

SAINT MARY'S COLLEGE OF CALIFORNIA

CHEMICAL HYGIENE PLAN

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Saint Mary's College of California
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Change History	Date	Brief Description of Change	
Revision 0	September 2014	New Document	
Revision 1	September 2015	Minor Revisions and corrections	
Revision 2	May 2016	Major update and consolidation of information	
Revision 3	September 2017	Updated PPE requirements for individual labs	
Revision 4	April 2018	Added the Incident Notification Form in Appendix A Minor updates and revisions	

1. PURPOSE

Saint Mary's College of California (College or SMC) has developed the Chemical Hygiene Plan to:

- Assure that relevant health and safety considerations are included in laboratory work involving hazardous chemicals.
- Describe procedures, equipment, personal protective equipment (PPE), and work practices for protecting employees from the potential health and safety hazards associated with these chemicals.
- Describe how health and safety information about hazardous chemicals and chemical mixtures will be provided to Saint Mary's College laboratory employees, including Safety Data Sheets (SDS).
- Comply with Cal/OSHA 8 CCR §5191, Occupational Exposure to Hazardous Chemicals in Laboratories.

2. SCOPE

This plan applies to faculty, staff, student workers and research students, who perform "laboratory use" of hazardous chemicals at the College. Laboratory use of hazardous chemicals means handling or using such chemicals in which all of the following conditions are met:

- The handling or use of chemicals occurs on a "laboratory scale," that is, the work involves containers that can easily and safely be manipulated by one person;
- Multiple chemical procedures or chemical substances are used; and
- Protective laboratory practices and equipment are available and in common use to minimize the potential for lab employee exposures to hazardous chemicals.

Chemical use by non-laboratory employees is covered in SMC's Hazard Communication program.

Students working in a laboratory where the laboratory use of hazardous chemicals occurs should be informed of and required to follow the General Laboratory Standards (Appendix A) and any laboratory-specific operating procedures.

3. RESPONSIBILITIES:

Group	Responsibilities
Faculty	<ul style="list-style-type: none"> • Plan and conduct work with hazardous chemicals in accordance with the Chemical Hygiene Plan. • Ensure that the use of extremely hazardous chemicals is avoided when possible; in cases where they are used ensure that regulatory requirements are addressed, and appropriate control measures are identified, documented and followed. • Provide students with the training and equipment needed to perform laboratory work safely, including Best Management Practices (BMP) to control discharges to the sanitary sewer drains.
Staff	<ul style="list-style-type: none"> • Provide support to faculty in chemical management, including ordering, labeling, delivery, and storage of chemicals. • Chemistry Department Technician manages the inventory system and the chemical storage room.
Environmental, Health and Safety (EH&S)	<ul style="list-style-type: none"> • Manage Saint Mary's SDS system. • Manage Saint Mary's Hazardous Waste program. • Provide EH&S technical support to Faculty, staff and student workers, as needed.
Chemical Hygiene Officer (CHO), Director of EH&S	<ul style="list-style-type: none"> • Conduct Hazard and Risk Assessment and PPE assessments as needed, or as requested by Faculty. • Arrange for exposure assessments, as needed. • Coordinate the review of extremely hazardous substances used in the labs. • Ensure that laboratory employees' exposures to such substances do not exceed the exposure limits specified in 8CCR, Group 16, §5139. • Provide appropriate chemical safety training and information to laboratory workers and document, as needed. • Maintain the Chemical Hygiene Plan, periodically review and update as needed.
Facilities Department	<ul style="list-style-type: none"> • Maintain laboratory facilities and infrastructure, as per regulation and manufacturer specifications (laboratory-type hoods, electrical outlets, gas outlets, storage cabinets, eyewashes and safety showers, fire extinguishers, sprinklers, etc.).

