

Department Procedures for Research Students

This part of the safety training pertains to the use of research labs, safety rules you will be required to adhere to, and navigating the paperwork to get your key card and what is expected from you in maintaining the research space and your key card. The second section goes over how to deal with any hazardous waste you may generate in your research lab.

There are several steps you must complete in order to acquire materials or space for your project. Below is a list of these steps arranged as a checklist for your convenience. The Chemistry Stockroom has all the forms you will need to complete these steps:

1. You must be currently enrolled in the Chemistry or Biochemistry course which involves you in this laboratory work.
2. CHEMICAL HAZARD ASSESSMENT FORM - Submit this completed form to the Chemistry stockroom as early as possible. You must have this form on file before you can obtain general chemicals from the stockroom. Specialty chemicals must be ordered by your PI.
3. KEY CARD REQUEST FORM - This form must be submitted to the Chemistry stockroom to secure access to your space under the terms described on succeeding pages. Your PI will determine how long you will maintain access to research space.
4. RESEARCH ROOM SAFETY CARD - This card identifies your space and gives a summary of the materials in use in the lab. This card should be posted outside of your primary research space or on the inside door.
5. DOCUMENTED SAFETY TRAINING - At a minimum, this requires successful completion of this online safety training.
6. CHECKING OUT - You must check out of your research space every quarter with your PI. You must check out of your research space every academic year to avoid charges and/or holds.

More details on the above procedures are included in the information to follow.

KEY CARD REQUEST FORM

The choice of your particular space is determined by the nature of your research, existing assigned spaces, and the wishes of your research advisor.

To have key card privileges, you must have a completed and current Key Card Request form on file in the 432 Organic Stockroom. **This card is only valid for as long as your PI has indicated.** You must submit a new Key Card Request form at the beginning of each academic year.

RESEARCH ROOM SAFETY CARD

A Research Room Safety Card is mounted by the door of your research area(s). This information assists first responders (police, fire) in case of an emergency – use complete chemical names only, not structures or chemical symbols. You may indicate any acronyms you are using on small vials on this card by putting the acronym in parenthesis next to the complete chemical name. Acronyms may not be used unless the size of the vial prohibits complete chemical name. We have been forewarned by public safety personnel that they may decide to not enter a laboratory unless in the event of a spill or fire if there is not a clear indication what chemicals, reagents are in the room.

KEY AND WORKSPACE PROCEDURES AND POLICIES

A. GETTING STARTED

1. Student fills out associated paperwork for research
2. Advising faculty signs paperwork
3. Student completes online safety training and successfully passes both quizzes
4. Key cards are issued and paperwork explaining key card policy is issued - At this time a charge slip would be filled out and kept on file with the associated fee for a key card not returned properly = \$95.00

B. END OF QUARTER ACTIONS

1. At the end of every quarter, you must check out of your research space with your PI. This includes disposal and organization of all remaining samples.
2. Your PI will designate when your access to research space expires. At that point, you must check out of your research space with your PI **and a staff member.**
3. You must then turn in your research key card.

IN ANY CASE, YOU MUST NOTIFY YOUR PI AND DO THE PROJECT CHECKOUT PROCEDURE BELOW:

4. Set-up a time for your PI to check out of your lab space, **no later than Final's week**.

At the minimum the checkout procedure includes the following:

- a) Clear and wipe down all bench spaces
- b) Wash all glassware and put away. No glassware to be left in sinks or hoods
- c) Make sure Hazardous Waste jars which you generated are properly labeled and ready to hand over to technical staff, (IN PROPER CONTAINERS WITH PROPER LABELS).

Attached to this package is a sample of proper waste chemical labeling.

- d) Empty refrigerators, cabinets, drawers, etc. of all associated reagent bottles and media that will not be used in the future

Note: This is not an onerous or time consuming task. It takes only minutes and saves the technical staff days of cleaning out used vials, media, unlabeled bottles, etc. accumulated in research labs after a few years time. This process is dangerous can be easily avoided with proper labelling and routine organization/cleaning.

