perchloric acid has been used in chemical fume hood, contact EH&S for testing.

Final clearance and decontamination survey will be conducted by EH&S when all clearance requirements have been met. Contact EH&S at x6727 or write to safety@caltech.edu.

NEW AREA CHECKLIST FOR INVESTIGATORS MOVING INTO CALTECH LABORATORIES

Investigators moving into Caltech lab space should make sure all of the following items are addressed.

GENERAL CONDITIONS

- Hazardous work areas and equipment posted for biohazards, carcinogens, radiation, lasers, sonicators, and UV light?
- Compressed gas cylinders secured?
- Is there a minimum of 36" clearance in the aisles?
- Heavy objects stored low? Overhead objects secured?
- Storage shelves and cabinets secured for earthquakes?
- Cabinets and shelves over 48" high secured for earthquakes?
- Laboratory Emergency Information Sign posted outside each lab room?

EMERGENCY EQUIPMENT

- Emergency eye wash and shower are accessible within a quick ten second walk?
- Fire extinguishers accessible within 50 feet?

CHEMICAL WASTE AND STORAGE

- Are chemicals segregated by hazard class?
- Corrosive materials stored in low cabinets or shelves below waist height?
- Are flammables correctly stored? Fire codes limit the quantity of flammable liquids stored and regulate the type of container used. In general, no more than 10 gallons of flammable liquids may be stored in the open lab. Quantities in excess of ten gallons must be stored in flammable liquid storage cabinets. Prudent laboratory practice dictates that flammable storage in the lab should be kept to a minimum.
- Different containers labeled for radiation, chemical, and Biohazardous waste?

- Chemical storage areas are secured for earthquake and secondary containment trays are used?

FUME HOODS

- Are the fume hoods clean and certified?

BIOSAFETY ISSUES

- Is a Sharps container for broken glass and needles available and labeled?

RADIATION SAFETY

- Are Clean Areas posted and approved by EH&S?
- Are "Caution Radioactive Materials" signs posted?
- Has the Radioisotope Use Authorization been amended to allow radioisotopes at the new location?
- Are waste storage areas appropriately shielded?

ONE MONTH BEFORE YOUR MOVE

Begin planning your move, review what you have on hand, and dispose of all chemicals you no longer need. This will greatly simplify the moving process.

- Contact EH&S to notify them of your move.
- Print the [Caltech Laboratory Clearance Checklist](#) and follow the instructions.
- Dispose of all hazardous wastes.
 - o To get the most up-to-date information on handling and disposal of hazardous waste, to have hazardous waste questions answered or if you need more help contact EH&S x6727 or safety@caltech.edu.
- Make sure all chemicals you will be moving are properly labeled and that the containers are safe to handle. Repackage or dispose of any chemicals in broken or degraded containers

OTHER THINGS TO CONSIDER

- Some equipment such as biosafety cabinets and chemical fume hoods need to be professionally decontaminated prior to moving and re-certified after a move. Make arrangements for this work in advance to allow contractors to meet your schedule.
- Remove all old or damaged equipment from the laboratory.
- Equipment that could possibly be contaminated with radioactive, chemical or Biohazardous material needs to be checked and cleared by EH&S. Contact EH&S to schedule a clearance evaluation.
- Plan where equipment will go in your new area. Identify any renovations, such as electrical outlets or seismic restraints and have them addressed before the move, so you do not have to wait after the move.
- Are you moving to an off-campus location? If so, special permits will be required. Contact EH&S for special assistance in determining which permits to obtain. Provisions will also need to be made for handling and disposal of hazardous wastes at off-campus location(s).

THREE WEEKS BEFORE YOU MOVE IN

- Collect sturdy boxes and other packing materials needed for the move.
- Contact the Radiation Safety Officer at x6727 for instructions on packing and moving radioisotopes and radiation producing equipment.
- Visit your new lab space to ensure that previous occupants (if any) have not abandoned any equipment or materials.

AS YOU PACK AND BEGIN MOVING

- Have boxes, plastic bags, and containers for broken glass, etc., ready and available before you begin.
- Package and move lab items only during normal business hours (8:00 am - 4:30 pm) so staff will be available to help if there is a spill or accident.
- Never transport hazardous materials alone.
- Never transport hazardous materials on public roads.
- Wear appropriate personal protection for the materials being handled (safety glasses or goggles, lab coat, gloves, closed-toe shoes, etc.).

