



Ventura County Community College District
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VENTURA COLLEGE CHEMICAL HYGIENE AND LABORATORY SAFETY PLAN (CH/LSP)



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VENTURA COLLEGE CHEMICAL HYGIENE AND LABORATORY SAFETY PLAN (CH/LSP)

I. Purpose

This Chemical Hygiene and Laboratory Safety Plan (CH/LSP) sets forth procedures,

Equipment, personal protective equipment and work practices to ensure that employees and students who work in a laboratory setting will be protected from any chemical exposures that exceed permissible exposure levels and that they will be educated as to the nature of the health hazards presented by hazardous chemicals used in the college laboratories. This plan is intended to meet the requirements of Cal/OSHA, 8 CCR, Subchapter 7, Group 16, Article 109 §5191 and 29 CFR 1910.1450, Occupational Exposure To Hazardous Chemicals In Laboratories. A copy of the California regulations is included with this manual.

II. Scope

This CH/LSP applies to all science laboratories where employees work with substances in which the containers used for reactions, transfers, and other handling of substances are easily and safely manipulated by one person. The objective of this program is to provide guidance to all laboratory personnel who use chemicals, so that they can perform their work safely.

Laboratory Employees — Each individual working in a laboratory should be informed about hazards associated with that laboratory and the specific work going on there. This includes all staff, students, volunteers and assistants.

Support Personnel – Storeroom, janitorial, maintenance, and delivery personnel may be exposed to potential physical and chemical hazards from work carried out in the laboratory. They must be informed about the risks involved and trained how to avoid potential hazards.

All employees exposed to hazardous chemicals should be knowledgeable of the contents of the CH/LSP. Each college in the Ventura County Community College District will utilize this basic Chemical Hygiene and laboratory Safety Plan and can make modifications to the Plan as necessity and college practice dictates.

III. Responsibilities

Each person working with or around chemicals, having been trained, is responsible for remaining aware of chemical hazards and handling these materials in a safe manner. If one is unsure of a hazard or proper procedure, they should ask for assistance before use.

A. Chemical hygiene Officer (CHO):

To achieve the goal of employee and student protection from the effects of hazardous chemicals this plan requires that each college appoint a Chemical Hygiene Officer to develop, implement and monitor the chemical hygiene plan.

District Risk Manager:

- Will act as consultant to the college Chemical Hygiene Officer for the Chemical Hygiene and Laboratory Safety Plan at each college and will provide continued direction for the Chemical Hygiene Program and Hazardous Materials Program.

The Campus Chemical Hygiene Officer (CHO):

- Work with college administrators, other faculty and especially the college's Hazardous Materials Consultant, to develop and implement acceptable, appropriate chemical hygiene policies and practices at their specific college,
- Monitor procurement and use of chemicals in the lab, and determine that laboratory facilities and training levels are adequate for chemicals in use,
- Perform regular, formal chemical hygiene and housekeeping inspections that include inspections of emergency equipment,
- Maintain a current chemical inventory of science chemicals present within the specific college campus,
- Investigate laboratory accidents, spill/releases, determine causes of accidents recommend corrective action, and forward investigation reports to supervisors,
- Ensure that laboratory workers/students know and follow chemical hygiene rules,
- Determine the proper level of personal protective equipment; ensure that such protective equipment is available and in working order, enforce use,
- Ensure that the appropriate training has been provided to employees,
- Monitor the Chemical Waste disposal program.
- Appoint an alternate CHO to take responsibility when the primary CHO is absent.

COLLEGE	CHEMICAL HYGIENE OFFICER
Ventura College	Primary: vacate, Director of Maintenance and Operations
	Alternate: KaiFeng Liang, Chemistry Lab Technician II

B. Supervisors

Supervisors are directly responsible for chemical hygiene in the laboratory. The supervisor is required to ensure that provisions of the CH/LSP are being followed in the laboratory. The college laboratories and their supervisors are:

COLLEGE	SUPERVISOR
Ventura College Chemistry	Primary: Dan Kumpf, Dean of Physical Sciences
	Alternate: Jennifer Kalfsbeek, Vice President Academic Affairs

C. Student Workers:

- Understand and act in accordance with the safety requirements established by the laboratory.
- Participate in all required training programs.
- Understand the function and proper use of all personal protective equipment.
- Wear and properly maintain the personal protective equipment necessary to perform each task.
- Follow good chemical hygiene practices.
- Report to supervisor all facts pertaining to accidents that result in injury or exposure to hazardous substances and any action or condition that may result in an accident.