5. If lab is checked out as cleaned, student returns key card and charge slip from Step 4 above would be torn up.
6. If student does not properly check out of lab space with technical staff and/or fail to return their key card, then the fee of \$95.00 is charged to student through student accounts- no exceptions.

RESEARCH KEY POLICIES

A. LEVEL 1 Key Card Access

1. Your working hours are limited to 8 am to 6 pm, Monday through Friday.
2. *If you need additional hours in your research lab, you must fill out the appropriate papers **before** working outside the 8 am to 6 pm accepted hours.* "Extended Use Key Card" forms allowing overnight, Monday – Friday, or weekend key card are attached to this package and available in the Chemistry Stockroom. These must be signed by your research advisor.

3. If you fail to return the Extended Use key card on time, your regular key card privileges will be suspended for one week for the first offense. Additionally, violation of safety protocols will result in your key card privileges being suspended for one week for the first offense. At this time, your research advisor will be contacted. A second offense will result in loss of your key card privileges for the remainder of the quarter. Your research advisor will then be solely responsible for providing you with access to the lab.
4. Faculty who allow facilities access to students should supervise the students and area.
5. Faculty research space and equipment will not be disturbed or moved without approval of the faculty concerned.
6. Key card privileges expire at the end of the last day of finals each quarter. Your key card must be returned to the stockroom to avoid a \$95 key card non- return fee.

B. LEVEL 2 Key Card Access

1. If you meet **all** of the following requirements, you may be eligible for Level 2 Key Card access:
 - a) You are enrolled as a student in the Dept. of Chemistry & Biochemistry
 - b) You have completed at least one quarter or one summer of research with your advisor
 - c) You are continuing research with your same advisor
 - d) Your advisor approves your Level 2 Key Card Access
2. With Level 2 Key Card Access, you will be granted additional privileges, which come with several stipulations, not limited to those listed below:
 - a) Your standard working hours are limited to 7am to 9pm, Monday through Friday.
 - b) You must receive written permission from your advisor and submit appropriate paperwork if working outside of standard working hours. To do this, complete and return to the stockroom the “ Extended Use Key Card” form **before** you plan to work outside of the hours listed above.
 - c) You must always work with a buddy before 8 am or after 6 pm on weekdays and all day on the weekends. A **“buddy” is defined as someone who must be conversant in the processes and materials being used and be able to render assistance in case of an accident.** Your buddy must be within hailing distance from your work area. That is, they must be able to hear you yell for help in the event of an emergency.

d) Researchers must follow Cal Poly Chemistry/Biochemistry departmental safety rules included in this document, safety protocols defined in Standard Operating Procedures (SOPs), as defined by your PI, and policies of the Cal Poly State University Chemical Hygiene Plan. It is the PIs responsibility to ensure that researchers are aware and follow these policies.

e) You must follow protocols and research approved by the PI and may not do **any** lab work outside of these.

3. Violation of any of these policies will result in the revocation of your Level 2 Key Card Access for the rest of the quarter. A second violation will result in permanent revocation of Level 2 Key Card Access.
4. Your Principal Investigator (PI) will be charged with your compliance with these policies. However, other faculty and staff will report violations to your PI and the department chair.

C. GRADUATE STUDENTS

1. Chemistry Dept. graduate students must follow all the same rules as the Level 2 Key Card Access. An exception is that graduate students may keep their key cards in their possession until they graduate. Your working hours are the same as Level 2 Key Card holders; 7 am – 9 pm, Monday – Friday. See 2b. above.
2. Graduate students from departments other than Dept. of Chemistry & Biochemistry cannot obtain Level 2 Key Card Access.

LABORATORY WORK RULES

A. EYE PROTECTION

While you are doing laboratory work at Cal Poly Chemistry and Biochemistry department, you must wear some form of eye protection **AT ALL TIMES**. Your Principal Investigator (PI), or Advisor is responsible for determining the correct level of safety eye wear according to the rules below. Failure to wear appropriate eye protection will result in a reprimand with the first offense; a subsequent lapse will jeopardize your project privileges.