Group	Responsibilities
	<ul style="list-style-type: none"> • Identify deficiencies in facilities and infrastructure and services in a timely manner. • Perform and document monthly testing of emergency equipment (eyewashes, safety showers, fire extinguishers). • Install signage as directed by Chemical Hygiene Officer
Dean	<ul style="list-style-type: none"> • Provide oversight and direction to the Chemical Hygiene Plan as it applies to their schools. • Provide resources to support the Chemical Hygiene Plan.
Human Resources	<ul style="list-style-type: none"> • Manage injury and illness related programs, e.g. medical treatment and worker compensation.

4. GENERAL LABORATORY REQUIREMENTS

4.1 Applicability

4.1.1. All laboratory workers, including staff, faculty, student workers and research students, must follow the provisions of this Chemical Hygiene Plan, including the General Laboratory Standards in Appendix A.

4.1.2. Faculty shall ensure that students enrolled in College-sanctioned classes and teaching laboratories follow the General Laboratory Standards in Appendix A. Faculty shall also provide students with chemical safety training appropriate to the work being performed and Best Management Practices (BMP) to control discharges to the sanitary sewer drains prior to their initial assignment.

4.2 Hazard and PPE Assessments

4.2.1. The CHO and faculty must conduct a hazard/PPE assessment for a laboratory space and associated tasks when the lab undergoes a major change in design and/or operation. The risk assessment must be documented.

4.3 Engineering Controls and Safety Equipment

4.3.1. Laboratory-type hoods - Labs shall have laboratory-type hoods as needed to control exposure to airborne chemical hazards. Laboratory-type hoods must meet the standards specified in 8 CCR 5154.1.

4.3.2. Safety Equipment - During the hazard/PPE assessment process, the need for safety equipment shall be identified, e.g. safety shields, gloves, safety glasses, lab coats, etc. The safety equipment identified by this process must be implemented by the responsible faculty member, with the assistance of Facilities and EH&S, as needed.

- 4.3.3. Eyewashes and Safety Shower – Plumbed eyewashes and safety showers that comply with ANSI Z358.1 must be present in or near all lab areas with potential exposure to hazardous chemicals. The area of the eyewash and shower equipment must be maintained free of items that obstruct their use.
- 4.3.4. Fire Extinguishers – Fire extinguisher must be present in or near each laboratory area. The fire extinguisher must be appropriate for the classes of fires possible in a particular laboratory. Employees who have been trained to use extinguishers may, at their comfort, use them to fight incipient fires. Personnel who have not been trained in extinguishers should evacuate rather than attempting to fight fires.
- 4.3.5. Testing of Emergency Equipment – Emergency safety equipment, including eyewashes, and safety showers shall be tested monthly to confirm their function by Facilities. Testing must be documented.

4.4 Periodic Self-Safety Inspections

- 4.4.1. The responsible faculty member, associated staff and/or a trained student worker will conduct periodic self-safety inspections in accordance with the following schedule. The inspection will be documented using the form in Appendix B. A representative of EH&S and/or the CHO may participate in these periodic inspections as needed or on random bases.
- 4.4.2. Faculty members are encouraged to conduct additional periodic inspections, as needed, particularly when the lab undergoes a major change in design and/or operation.
- 4.4.3. The responsible person must implement corrective measures to address findings observed during the periodic self-safety inspection. He/she may request assistance from EH&S and Facilities if the corrective action is beyond departmental resources. Once the inspection is complete and all corrective measures have been addressed, the completed form shall be submitted to EH&S for recordkeeping.