College	Technical Staff Responsible
Ventura College Chemistry	Primary: KaiFeng Liang & Antonia Flores Instructional Lab Techs, Chemistry
	Alternate: Sheena Bullock & Carol Smith Instructional Lab Techs, Biology
Ventura College Life Science	Primary: Sheena Bullock & Carol Smith Instructional Lab Techs, Biology
	Alternate: KaiFeng Liang & Antonia Flores Instructional Lab Techs, Chemistry

D. Student / Assistants and Volunteers

- Students, assistants and volunteers in laboratory classes are responsible for planning and conducting each operation in accordance with prescribed chemical hygiene procedures and wearing proper PPE.
- The Instructor is in charge of ensuring proper Chemical Hygiene practices are being followed by their students.

COLLEGE	SUPERVISOR
Ventura College Chemistry	Primary: Instructor of Record
	Alternate: Joe Selzler Department Chair, Chemistry
Ventura College Biology	Primary: Instructor of Record
	Alternate: Kamelia Algiers Department Chair, Life Sciences

IV. Standard Operating Procedures for Laboratory Chemicals**A. Chemical Procurement and Control**

The acquirement of chemicals shall be conducted by the appropriate trained lab technician, or faculty member. If a chemical is to be purchased that has never been purchased before it will need to be submitted for review to the CHO for review that the facility has the proper equipment to handle the chemical.

All gifts and donations of hazardous chemicals will need to be approved by the CHO in advance of the item(s) entering the site.

There shall be a sincere attempt on the lab's part to ensure that only the appropriate amount required is kept in stock. Large quantities of excess chemicals pose a health risk and have a greater chance of moving past their expiration date.

Annual inventory checks will be conducted to ensure that chemicals past their expiration date are removed.

In addition, chemicals used in the laboratory shall be those that are appropriate for the college's air circulation and exhaust ventilation system.

All chemicals must be received in either the appropriate laboratory stockroom or the Prep Room. Personnel who receive chemical shipments shall be knowledgeable of the proper procedures for receipt.

Chemical containers shall not be accepted without accompanying labels and safety data sheets (SDS) unless a current SDS is already on file. Containers must be undamaged and packaged in accordance with current chemical guidelines. All chemical shipments should be dated when received, unpacked and promptly put into inventory for use.

B. Chemical Storage

1. All Chemicals

Received chemicals shall be immediately moved to the designated Chemical Storage area by one of the lab technicians or knowledgeable assignee. Large glass containers shall either remain in their original shipping container or be placed in carrying containers (e.g., rubber “boots”) during transportation.

The storage area shall be clearly designated and well illuminated, with storage generally maintained at or below eye level. Flammables will be stowed in the designated flammable storage cabinets of adequate size in lab prep areas away from ignition sources and oxidizers. Never store flammables in a refrigerator unless the refrigerator is explosion proof. Use portable safety cans, as necessary, for flammables storage and use.

Chemicals must be segregated by hazard classification and compatibility in a well identified area, with good general exhaust ventilation.

The storage area shall NOT be used as a preparation or repackaging area and shall be accessible during normal working hours. The storage area is under the control of the lab technicians. The amount of chemicals at lab benches shall be as small as practical.

The appropriate Instructional Lab Technician shall examine stored chemicals, at least annually, for container integrity and/or deterioration. The inspection should determine whether any corrosion, deterioration, or damage has occurred to the storage facility as a result of leaking chemicals. Report required repairs accordingly.

The appropriate Instructional Lab Technician shall conduct periodic inventories of chemicals outside the storage area. Unneeded items shall be properly discarded and useful items returned to the proper storage area.

2. Flammable Compressed Gasses

Compressed gasses should be handled as potentially explosive. Always protected the cylinder valve stem; avoid exposure to heat and direct sunlight; and secure in place to prevent damage and falling.

Any compressed gas cylinders used in science laboratories must be transported, handled, and stored in accordance with Cal/OSHA requirements.

Cylinders of toxic, flammable or reactive gases should be used only under a fume hood.

Do not extinguish a flame involving a combustible gas until the gas is shut off, otherwise it can re-ignite and possibly cause an explosion.

