

SAFETY IN THE LABORATORY

Information for Contractors and Physical Facilities Personnel
Working in UCSB Labs

University of California, Santa Barbara
Environmental Health, & Safety
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This booklet was developed by UCSB Environmental Health and Safety (EH&S) for contractors and Physical Facilities personnel working in laboratory spaces at UCSB. Its purpose is to provide information on:

- 1) concerns regarding general potential hazards that may be encountered while working in laboratories at UCSB; and
- 2) what to do and who to contact should an emergency occur.

As a worker on campus, it is your responsibility to ensure that your activities are conducted safely and in accordance with University policies and all state and federal regulations.

If your questions are not answered by this booklet, contact the project manager or the EH&S Office (893-7534). We want to assist in providing information that will support your endeavor to conduct work here in a safe and healthful manner for you, your workers, and the UCSB laboratory staff.

The manager for this project is:

Phone: _____

What should you do if an emergency occurs?

Fire Most UCSB buildings have fire alarm and fire pull stations. In case of a small fire in your area, use a fire extinguisher if you have been trained to do so by your employer and if the fire is small enough that you are not endangering yourself. Make sure you have a safe exit behind you. For all other fires, evacuate the area, close the door behind you, pull the fire alarm, and call **9-911** from a campus phone (dial **911** from a pay phone or residence hall phones). Notify your supervisor. Wait outside in a safe area and meet the emergency personnel when they arrive.

If you hear an alarm in your area, cease work and turn off equipment. Evacuate the building and wait for authorization from the responsible authorities before re-entering the building.

Spill If a container of laboratory chemical, biological, or radioactive material breaks in the laboratory—spilling even a small amount—notify others in the area and close the door behind you as you leave. From campus phones, call x-3194 for assistance; from non-UCSB phones, call 893-3194. This number is answered 24-hours a day by a live person, or by an automatic paging system to notify the EH&S “duty officer”. . Notify your supervisor. Wait for emergency personnel in a safe area away from the spill.

Injury If you or someone working with you in the laboratory is injured, follow your company procedures or, for serious injury, call 9-911 (911 from a pay phone or residence hall phone). In general, if chemicals are splashed in the eyes or on the skin, immediately rinse the affected area with water. Continue rinsing for 15 minutes. Safety showers and eye washes are available in most laboratories or in the hallways.



What are the potential hazards you might find in the laboratory?

A variety of hazards may exist in any particular laboratory or support area. The first indication of a particular hazard will be a sign on or near the door to the laboratory. Signs may indicate the presence of biohazards (human blood, infectious agents, or viruses that can cause disease), radioactive materials, radiation-producing machines, lasers, strong magnetic fields, or high-voltage equipment. Most laboratories contain some chemicals, and a few laboratories will have many chemicals. In a few high risk areas, access is limited; normally, all activities will be shut down and the area decontaminated before contractors are permitted inside. The majority of our laboratories are not considered high hazard areas.

Three labels you might see on doors or equipment are:



A **radiation** warning sign on the door means radioactive material is used in the laboratory. Radioisotopes are used to "tag" molecules for scientific studies. The quantity of radioisotopes stored in a lab is quite small. Laboratory staff working with radioactive materials wear film badges (radiation detectors) to measure any exposures. The average dose to full-time lab workers in our facilities is generally too low to be detected. It is very unlikely that you would receive any measurable exposure. All potentially contaminated items and equipment are labelled with the standard warning symbol and statement, or placed within equivalently marked containers or areas. Never touch items with the radiation warning symbol, as it may be contaminated. Lab surfaces are regularly checked for contamination by both EH&S and the laboratory staff.

For labs containing **lasers**, PF and contractor personnel should verify with the lab personnel that the lasers will not present a hazard. Be aware that some lasers operate at invisible wavelengths. Lasers should be turned off if contractors are present in the lab.

Strong magnetic fields are present in those labs which have magnetic field warning signs posted. People with **cardiac pacemakers or metallic implants** are not permitted in these labs. Contractors or PF personnel need to gain approval from lab personnel prior to

bringing any ferro-magnetic items (e.g. tools, gas cylinders, etc.) into the lab, since these items can be attracted to the magnetic.

Chemicals are used in most labs. These might include corrosives (acids and bases), flammable liquids, toxic materials, compressed gases, reactives (those that can cause fire upon contact with air, water, or other materials), and carcinogens. Most hazardous chemicals are used in a fume hood. However, closed containers of hazardous chemicals are often stored on shelves and in cabinets in the open room. Storage of these materials normally does not cause a problem since chemicals are well contained. The main concern is that bottles may be broken during your activities—so have the laboratory staff move chemicals out of your work area as a precaution.