Laboratory Type	Frequency
Chemistry, Chemical Storage Room, and other Laboratories (designated higher hazard)	Once per semester – beginning of new semester or end of old semester
Biology, Physics and other Laboratories (designated lower hazard)	Annually – beginning of the new school year

5. CHEMICAL MANAGEMENT

- 5.1 All locations where hazardous chemicals are stored must have an inventory. All expired, contaminated or otherwise unwanted chemicals must be disposed accordingly with assistance from assistance from EH&S.
- 5.2 Safety Data Sheets (SDS) and Material Safety Data Sheets (MSDS)
 - 5.2.1. MSDSs and SDSs are available online (the Internet) for each hazardous substance needed.
 - 5.2.2. MSDSs and SDSs can be accessed online at the Google search site as follows:
 - 5.2.2.1. Access the Google Web site at <http://www.google.com>
 - 5.2.2.2. In the search window, type the following, in order: MSDS “name of the chemical”. For example, to find the MSDS for the chemical hydrogen chloride, type: “MSDS hydrogen chloride” in the search window. A search result listing will be provided
 - 5.2.2.3. Options: The manufacturer name and/or the desired chemical concentrations can also be inserted in the search window after the term described above to limit the search results. For example, to find the MSDS for 25% hydrochloric acid manufactured by Fisher Scientific, type: “MSDS 20% hydrochloric acid Fisher Scientific”.
 - 5.2.3. Contractors are responsible for maintaining a list of MSDSs and SDSs for all products used by contractors at the job sites. Prior to ordering a new hazardous chemical the responsible faculty member or laboratory technician must notify EH&S by e-mail and obtain approval for its purchase.
- 5.3 Labeling
 - 5.3.1. Containers must be labeled with the identity of the hazardous chemical and appropriate hazard warnings. Labels must be in English, clearly positioned, and easy to read. Alternatives to container labels include labeling secondary containment (particularly in cases of many small containers of the same hazardous chemical) and/or posters.
 - 5.3.2. Containers labeled with supplier labels do not require additional labeling. Supplier labels must not be removed or defaced, and information on supplier labels must not be altered.
 - 5.3.3. Where appropriate to reuse a container for another chemical, the original label must first be thoroughly defaced or removed. The container must then be labeled with the information required for the new contents.
 - 5.3.4. Containers of hazardous chemicals transferred from original supplier containers or other containers without supplier labels must be labeled with the chemical name and the primary hazard(s) of the chemical unless the container is for the immediate use of the person making the transfer.

5.4 Control of Extremely Hazardous Substances

- 5.4.1. New chemicals proposed for use in the lab must be preapproved by EH&S to determine if it is an extremely hazardous substance or if additional safety precautions may be needed.
- 5.4.2. If the new chemical is an extremely hazardous substance, or a carcinogen, the CHO and responsible Faculty will determine if an alternative chemical that is not an extremely hazardous substance could be used.
- 5.4.3. If no alternatives to the extremely hazardous substance are identified, the CHO and responsible Faculty will identify and implement the control measures, including engineering controls, needed to handle the extremely hazardous substance safely.

5.5 Chemical Storage in Laboratories and Stockrooms

- 5.5.1. Incompatible chemicals must be stored separately. Compatibility information may be available on the chemical's SDS or other technical literature from the manufacturer.
- 5.5.2. A flammable liquid storage cabinet must be used to store flammables. Acetic acid is treated as a flammable rather than a corrosive.
- 5.5.3. Acids and bases must be stored in separate corrosive storage cabinets.
- 5.5.4. Refrigerators used for storage of flammable liquids must be either listed as appropriate for flammable materials or rated as "explosion proof."
- 5.5.5. Hazardous chemical storage in fume hoods and on bench tops should be kept to a minimum, e.g. generally the amount needed to complete the current experiment. Chemicals must be stored in such a way to prevent releasing them into sinks or drains and must not be stored on the floor.
- 5.5.6. Stored chemicals shall be examined periodically (at least annually) for replacement, deterioration, and container integrity.

5.6 Transport and Shipment of Hazardous chemicals

- 5.6.1. Liquid hazardous chemicals over 500 ml in size should be transported in secondary containment [safety containers, or on a wheeled cart with a design capable of containing leakage or spillage and negotiating uneven surfaces (e.g., expansion joints or floor drains) without tipping the chemical container or cart. Chemical containers should be sealed during transport.
- 5.6.2. Hazardous chemicals should be transported on elevators without riders where possible.
- 5.6.3. Cylinders should be strapped to a cylinder hand truck specifically designed for that purpose and cylinder valve protective caps must be in place to protect the valve.