3. Acids

Mineral acids should be segregated from flammable and combustible materials.

Separation is defined by NFPA 49 as storage within the same fire area but separated by as much space as practicable or by intervening storage from incompatible materials.

Nitric acid will be stored in an acid cabinet, preferably segregated from other acids. Acid resistant trays shall be placed under bottles of mineral acids.

Acid sensitive materials, such as cyanides and sulfides shall be separated from acids or protected from contact with acids and water.

- Glacial Acetic Acid to be stored in acid compartment with the most compatible acids including Formic and Trichloroacetic. Do not store directly with Hydrochloric Acid or other mineral acids.

4. Corrosive Materials

Corrosives are to be stored in appropriate corrosive cabinets.

Wear a chemical splash face shield when handling corrosive materials.

5. Highly Toxic Materials

Highly toxic chemicals shall be stored in unbreakable secondary containers.

C. Chemical Handling

Each laboratory employee/student employee (with the training, education, and resources provided by supervision) shall develop work habits consistent with requirements of the CH/LSP to minimize potential personal and co-worker exposure to chemicals. Based on the realization that all chemicals inherently present hazards under certain conditions, exposure to all chemicals shall be minimized.

General precautions that shall be followed for the handling and use of all chemicals are:

1. Skin contact with chemicals shall be avoided at all times.
2. Employees shall thoroughly wash all areas of exposed skin prior to leaving the laboratory. Hand soap is provided at each sink.

3. Mouth suction for pipetting or starting a siphon is prohibited.
4. Eating, drinking, smoking, chewing gum, or application of cosmetics in the laboratory is prohibited.
5. Food or beverage storage is not allowed in chemical storage areas or refrigerators used for laboratory operations.
6. Determination of risks shall be conservative in nature.
7. Any chemical mixture shall be assumed to be as toxic as its most toxic component.
8. Substances of unknown toxicity shall be assumed to be toxic.
9. Laboratory employees/student employees shall be familiar with the symptoms of exposure for the chemicals that they work with and the precautions necessary to prevent exposure.
10. All Laboratory employees/Student employees shall adhere to this CH/LSP.
11. In all cases of chemical exposure neither the OSHA Permissible Exposure Limits (PEL's) nor the Threshold Limit Values (TLV's) of the American Conference of Governmental Industries hygienists (ACGIH) shall be exceeded.
12. Engineering controls and safety equipment in the laboratory shall be utilized and inspected in accordance with guidelines established with the CH/LSP.
13. The Chemical Hygiene Officer or designee shall maintain an inspection log that documents emergency eyewash/shower functional operations.
14. Specific precautions based on the toxicological characteristics of individual chemicals shall be implemented as deemed necessary by the CH/LSP.

D. Laboratory Equipment and Glassware

Each employee/student employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled, in accordance with the CH/LSP guidelines.

At the completion of each workday or operation/activity, the work area shall be thoroughly cleaned and all equipment cleaned and stowed.

Do not use chipped, etched or cracked glassware since it presents a serious breakage potential when heated or handled.

In addition, the following procedures shall apply to the use of laboratory equipment:

1. All laboratory equipment shall be used only for its intended purpose.
2. All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately and properly disposed of in the broken glass container.
3. When transferring chemicals to any container, start with confirmed clean vessels.
4. All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
5. Labels shall be attached to all chemical containers, identifying the contents and related hazards.
6. Waste receptacles shall be labeled as such.
7. All laboratory equipment shall be inspected on a periodic basis and replaced or repaired as necessary. Malfunctioning equipment shall not be used and repaired or replaced as soon as possible.

E. Personal Protective Equipment

Safety Glasses meeting ANSI Z87.1 standards are required to be available for employees and visitors to the Science Laboratories and will be worn at all times when, as required in SDS, chemicals are being used or manipulated in the laboratory. Goggles must always be clean and functional.

Chemical goggles and/or full-face shield shall be worn during chemical transfer and handling operations as procedures dictate.

Chemical resistant aprons or lab coats should be worn in the laboratory. Aprons/Lab coats shall be removed immediately upon discovery of significant contamination.

Appropriate chemical-resistant gloves (based on information from the glove manufacturer) shall be worn at all times when there exists the potential for skin contact with chemicals.