1. SAFETY GOGGLES

You **must** wear splash protection goggles if there is any possibility of hazardous liquid splash or spill or flying particles. Only goggles that conform to ANSI Z87.1-1989 and provide a complete seal around the eye area are authorized. If you are in the same room with a person handling hazardous liquids, you **must** also wear goggles, not safety glasses.

2. SAFETY GLASSES

- a. Safety glasses must meet ANSI Z87.1-1989 standards for this work environment. This means that the safety glasses must have side shields and brow guards.
- b. Ordinary prescription glasses are not acceptable as eye protection in this department.
- c. Safety glasses provide only a minimum eye protection for regular use. Again, if you are in the same room with a person handling hazardous liquids, you also must wear your goggles, not safety glasses.
- d. The safety glasses must be worn whenever you are NOT exposed to the hazard of chemical splash. For example, you must wear safety glasses when washing glassware, tidying up labs or handling sealed chemical and waste containers. If you are not sure whether an assigned task requires eye protection, ask your supervisor - 99% of the time, the answer will be "Yes!"

3. CONTACT LENSES

The ANSI Z87.1 standard does allow for the wearing of contact lenses if approved chemical splash **goggles** are worn over the eyes at the same time.

B. ADDITIONAL RULES

1. Students must never work in laboratories alone. There must be a "buddy" at least within hailing distance. (He/she can hear you and aid you in case of an accident.) A buddy is defined as a person conversant in the processes and materials being used and be able to render assistance in case of an accident.
2. Other persons present in the laboratory may not perform lab work without separate authorization. You, as a key card holder may not admit others into the laboratory to perform laboratory work or to socialize. The door may not be blocked open or left unlocked when you leave the room.
3. The laboratory must be left in a clean and orderly condition. Dirty apparatus and glassware must be cleaned and stored in appropriate locations. *Figure 1 displays what NOT to do.* Large amounts of chemicals not currently being used, especially solvents, must not be accumulated in the laboratory. Return this material to the Stockroom.



Figure 1. Messy, cluttered hood area

4. All chemicals or reagents must be properly labeled with complete chemical name, your name, and the date it was transferred to reaction vessel, bottle, or jar.
5. Doors and windows must be closed and locked when the laboratory is unattended.
6. Windows are not to be opened to sweep noxious fumes into the hall. Instead, turn on the fume hood, leave the laboratory, and close the door.
7. An experiment to be left operating unattended must meet the following criteria:
 - a. Experiments to be left unattended must first be discussed with the research advisor.
 - b. Reasonable care must be exercised to prevent the development of hazardous situations in case of unexpected occurrences such as electrical power interruption or equipment failure.
 - c. All running water connections must be wired securely.
 - d. Apparatus must be tagged indicating its contents, the name and home number of both the student and the project advisor, and the dates of start-up and shut-down.
 - e. All services left on (gas, water, electricity) must have a tag on the valve or switch , reading "DO NOT TURN OFF".
8. Equipment, glassware, or chemicals may not be removed or borrowed from other labs or other projects unless specific permission has been obtained from the original user or the Chemistry Department staff (not student assistants).
9. Current Chemistry and Biochemistry Department Safety Policies must also be adhered to.
10. Failure to adhere to either Laboratory Work Rules or current department Laboratory Safety Rules will result in revocation of key card privileges for the remainder of the quarter.

Hazardous Waste

Research students, under the supervision of research advisors, are responsible for proper handling and disposal of any hazardous waste that is generated. Regulation of laboratory hazardous waste is governed by a complicated web of intersecting federal, state and local codes. Nevertheless, every generator of hazardous waste (including every research student) is expected to know and comply with waste regulations; Cal Poly is subject to inspection by hazardous waste regulating agencies and substantial fines can be assessed against the Chemistry and Biochemistry Department for violations. The following sections will define hazardous waste and describe basic handling and labeling procedures.

WHAT IS HAZARDOUS WASTE?