When the **biohazard** symbol is displayed, it usually means that bacteria, viruses, blood, or human cells are used in the lab. A few research laboratories work with biohazards that can cause disease. However, to "catch" something in these laboratories you would have to be cut with contaminated material, splashed, or contaminate your hands and then get it in your eyes, nose, or mouth. Work with these materials is normally confined to a filtered biosafety cabinet. A biosafety cabinet looks like a fume hood (a large metal box open on one side) through which filtered air flows. It has special filters which capture essentially all bacteria and viruses. The lab worker is protected from contamination by the biological material (cells, bacteria, etc.) in the cabinet, and the biological material in the cabinet is protected from the outside air (dusts, your germs, molds in the air, etc.). Laboratories using biological agents decontaminate lab surfaces with a disinfectant after each use.

Entering a laboratory

Do not enter any area or laboratory that is marked with a sign warning against unauthorized entry or that says "KEEP OUT", or "RESTRICTED AREA", without contacting the manager of the lab or EH&S. Laboratories may contain sensitive experiments that could be destroyed by exposure to light, changes in temperature, or contamination from the outside environment. Some laboratories may contain lasers with invisible beams or strong magnets that could be a hazard to you. These conditions will be posted on the outside door. The custodial staff have generally already made special arrangements with the managers of restricted areas for routine lab entry to perform janitorial services.

Once inside a laboratory, you will see whether active work is being done. If there are researchers at work, explain what you are there to do and ask directly if you should be concerned with any special hazards. If hazardous equipment is in operation, hazardous supplies or hazardous wastes are present, or experiments are in progress in the area you need to work in ask the laboratory staff to move them. **Never move any equipment, chemicals, or other containers without the direct permission and instruction of the laboratory manager or the EH&S Office.**

If no one is present in a laboratory but it appears to currently be in use, contact your project manager and wait for instructions. Do not start work until you have clearance to do so.

Many laboratories require safety glasses to be worn at all times. Entry may be denied to anyone not wearing eye protection. As a contractor, respect the individual safety rules of the laboratory. It is for your protection.

Policies for Custodial Staff

Generally the following policies apply to the custodial staff for their routine entry into campus lab spaces:

- Staff will empty the trash and sweep/mop lab floors, but do not clean benchtops, shelving or other surfaces in the lab. Only regular, designated trash cans should be emptied - no “home-made” boxes or bags of trash should be emptied (e.g. designated radioactive trash boxes).
- Any liquid spills found on the floor should not be touched or cleaned up and must be reported to a custodial supervisor. For solid materials, only normal dust, dirt papers, etc. should be swept up; chemical-looking solids should not be touched. When emptying the trash, the can should not be turned upside-down - there may be chemical powders in the trash which can become air-borne. A better method is to just remove the bag liner and keep upright.
- If a lab is occupied by researchers, the custodial staff will either not enter the lab, or ask the occupants if it is appropriate and safe to come in and do their work. Custodial staff should not enter the lab if experimental work is being done, e.g. lab staff are working with chemicals, running equipment, wearing safety glasses, etc.
- For labs that are posted as “Restricted Access”, such as the Vivarium, custodial staff/supervisors need to make special arrangements with the management of these labs for routine access.
- Lab personnel are instructed not to place any glass, broken glass, syringe needles or other “sharps” into the regular trash that may injure custodial staff. Researchers must designate and label a separate container for those items. Sharps found in the regular trash by custodial staff must be reported to a custodial supervisor. If sharps waste is properly contained (sturdy, well-sealed, puncture-proof container) the custodial staff may empty these containers, but only directly into a building dumpster.
- It is recommended that lab custodial staff wear sturdy footwear and not “flip-flops” or sandals.

Working in fume hoods or roof areas with fume hood exhaust

Fume hoods are the most common and most important piece of safety equipment used by the laboratory staff to protect themselves from chemical and radioactive exposures. The inside of a hood is generally the "dirtiest" place in the laboratory; it is where most of the hazardous chemical and radioactive work is performed.

If the project involves work inside a fume hood, the laboratory staff must first remove equipment and supplies and wipe out the interior surface of the hood. If radioactive materials are/were used in the hood, a radiological survey should be performed by lab personnel or EH&S. Always consider the inside of fume hoods to be chemically contaminated. Heavy rubber, neoprene or nitrile gloves (or other impervious gloves) and safety goggles should always be worn by the contractor. Immediately dispose of or wash the gloves after use to prevent the spread of any possible contamination to your equipment or supplies. EH&S also recommends the use of disposable coveralls, such as Tyvek, to prevent clothing contamination.