Gloves shall be inspected and if damaged or contaminated shall be immediately replaced.

Thermal resistant gloves shall be worn for operations involving the handling of heated materials and exothermic reaction vessels. Thermal resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.

Respirator usage shall comply with Cal/OSHA Respiratory Protection Standard, GISO, Article 107, §5144, and the laboratory's respiratory protection procedures. Respirators must be fit tested and have the right cartridge installed.

F. Personal Work Practices

Laboratory supervision must ensure that each employee/student employee knows and follows laboratory-specific rules and procedures integrated into this plan. For example, safety rules in Biology may differ from those in Chemistry.

All employees/student employees shall remain vigilant to unsafe practices and conditions in the laboratory and shall immediately report such practices and/or conditions to the laboratory supervisor. The supervisor must PROMPTLY correct unsafe practices or conditions.

Long Hair or loose-fitting clothing shall be confined close to the body to avoid contact with chemicals or being caught in moving machine/equipment parts.

Use only those chemicals appropriate for the ventilation system.

Avoid unnecessary exposure to all chemicals by any route (inhalation, absorption or ingestion).

Encourage safe work practices in co-workers by setting the proper example. Horseplay, practical jokes or other behavior, which might confuse, startle or distract another lab worker/student employee, is strictly forbidden.

Seek information and advice from knowledgeable persons regarding Standards and codes about hazards present in the laboratory. Plan operations, equipment use, and protective measures accordingly.

Use engineering controls in accordance with CH/LSP procedures.

Inspect personal protective equipment prior to use, and wear appropriate protective equipment as procedures dictate and when necessary to avoid exposure. Ask the supervisor or instructor when in doubt.

In General:

1. Minimize all chemical exposures
2. Avoid skin contact with chemicals
3. Do not smell or taste any chemicals
4. Consider all chemicals dangerous, even in very low concentrations
5. Read and understand all chemical container labels prior to use
6. Never store chemicals over, under or near a sink
7. Never work alone in the laboratory, chemical storage or prep area

G. Labeling

All containers in the laboratory shall be labeled. This includes chemical containers and waste containers. The labels shall be informative and durable, and at a minimum, will identify contents, source, date of acquisition, and indication of hazard. Mislabeled containers present a severe hazard to the user.

The user of portable containers shall identify the substance with a temporary label. Exemptions for labeling requirements can be made for chemical transfers from a labeled container into a container that is intended only for the immediate use of the employee who performed the transfer.

The labeling procedure shall be periodically inspected by the appropriate Technical Staff to ensure that labels have not been defaced or removed.

V. Criteria For Implementation of Control Measures**A. When to use chemical Fume hoods:**

Chemical Fume Hoods should be used **WHENEVER POSSIBLE** to contain and exhaust toxic, offensive, or flammable materials. Processes that have potential for generating hazardous airborne chemical concentrations should be carried out within an operating fume hood.

B. When to use safety shields or other containment devices:

Safety shields must be used where the possibility exists for laboratory scale detonation. Protective devices, such as long and short-handled tongs for holding or manipulating hazardous items should be used **WHENEVER POSSIBLE**.

C. When to use personal protective equipment:

Eye Protection – whenever hazardous chemicals are in use, all laboratory personnel must wear safety goggles or laboratory splash glasses. **NO EXCEPTIONS.**

Gloves – Gloves should be worn to protect the skin from chemical and physical (e.g. heat, cold) exposures. Soiled or damaged gloves should be decontaminated and disposed of properly.

Respirators – Respiratory protection may be necessary to maintain chemical exposure below OSHA's PEL. Respirators will be provided, if necessary.

D. When to institute special work practices:

If particularly hazardous chemicals are to be used (carcinogens, reproductive toxins, teratogens, or acutely toxic chemicals), specific work practices and work locations must be designated. Either the College Chemistry Supervisor or the college Life Science Supervisor must approve special work practices.

VI. FUME HOOD MANAGEMENT

- A. Frequency and type of monitoring** – all local exhaust hoods used for primary containment control will be monitored for adequate airflow at the beginning of each semester. The survey will be completed with a calibrated velometer and records maintained.
- B. Acceptable operating range** – Minimum face velocities of at least 100 linear fpm must be maintained for each hood. If the face velocity does not meet the recommended minimum of 100 linear fpm, maintenance personnel must be contacted to repair or upgrade the hood.
- C. An approved Environmental Firm** may provide monitoring on a regular basis. Results will be documented and included in this CH/LSP binder.
- D. Maintenance schedule** – Maintenance of local exhausts or fume hoods will be completed on an “as needed” basis, or annual schedule, whichever comes first.