5.6.4. Hazardous chemicals must not be transported on public roads by College staff.

6. WASTE DISPOSAL PROGRAM

6.1 Hazardous Waste

All hazardous wastes generated in the labs or stockroom must be managed in accordance with local hazardous waste regulations. Submit hazardous waste to EH&S for management.

6.1.1. Hazardous waste collection containers located in the lab hoods for the collection of waste during experiment must be kept closed at all times except when adding waste.

6.1.2. Hazardous waste containers must be kept in secondary containment sized to contain 110% of the contents of the largest container.

6.1.3. Hazardous waste collection containers must be labeled with Satellite Accumulation labels and accumulation start dates of less than one year.

6.2 Sink Disposal

6.2.1. DO NOT DISCHARGE ANY WASTE TO THE SANITARY SEWER DRAINS unless the EH&S department has given explicit permission to do so. In order to be acceptable for discharge, wastewater must meet the following criteria:

6.2.1.1. The wastewater must not be a hazardous waste.

6.2.1.2. The pH must be between 5.5 and 11.

6.2.1.3. The wastewater must not contain heavy metals, e.g. arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc, etc.

6.2.1.4. The wastewater must not contain phenol, toxic organic chemicals, oils & greases, or flammable solvents.

6.2.1.5. If a hazardous chemical or waste is released into the drain, report the release to EH&S immediately.

7. EMPLOYEE EXPOSURE ASSESSMENT

- 7.1 The CHO will identify the need to perform and document industrial hygiene monitoring based on:
- 7.1.1. Sampling required by specific applicable Cal/OSHA regulations.
 - 7.1.2. The potential to exceed the action level for hazardous chemicals.
 - 7.1.3. Special monitoring consideration for select carcinogens, reproductive toxins and chemicals with a high degree of acute and chronic toxicity as well as for chemicals relating to employee reports of symptoms or other exposure concerns.
- 7.2 In the event that employee exposures are measured in excess of the Permissible Exposure Limit (PEL), the CHO ensures that appropriate corrective actions are implemented to reduce employee exposures below the PEL.

8. EMERGENCIES AND EXPOSURES

8.1 Planning and Preparation

- 8.2 The responsible faculty member must consider the type of emergencies that might occur as part of planning each experiment or lab. The pre-planning must consider the type of equipment and procedures needed to minimize the risk of the emergency and must implement preventive measures.

8.3 Accident Notification

The responsible Faculty must report all work-related accidents (e.g. injuries and illnesses, fires, and spills) to the Dean, EH&S and CHO and/or call the Public Safety Department at extension 4282, or call 911 from a landline.

Personnel at the immediate scene of the accident should take actions that will mitigate the extent of the accident without jeopardizing their health and safety. When in doubt, warn others in the area, evacuate the area, travel to a safe location, and report the incident using the Incident Reporting Form in Appendix A.

8.4 Accident Investigation and Reporting

All work related accidents and near misses shall be reported in accordance with the Injury and Illness Prevention Program (IIPP).

9. MEDICAL CONSULTATION

- 9.1 The CHO will arrange medical evaluations by or under the consultation of a licensed physician at no cost to the employee as follows:
- 9.1.1. Medical examinations: When an employee develops signs or symptoms that may be associated with exposure to a hazardous chemical in the laboratory.

9.1.2. Medical surveillance: When exposure monitoring confirms employee exposure above the Action Level (AL), or in the absence of the AL the PEL, for a Cal/OSHA regulated substance for which there are medical surveillance requirements.

9.1.3. Medical consultation: For employees affected by an exposure event such as a leak or spill involving hazardous chemicals.

9.2 Human Resources will obtain, and maintain the medical records, an appropriate written opinion from the physician for further medical follow-up.