- Make sure you remove all hazardous materials. EHS will survey the vacated space to determine that it is free of hazards.
- **If you are unsure about anything, ask. Call x6727 or email EH&S at safety@caltech.edu for the following topics:**
 - Biosafety
 - Chemical Safety
 - Fire Safety
 - Radiation Safety
 - Waste Disposal
 - Spills: Radioactive, Chemical, or Biological

PACKING CHEMICALS TO BE MOVED

- Wear personal protection equipment appropriate for the materials being handled (safety glasses, lab coat, gloves, closed-toe shoes, etc.).
- Make sure chemical containers are properly labeled and are not likely to leak in transport.
- Do not move unlabeled ("unknowns") or leaky containers.
 - Unknowns cannot be disposed of until the contents are identified.
- Separate chemicals into compatible groups and provide separate, labeled boxes for each group. This is extremely important to prevent serious mishaps should boxes be dropped or damaged in transport.
- Keep an inventory as you pack. Minimum information should include chemical name and quantity.
- Plan for segregated storage in your new lab. See the [Caltech Chemical Hygiene Plan](#) for more details on inventory and segregation.
- Use sturdy, partitioned boxes or other suitable chemical containers.
 - Leave enough room to completely close the box.
 - Do not allow protruding bottle necks or stems.
- Limit box size to approximately 18" per side, and don't make any one box too heavy to lift.
- Refrigerated materials should not necessarily be boxed together. Separate them into hazard class and handle according to their special requirements.
- Check containers for expiration date and signs of corrosion and/or crystallization.
- Peroxide forming materials should be disposed of and not moved to the new laboratory if the container has been opened and is more than six months old, or has not been opened and is more than one year old.
 - Always dispose of by the expiration date listed by the supplier. Contact [EH&S](#) for more information.

MOVING PACKAGED CHEMICALS

- Contact [EH&S](#) x6727 for assistance with moving hazardous materials between buildings or off campus.
- It is illegal to use personal vehicles to transport chemicals or radioactive materials.
- Use proper lifting techniques as described in the [Back Injury Prevention](#) section of this Guide.

PACKING AND MOVING BIOLOGICAL MATERIALS

- Biological materials including all etiologic agents, human and animal tissues, blood, blood products, and other body fluids must be packaged in both primary and secondary containers.
- Primary containers must be tightly sealed to prevent leakage. Take care to avoid contamination of the container's exterior.
 - Examples of primary containers are test tubes, vacutainers, IV bags, or culture flasks.
 - Surround the primary container with absorbent packing material.
- Use rigid, sealable and break resistant containers, such as sealable pans, closed metal ice chests, cardboard or plastic mailing tubes as Secondary containers.
- Label primary and secondary containers with the international Biohazard symbol, the type of material, and the name and phone number of the PI. Labels should be legible and indelible.
- If moving off-campus, consult with EH&S for specific inter/intrastate or international shipping regulations.

GETTING YOUR NEW SPACE READY

- Refer to the [New Area Checklist](#) to help get your new space ready.
- Required warning signs (radioactive materials, biohazard, etc.) must be posted in your new lab location. Call EH&S at x6727 for assistance.
- Review the location of safety showers, eyewashes, fire extinguishers, and all available means of exit from laboratories and the building.
- Document your review for inclusion in your Injury & Illness Prevention Program training records. [Caltech Injury & Illness Prevention Program](#)

COMMON CAUSES OF ACCIDENTS

In our experience the most common acts that result in chemical spills or accidents during chemical transport are avoidable. They include:

- Knocking bottles against each other.
- Attempting to lift containers or bottles by the cap. Caps may be loose or not fit correctly, causing the container to drop.
- Placing bottles in boxes without adequate packing.
- Trying to save trips by stacking boxes too high on carts or trying to move too much at once.
- Not supporting the bottom of the box while lifting--the bottom of the containers often drop out.
- Use of makeshift carts. For instance, stacking boxes on chairs with wheels.

HANDLING CHEMICAL EMERGENCIES

To get information on Handling Chemical Emergencies, go to Caltech Emergency Response Guide, [Chemical/Biological Incident](#).

For Emergency Medical Assistance:

Campus Phone - Call x5000 / Non-Campus Phone - Call 626-395-5000

For Chemical Spills:

During Work Hours - Call x6727 / After Work Hours - Call x5000

BACK INJURY PREVENTION

Although you personally may not be moving your lab contents, you will be packing boxes, moving items out of your way, and stretching over and around objects.