VII. EMPLOYEE INFORMATION AND TRAINING

A. Information

1. A copy of the CAL/OSHA, General Industry Safety Orders, Subchapter 7, Group 16, “Control of Hazardous Substances,” Article 109, “Hazardous Substances and Processes,” §5191, “Occupational Exposure to Hazardous Chemicals in Laboratories,” can be found in this manual or at Cal OSHA website.
2. The THRESHOLD LIMIT VALUES published by the American Conference of Governmental Industrial Hygienists can be obtained from the ACGIH’s. Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with intended Changes, 6500 Glenway Avenue, Building D-7, Cincinnati, OH 45211-4438 (latest edition).
3. Recommended exposure limits for other hazardous chemicals, information on signs and symptoms associated with exposure to hazardous chemicals, material safety data sheets, and other information on the hazards, safe handling storage and disposal of hazardous chemicals can be obtained from the Cal/OSHA reference GSI, Chapter 7, Group 16, Article 109, §5091 “Occupational Exposure to Hazardous Chemicals in Laboratories, included in this manual can be found at Cal OSHA.
4. A list of OSHA health hazards definitions and lists of select carcinogens, reproductive toxins, and high toxicity materials are also in Cal/OSHA references included.

B. Training

1. Employees will be provided with training to ensure that they are apprised of the hazards of chemicals present in their work area. Such training will be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Refresher training will be provided annually.
2. Students will receive safety training in conjunction with the course curriculum as provided by the instructor. Such training should be documented.
3. Employee training will include:
 - Methods and observations that may be used to detect the presence or release of hazardous chemical.
 - Location and availability of chemical Safety Data Sheets (SDS).
 - The measures employees can take to protect themselves from these hazards. Proper use and location of safety equipment.
 - The applicable details of this chemical Hygiene/Laboratory Safety Plan.
4. The College Chemical Hygiene Officer and/or appropriate training consultants will manage training documentation. Documentation of training should be filed in the Training Section of this manual and the individual employee's personnel file.

VIII. REQUIRED APPROVALS

Certain laboratory procedures, which present serious health hazards upon exposure, require prior approval by either the College Chemistry Supervisor or the College Life Science Supervisor before work may commence.

For the Community Colleges of Ventura County, prior approval is required before proceeding with the following procedures:

- Changing the process of hazardous chemical disposal
- Working with Carcinogens/Teratogens/Mutagens
- Working unsupervised in the laboratory after hours or alone.
- Making any changes to this Chemical Hygiene Plan and Laboratory Safety Plan.
- Modifying laboratory safety or test equipment.

Carcinogens:

In conjunction with standard practices for identifying carcinogens as defined by Prop 65, development of safe handling and storage procedures and advising employees with their use, the Chemical Hygiene Officer shall provide a list of

carcinogens to all employees, students, assistants and volunteers at the laboratory by posting in all applicable laboratory areas and classrooms.

IX. MEDICAL CONSULTATION AND EXAMINATION

A. Eligible Employee

An employee, who works with hazardous chemicals, and:

- Develops symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory.
- Works where exposure monitoring reveals an exposure level routinely above the OSHA action level or, in the absence of a designated action level, exposure above the OSHA

Permissible Exposure Limit (PEL), (as published in 29 CFR 1910.1000, et. seq.), for OSHA regulated substances for which there are medical monitoring and medical surveillance requirements.

Chemicals that fall within this category are:

Asbestos	Vinyl Chloride	Formalin
Inorganic Arsenic	Lead	Methylene Chloride
Benzene	Coke Oven Emissions	Methylenedianiline
Cotton Dust	1, 2-Dibromo-3-Chloropropane	1, 3-Butadiene
Acrylonitrile	Ethylene Oxide	Cadmium
Formaldehyde	Carbon Tetrachloride	2-aminonaphalene

- Or is exposed to the hazardous chemical during a spill, leak, or explosion or other occurrence resulting in personal exposure, is entitled to medical attention including an examination and follow-up exams as deemed necessary by the physician chosen by the employee.