10. EMPLOYEE INFORMATION AND TRAINING

10.1 The Chemical Hygiene Officer will ensure that all laboratory employees will be informed of and trained in laboratory safety and

- The location and availability of the required list(s) of hazardous chemicals and SDSs outlined in this regulation.
- Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.
- The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, SDSs.
- The physical and health hazards of chemicals used in the laboratory.
- The measures employees can take to protect themselves from these hazards.
- Methods and observations that may be used to detect the presence or release of a hazardous chemical.

10.2 The appropriate faculty members will ensure that laboratory-specific training is provided to students for specific procedures and experiments. This training should be provided before laboratory work begins. It should include specifics of the hazardous materials to be used and specific safe work practices including PPE requirements for the laboratory.

11. PROGRAM MAINTENANCE AND EVALUATION

11.1 The CHO will review this Chemical Hygiene Plan at least annually and update as necessary.

Appendix A – General Laboratory Standards

The following general standards should be followed by Saint Mary's College employees for all laboratory work with laboratory chemicals. These general guidelines can be modified based on a written evaluation of hazards and risks, which lead to a task-specific operation and protective equipment program.

- General Safety Rules and Procedures
 - Know the safety rules and procedures that apply to the work that is being done.
 - Determine the potential hazards and appropriate safety precautions before beginning any new operation.
 - Be alert to unsafe conditions and actions and call attention to them so that corrections can be made as soon as possible.
 - Do not eat, drink, smoke, chew gum, or apply cosmetics in any College Laboratory and where laboratory chemicals are present.
 - Do not store, handle, or consume food or beverages in storage areas, refrigerators, glassware, or areas that are also used for laboratory operations.
 - Do not engage in practical jokes or other behavior that might confuse, startle, or distract other workers.
 - Do not work with hazardous chemicals in the laboratory alone, unless you have reviewed with your supervisor and made provisions for lone worker safety, e.g. work buddy.
 - Keep personal belongings off the laboratory bench when hazardous chemicals are being used.
- Hazardous Materials
 - Use only those hazardous chemicals for which appropriate safety controls and protective equipment are available.
 - Notify the Chemical Hygiene Officer in advance if you plan to purchase a chemical that is not on the chemical inventory list, or if a chemical is received that is not on the inventory list.
 - Dispose of chemicals properly in accordance with Saint Mary's College waste disposal procedures.
 - Never allow hazardous chemicals to be released down the drain unless the EH&S department has given explicit permission to do so (and approval may also be needed from the sanitary district).
- Personal Protective Equipment (PPE)
 - Wear the personal protective equipment required by the PPE assessment for the work being done. A sign posted at the entrance of each lab lists the required PPE in that specific lab.
 - Sometimes, a lab is used as a classroom with no requirements for PPE, as determined by the responsible faculty member. In this case, the following minimum requirements must be met:
 - The lab benches must be wiped down with mild soapy solution before beginning of the classroom session
 - No laboratory chemicals may be present on the lab benches near the students. All laboratory chemicals must be stored away safely
 - No laboratory chemicals may be retrieved, handled or manipulated by the responsible faculty member or the students
 - Closed-toed shoes are required at all times when working with hazardous chemicals.

- Legs must be covered below the knees at all times when working with hazardous chemicals.
- Confine long hair and loose clothing.
- Wash hands and areas of exposed skin prior to leaving the laboratory after using chemicals, even if gloves or another similar PPE item was worn.
- Clean, disinfect, maintain, and store PPE as required by the nature of the work and manufacturer's recommendations.
- Equipment
 - Use equipment only for its designed purpose and in accordance with the manufacturer's guidelines.
 - Do not use mouth suction for pipetting or starting a siphon.
 - Handle and store laboratory glassware with care to avoid damage; do not use damaged glassware.
 - Use extra care with Dewar flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur.
- Emergency Preparedness
 - Be familiar with emergency procedures. Know the location of and how to use the emergency equipment in the work area, as well as how to obtain additional help in an emergency.
 - Report incidents following the procedure outlined in Saint Mary's College's Injury and Illness Protection Program (IIPP) or by using the form below.