Fume hood exhaust stacks are located on the roof. To protect roof workers, the stack tops are generally 7 to 10 feet above the walking surface. If a sudden and unexpected odor is encountered while working on the roof, workers should leave the immediate area immediately and inform the project manager, or EH&S. If working on a particular exhaust system for an active lab, the hood should be posted "Do Not Use" and lab personnel should be informed.

The hard, grey, cement-like panels on the inside of many older hoods are made of transite. Transite is a chemical- and fire-resistant material that contains asbestos. Transite should be handled in intact sheets whenever possible and should not be broken unnecessarily. All work involving removal of transite or other asbestos must be coordinated with the project manager and the EH&S Asbestos Program (x-4689).

Working in an unoccupied space

The majority of renovation work involving contractors takes place in unoccupied laboratories which have had all hazardous materials, equipment and furniture removed to prepare for new researchers with specific requirements, or for structural upgrades.

When a research group vacates a laboratory, a clearance survey is performed to ensure that hazards are not left behind. Laboratory staff remove all their materials, decontaminate surfaces, and wipe down areas where work was performed. EH&S then conducts a walk-through inspection. The departing research group should not be granted clearance until all potential hazards are removed. If EH&S has posted an area as "contaminated" do not proceed until communicating with EH&S.

Some *hidden* hazards may go undiscovered until renovations are underway. These may include finding broken glass, needles, or small amounts of mercury metal in drain traps. As mentioned above, the inside of a fume hood should always be considered to have some contamination. Note that mercury must be given to EH&S for proper disposal.

Contact the project manager for any hazards that might be discovered during the course of work and wait for instructions.

How can you get more information about the hazards in the laboratory?

Your supervisor should be able to provide you with information on the hazards associated with the materials and procedures you are using. If you have any questions about hazards you see or suspect in the lab, you can:

1. ask the researchers onsite for more information;
2. ask your supervisor to get more information from the project manager or from the EH&S Office; or
3. contact Environment, Health & Safety (893-7534) for campus facilities; Material Safety Data Sheets (MSDSs) are located at EH&S for review.

How can you protect yourself from hazards in the laboratories?

Good work practices include washing your hands before leaving the laboratory, as **well as no eating, drinking, or smoking** while in the laboratory.

Follow the practices outlined in the fume hood section before working in the fume hood. If you are working in a bench area, in an area where chemicals were stored, or on laboratory equipment, wear rubber, nitrile, or latex gloves, and safety glasses/goggles.

Do not work near waste containers or work surfaces labeled with the biohazard, radioactive, carcinogen, or other specific warning sign. Check with your supervisor before beginning work.

Many chemicals used and stored in the laboratory are flammable solvents and may be easily ignited. If you are going to work with equipment that might generate heat or sparks, it is extremely important that flammable materials are safely stored away from your work area before you begin work. Again, these materials should be moved by the laboratory personnel. Contact your supervisor or the project manager to have the chemicals moved. Always remember to have a fire extinguisher close by. There is an ABC (dry powder) extinguisher near the exit door of most UCSB laboratories. All gas cylinders should be secured before work begins.

What do the laboratory staff need to know before you go into their area?

Many of the experiments being done in the lab take days, weeks, and sometimes months to set up and complete. If the work you will be doing will disrupt any of the researchers' work,

they should be notified well in advance. Let them know where, when, and how long your project will take. Work with the project manager to let the laboratory staff know what will be needed of them; project managers can provide effective notification in most cases. Most researchers are willing to move their work to another area or cover equipment and experiments if given plenty of time.

What else do you need to know?

Utilities Interruptions

In many areas your actions can significantly impact the work and the safety of people elsewhere in the building. If you turn off a blower or de-energize an electrical circuit, you may expose people to hazardous situations. **Never turn off any bldg. alarm or utility without first coordinating with the project manager.**

Use of hazardous or smelly materials

If possible, avoid the use of hazardous materials and strong-smelling materials inside buildings. Avoid using hazardous or smelly materials and combustion-driven generators or compressors near the air intakes. Air intakes are often found in loading dock areas. Turn off vehicles promptly. Do not pour hazardous materials down the drain or dump them on campus. Any hazardous waste you generate is your responsibility to dispose of properly unless specific prior arrangements are made.

Maintaining exits and accesses

Hallways and stairways should be kept clear to allow emergency exiting in case of a fire or other emergency. Do not block fire extinguishers, fire alarm pull stations, emergency eye wash/shower units, or electrical panels.

Personal protective equipment

You may be asked to work in "clean areas" where animals, or equipment are highly susceptible to everyday germs, dirt, and dust. In these areas you will be asked to wear coveralls, gowns, masks, and other protective gear which are intended to protect the patient or research from possible contamination from you.