An examination is provided without cost to the employee, without loss of pay, and conducted at a reasonable time and place.

B. Procedures to secure medical consultation and examination are as follows:

1. Report exposure to CHO and the College Chemistry Supervisor or the College Life Science Supervisor and fill out appropriate incident report form (student or employee version).

2. Seek medical care at the Student Health Center or approved health center of the employee's choice.
3. The employer will provide the following information to the physician:
 - a) Identity of hazardous chemical
 - b) Description of conditions under which exposure occurred. (Student or Employee Accident Report)
 - c) Description of signs and symptoms employee is experiencing.
4. A written opinion from the physician shall be provided to the employer including:
 - a) Recommendation for further medical follow-up.
 - b) Results of medical exam and tests.
 - c) Any medical condition revealed during the exam that places the employee at increased risk.
 - d) A statement that the employee has been informed by the physician of the results of the results of the exam and any medical condition that may require further treatment or examination.
 - e) These written statements and records should not reveal any specific findings that are not related to an occupational exposure.

X. REQUIREMENTS FOR PARTICULARLY HAZARDOUS SUBSTANCES (ADDITIONAL PROTECTION)

A. Employees who work with selected carcinogens, reproductive toxins and substances that have a high degree of acute toxicity, may require additional protection. Specific consideration will be given to:

- Establishment of designated work area
- Use of containment devices such as fume hoods or glove boxes
- Decontamination procedures

At present, no particularly hazardous chemicals are used. However, some carcinogens are stored in Chemistry and Biology (i.e. specimens preserved in formaldehyde).

B. Operating procedures that are at least as protective as those described on PP. 30-56 of *Prudent Practices*, (Procedures for Working with Substances that Pose

Hazards Because of Acute Toxicity, Chronic Toxicity, or Corrosiveness), will be employed for work with particular hazardous substances.

XI. EMERGENCY RESPONSE/CHEMICAL SPILLS

All science Instructors, Laboratory Technicians and Supervisors should be familiar with the College's Emergency Response/Chemical Spill Plan. The College's Chemical Hygiene Officer shall develop and publish emergency telephone numbers and spill response contacts (i.e., special spill cleanup contractors) for the college. The Maintenance & Operations Department personnel are not expected to be properly equipped or trained in hazardous chemical spill cleanup.

A. General

When chemical spills occur within the laboratory, the following procedures are followed to prevent injury or property loss:

1. Provide any first aid, as necessary, to affected personnel. Liberally use eyewash station and/or safety shower to flush affected areas. Flushing should continue for AT LEAST 15 minutes. A large exposure to the body merits emergency 911-ambulance service.
2. Notify Supervision of spill. If spill is large or extremely hazardous, the Campus Police will be notified. Student Health Center personnel should also be notified.
3. Evacuate student from the area to safe area.
4. If spilled materials exhibit flammability, eliminate ignition sources such as hot plates, Bunsen burners, etc.
5. Avoid all contact with spilled material. If necessary, use protective gloves, gown, goggles and/or respirator.
6. Obtain supplies from Chemical Spill Clean-Up kit (located in chemistry and/or Biology Prep. Rooms).
7. Neutralizer for both acid and base spills should be readily available in the event of a chemical spill.
8. Contain collected materials and label container with name of contents and also as Hazardous Waste.
9. Always refer to SDS for special precautions or spill clean-up requirements.

B. Liquid Spills

1. Confine spill to small area as practical.
2. For small quantities of acids or bases, use the neutralizing agent from the chemical spill clean-up kit. An absorbent material specially prepared for acid/base spills may also be used.
3. For small quantities of other materials, such as organic solvents, utilize an absorbent material to clean-up spill. Examples of absorbent materials are vermiculite, dry sand, paper towels, etc.
4. For large quantities of inorganic acids and bases, attempt to neutralize, then flush with large amounts of water, preferably toward a containment area or drain. *CAUTION must be taken not to add too much water to create a flood that may react with water-reactive materials and cause splattering and additional personnel exposure.
5. If possible, utilize a mop to pick up as much of the spilled material. An excellent clean-up device is the mop bucket and wringer to collect the liquid.
6. Carefully pick up and decontaminate any bottles, broken glass and/or other containers. Decontaminate over the bucket or pail to collect contaminated wash.
7. Avoid using any shop vacuum that is not rated for chemical clean-up. A potential exists for atomizing hazardous wastes and creating a potential human inhalation exposure.
8. If the spill is extremely volatile (high vapor pressure), allow the spill to evaporate and exhaust out the laboratory exhaust (e.g., fume hood).
9. Properly containerize, label, store and/or dispose of collected hazardous waste. (See waste disposal section of current College Business Plan (CUPA) and "Hazardous Materials Procedure.")