To prevent back strain:

- Review the [Back Injury Prevention](#) Safety Bulletin before starting any relocation work.
- **Never** twist, lift an object above shoulder height, stretch, or reach to pick up an object. These are the main cause of back injuries.
- Get as close to the object as possible to prevent excess back strain. Even a light object lifted at arm's length can strain your neck and back, particularly if it is done repeatedly.
- Face the object squarely, whether it is a book on a shelf, a reagent bottle, or glassware.
- Use a ladder or step-stool to bring high objects down below shoulder height and ask for help to safely hand down the object.
- If you must reach for an object in front of you, support your upper body weight by leaning on a desk or table. If possible, move the obstruction out of your way, climb up on it (if it is safe to do so), or ask for help.
- Lift with your leg muscles, not your back. For light objects below waist level, you can counterbalance rather than squat.
- If it is too heavy to move alone, get some help!

REPORTING INJURY OR ILLNESS

In the event of an injury or illness, immediately notify the Workers' Compensation Coordinator in Human Resources at x 4577. There is voicemail available to take messages at all hours, including weekends and holidays.

RADIATION SAFETY

- Before packaging or moving any radioactive materials or radiation-generating equipment, call the EH&S Radiation Safety Officer at x6727 for information and instructions.
- Contact EH&S to have your **Radioisotope Use Authorization** amended to allow radioisotopes at the new location.
- New lab areas must be properly posted before radioactive materials are brought in.
 - Call EH&S Radiation Safety Division if postings are missing from your new lab.
- Immediately report all spills of radioactive materials on campus to EH&S at x6727 during office hours (8:00 am to 5:00 pm), or after hours to Campus Security at x5000.
- The PI is responsible for complete decontamination and removal of radioactive materials from the vacated lab. EH&S will conduct a Radiation clearance survey only after all radioactive materials have been removed.
 - This survey is required **before** any construction is done or anyone moves into the vacated lab space.

- To facilitate evaluation of your new installation and maintain an accurate inventory, compile and send a list of radiation producing equipment (lasers and x-ray machines) to EH&S at MC 25-6.

BIOHAZARD SAFETY

- Authorized users of Biohazardous materials must update their Use Authorization (via amendments) to include their new locations. For the most up to date information go to the [Caltech Safety Office website](#) or call 626-395-6727.
- Access doors to regulated areas must be posted with warning signs. Call EH&S at 626-395-6727 for assistance if new locations are not posted.
- Biological safety cabinets require professional decontamination prior to moving and re-certification after the move. Make arrangements for this work in advance to allow contractors to meet your schedule.

COMPRESSED GASSES

- Make sure the valve cap is securely in place before moving any cylinder.
- Transport cylinders on a wheeled cart, carefully secured in an upright position to prevent them from falling. Never move a cylinder by rolling it across the floor
- Do not leave a cylinder unattended in the corridor.
- Never drop cylinders or bang them against each other or another object.
- Report all suspected leaks immediately to EH&S or Security after hours.
- If the material in the tank is highly toxic, evacuate everyone from the area.
 - o Leaking bottles should be put in the fume hood, if possible.
- Empty cylinders should be labeled "empty."
 - o Call Central Receiving at x4891 for pickup.
- Contact EH&S if you have a cylinder with unknown contents.

HAZARDOUS MATERIALS IN LABORATORY EQUIPMENT

Certain laboratory equipment may contain materials or chemicals which are potentially harmful to human health or the environment. These may include:

ASBESTOS		MERCURY	
Autoclaves	Gloves	Manometers	Barometers
Ovens	Curtains	Thermometers	Silent Switches
Furnaces			
PCBs		RADIOACTIVE MATERIALS	
Large Batteries	Capacitors	Liquid Scintillation Counters	
Power Supplies	Transformers	GC Units	
High Voltage Systems			
COMPRESSED GASSES			
Internal Cylinders	Ampules	Canisters	

- Asbestos gloves and curtains should no longer be used. Substitute materials are available for most applications. Call EH&S for more information.

- Care must be exercised in preparing this equipment for transport. Items that possess or are connected to damaged asbestos products should not be moved. [Report them to EH&S.](#)
- Suspect PCB items should also be reported to EH&S. Equipment containing any hazardous material, such as large power supplies containing PCBs, should be clearly labeled by the owner prior to transport to the new facility.