Title 22 contains several extensive lists of hazardous materials. If a material does not appear as a “listed waste”, it can still be qualified as “hazardous” if it exhibits any of the following characteristics, whether or not it is listed in Title 22: **ignitability, corrosivity, toxicity or reactivity**. The criteria for determining whether a waste falls into one or more of these hazard classes is detailed in the regulation. Note that a hazardous waste may exhibit more than one of the qualifying characteristics. A mixture must be evaluated according to the criteria for the hazardous waste characteristics, including calculating an oral LD50 value based on the LD50s of the components of the mixture.

Since the number of materials used in our department that qualify as hazardous waste far outnumbers materials that can be flushed down the drain and since the fines that can be levied are huge, the safest bet is to assume that your waste materials are regulated as hazardous waste. The Organic Chemistry stockroom technician will help you and your research advisor assess and categorize your waste stream.

PROPER HANDLING AND DISPOSAL OF HAZARDOUS WASTE

1. All hazardous waste must go into a bottle, or labeled waste container. **Never leave waste in an open container in the hood to evaporate!** Hazardous waste containers must be in good condition, compatible with the waste contained therein and bearing no label other than the hazardous waste label described in #3 below.
2. In addition, all waste containers must have secondary containment in case of spills or leaks – either placed in another container or stored in a basin that is capable of holding all of the contents. Suitable containers and basins are available at the stockrooms. (Figure 2)

3. Every container must have a Cal Poly Chemistry and Biochemistry Department “Hazardous Waste” label. Non-specific labeling, such as “solvent waste” is unacceptable and subject to substantial fines. Hazardous waste labels are available at the stockrooms. (Figure 3)



4. Every container must have the chemical constituents clearly written on the Hazardous Waste label; trade names, chemical symbols and chemical structures are unacceptable and subject to substantial fines. In addition the percent composition of the container must be listed for each chemical constituent (including water).
5. Every container must have the accumulation date written on the label. The accumulation date is the first day that you start adding waste to the container. Do not accumulate waste beyond 90 days. Your name must also appear on the hazardous waste label.
6. Containers of hazardous waste must remain sealed except when waste is being added to the container. The container must have a tight-fitting screw cap lid that will not leak if the container is tipped over. Do not leave funnels in the containers, unless it is an Eco-funnel that can be closed and latched and is considered a cap.

EXAMPLES OF HAZARDOUS WASTE LABELING

These labels are available (blank) at both Stockrooms.

CORRECT : Itemized lists of chemical names, concentrations, date, name of generator.
AMPLE INFORMATION !!!!!!!

HAZARDOUS WASTE		
START DATE : <u>3-26-99</u>		
CONTAINS : (List constituents <u>and</u> concentrations as %, M, or ppm)		
Chemical Name	Concentration	Amount
<u>hexanes</u>	<u>neat</u>	<u>100 mL</u>
<u>acetone</u>	<u>neat</u>	<u>20 mL</u>
<u>sulfuric acid</u>	<u>3 M</u>	<u>10 mL</u>
<u>potassium bisulfate</u>	<u>0.1 M</u>	<u>125 mL</u>
PHYSICAL STATE : liquid		
HAZARD TYPE : <u>flam</u> corr <u>toxic</u> reac (circle)		
GENERATOR : Chemistry Dept. Room <u>B-12</u> Name: <u>Paulding</u> Cal Poly State University, San Luis Obispo, CA		

INCORRECT : No date - no names. Who made this and what is it ??????????

HAZARDOUS WASTE		
START DATE : _____		
CONTAINS : (List constituents <u>and</u> concentrations as %, M, or ppm)		
Chemical Name	Concentration	Amount
_____	_____	_____
_____	_____	_____
<u>ORGANIC WASTE</u>		
_____	_____	_____
PHYSICAL STATE : _____		
HAZARD TYPE : flam corr toxic reac (circle)		
GENERATOR : Chemistry Dept. Room _____		

Cal Poly State University, San Luis Obispo, CA