C. Solid Spills

If possible, sweep solid spills of low toxicity into a designated, easily decontaminated, dust pan and place in a labeled container for storage and/or disposal.

D. Other Spills

Mercury – Clean up with pre-purchased spill clean-up kit. Collect mercury in a sealed container to prevent exposure to mercury vapors. Large spills or spills that render some mercury unavailable for clean up (e.g., Hg in floors cracks or beneath

lab benches) may require a subsequent airborne evaluation of mercury vapor content.

E. Incident Report

An incident investigation should take place after each spill and/or accident. The Incident Report should be completed by the Supervisor/Instructor and forwarded to the Chemical Hygiene Officer and College Safety Committee

XII. REVIEW AND UPDATE

This chemical Hygiene/Laboratory Safety Plan will be reviewed and updated annually. The College Chemical Hygiene Office will initiate the review in consultation with the District Risk Manager. A log of such review should be maintained with this manual.

XIII. SUGGESTED CHEMICAL STORAGE PATTERN

Storage of laboratory chemicals presents an ongoing safety hazard for college science departments. Many chemicals are incompatible with each other. The common method of storing these products in alphabetical order sometimes results in incompatible shelved materials. For example, storing strong oxidizing materials next to organic chemicals can present a hazard.

A possible solution is to separate chemicals into their organic and inorganic families and then further divide the materials into related and compatible families. Below is a list of compatible families:

Inorganic

1. Metals, Hydrides
2. Acetates, Halides, Iodides, Sulfates, Sulfites, Halogens, Thiosulfates, Phosphates
3. Amides, Nitrates (except Ammonium Nitrate), Nitrites, Azides
4. Hydroxides, Oxides, Silicates, Carbonates, Carbon
5. Sulfides, Selenides, Phosphides, Carbides, Nitrides
6. Bromates, Perchlorates, Perchloric Acid, Chlorites, Hypochlorites, Peroxides, Hydrogen Peroxide
7. Arsenates, Cyanides, Cyanates
8. Borates, Chromates, Manganates, Permanganates

9. Acids (except Nitric). Store acids in a designated cabinet. *Nitric Acid is isolated and stored by itself.
10. Sulfur, Phosphorus, Arsenic, Phosphorus Pentoxide.

Organic

1. Acids, Anhydrides, Peracids
2. Alcohols, Glycols, Amines, Amides, Imines, Imides
3. Hydrocarbons, Esters, Aldehydes
4. Esters, Ketones, Ketenes, Halogenated Hydrocarbons, Ethylene oxide
5. Epoxy Compounds, Iso-cyanates
6. Peroxides, Hydroperoxides, Azides
7. Sulfides, Polysulfides, Sulfoxides, Nitriles
8. Phenols, Cresols

Additional Storage Suggestions

1. Avoid floor chemical storage (even temporary)
2. No top shelf chemical storage.
3. No reactive liquid chemicals stored above eye level.
4. Shelf assemblies are firmly secured to walls. Avoid island shelf assemblies.
5. Provide anti-roll-off lips on all sleeves.
6. Avoid metal adjustable shelf supports and clips.
7. Store acids in dedicated acid cabinet(s). Store nitric Acid in same cabinet ONLY if isolated from other acids. Store both inorganic and permitted organic acids in the acid cabinet.
8. Store flammables in a dedicated and ventilated, approved, U.L. Listed ®Flammables cabinet.
9. Store severe poisons in a dedicated poisons cabinet.
10. Segregate known or suspected carcinogens from other chemicals.

If you store volatile materials (ether, hydrocarbons, etc.) in a refrigerator, the refrigerator must be explosion-proof. The thermostat switch or light switch in a standard refrigerator may spark and set off the volatile vapors in the refrigerator may spark and set-off the volatile vapors in the refrigerator and cause an explosion.

REFERENCES

<http://www.dir.ca.gov/title8/5191b.html>

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