Incident Reporting Form	
<p>Please complete and submit this form to the Dean, Director of Health & Safety and/or to the Department Lead as soon as possible after an injury or illness is reported to you by an employee or a student resulting from activities in your lab or classroom. Minor and first aid incidents reporting is optional.</p> <p>Date & Time of Injury or Illness: _____ Location: _____</p>	
Name of faculty member in charge	
Name of employee or student reporting the injury or illness	
What was the injury or illness?	
If treatment was given, what was given and where?	
Was the student or employee hospitalized or received professional medical treatment?	<input type="checkbox"/> YES – if YES, please explain: <input type="checkbox"/> NO
What happened? State how and what object or substance directly harmed the employee or student. i.e., "sulfuric acid"; "vapor fumes"; "UV light"; "laser beam", etc.	

APPENDIX B – LABORATORY SELF-SAFETY INSPECTION CHECKLIST

High hazard laboratories* must be inspected once per semester. Lower hazards labs*, annually. For each item, check Satisfactory, Unsatisfactory or Not Applicable. All “U” items must be corrected on the spot or work orders generated. Submit a copy of the completed checklist (all items must be corrected upon submittal) to EH&S (Safa Toma). If you have any questions, please contact EH&S at x8287.

Building, Lab & Room No.:				Area Supervisor:	
Inspected By:				Date:	
S	U	N/A	General Safety		
			1. Fire extinguishers pull alarms, emergency showers, eyewash stations and electrical panels are kept clearly accessible, unobstructed and free of trip hazard		
			2. Fire extinguishers, eyewash & shower stations have current inspection tags		
			3. An 18-inch vertical clearance is maintained from ceiling sprinkler heads		
			4. There is no food or drink in the lab		
			5. Extension cords/power strips not daisy chained; extension cords are used not for permanent use		
			6. There is no evidence of exposed electrical wire and/or damaged electrical cords		
			7. No blocked emergency exit doors or exit paths		
			8. Floors are free of slip, trip or fall hazards		
			9. Personal protective equipment (PPE) is available, in good condition and properly stored		
Hazardous Material Storage and Handling					
			10. Hazardous Material (i.e. chemical) containers are closed when not in use		
			11. All original, day use and temporary containers (squirt and spray bottles, etc.) with hazardous materials are properly labeled with chemical name and hazards		
			12. Secondary containment is used for storing liquid hazardous materials		
			13. Chemicals are properly segregated e.g. acids vs bases and stored in CORROSIVES storage cabinets		
			14. Flammable liquids stored in FLAMMABLES storage cabinets		
			15. Hazardous materials are <u>not</u> stored near sinks or drains unless secondary containment is provided		
			16. Fume hood sinks have spill protection rims and stoppers installed		
Hazardous Waste Accumulation, Biohazardous Waste Storage and Handling					
			17. Hazardous waste containers are closed when not in use		
			18. Secondary containment is used for all liquid waste container storage		
			19. Waste containers are properly labeled with: accumulation start date, content, location information, and chemical/physical properties. Label is legible and in good condition		
			20. There are no hazardous waste containers that are full or have accumulation start dates greater than 90 days stored in the lab		
			21. Biohazardous wastes (including sharps) are stored in designated biohazardous bags (red bag with biohazard symbol) in a closed rigid container. Containers are free of residue and are not overfilled		
Compressed Gas					
			22. Cylinders are positioned so that content label is visible and they are stored in a dry, well-ventilated location protected from heat sources		
			23. Cylinders > 26” tall are secured to a rigid structure at 1/3 and 2/3 of the height with metal chains		
			24. Cylinder valves are closed and the valve caps are in place when cylinders not in use		
Other Comments/Findings:					
Findings					
Item #	Corrective Action(s)	Owner	Due By	Completion Date	

*Chemistry and stock room are high hazard labs. Biology, physics, EES are low hazard labs