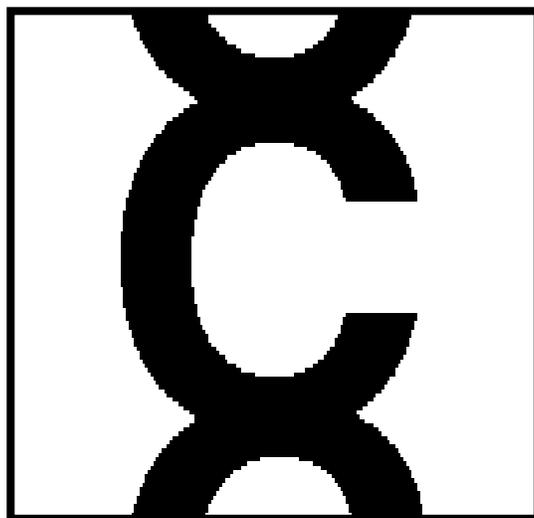


Chemical Carcinogen Safety Manual



Think Safe. Act Safe. Be Safe.

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I. Introduction

This manual covers the use of UC Davis campus-recognized chemical carcinogens other than radioactive materials. Chemical carcinogens are substances that are suspected of causing cancer in man and/or animals. The program covers chemical carcinogens recognized by Cal-OSHA (Title 8, California Code of Regulations), International Agency for Research on Cancer (IARC Group 1) and those designated by the Chemical and Laboratory Safety Administrative Advisory Committee for special control requirements. The complete list of campus recognized chemicals can be found in Appendix B.

The objectives of the Chemical Carcinogen Safety Program are to:

- Ensure that chemical carcinogen use on campus is as safe as possible and complies with federal and state laws, regulations and prudent laboratory practices
- Minimize exposure to carcinogens to levels as low as reasonably achievable
- Provide guidance for users of chemical carcinogens
- Document carcinogen use, location and users and prepare semi-annual reports required by Cal-OSHA

Contact the Office of Environmental, Health and Safety for questions related to the Carcinogen Program at: **752-1493**

II. Responsibilities

- A. The Department Chair is responsible for ensuring that the department has an effective Injury and Illness Prevention Program, Chemical Laboratory Safety Program and that chemical carcinogens are used safely. Departments in existing campus buildings must identify suitable areas for employees to eat and store food outside of research and teaching laboratories where chemicals are used or stored. New laboratory buildings require employee eating areas to be incorporated in the building design.
- B. The Principal Investigator must ensure that the laboratory has a current Chemical Hygiene Plan and that chemical carcinogen use is in accordance with the Chemical Carcinogen Safety Program. The Principal Investigator is also responsible for ensuring that workers within their areas are advised that the Chemical Carcinogen Safety Program requirements apply to materials flagged as carcinogenic in the on-line Chemical Inventory System (CIS), maintaining current data and conducting an annual self-audit.
- C. Faculty, students, staff and visitors must comply with all laboratory safety rules, regulations and procedures and attend required training.
- D. Employee Health Services is responsible for performing required medical monitoring, evaluating employee exposures to chemical carcinogens and maintaining exposure reports.
- E. The Office of Environmental Health and Safety (EH&S) is responsible for assisting the Chemical and Laboratory Safety Administrative Advisory Committee and users of chemical carcinogens. EH&S is also responsible for maintaining general records of work areas where recognized carcinogens are used, conducting periodic air sampling to monitor exposure to chemical carcinogens and preparing required Cal-OSHA reports.
- G. The responsibility of working safely with carcinogens on campus is ultimately up the Principal Investigator of that specific project or research. There are General Requirements of working

safely with carcinogens, listed below which must be taken into account in the event that a PI or Researcher plans to conduct any type of work with any of the Carcinogens listed in Appendix B.

III. Carcinogen General Requirements

The list of UC Davis Campus-Recognized Chemical Carcinogens includes:

- Carcinogens recognized under Cal-OSHA Title 8 CCR Section 5200 et seq.;
- Chemicals recognized by the International Agency for Research on Cancer (IARC) as human carcinogens (Group 1);
- Other chemicals used on campus which have a body of evidence indicating they might have carcinogenic potential (producing tumors in animals and/or being genotoxic) must be presented to the Chemical and Laboratory Safety Administrative Advisory Committee for possible inclusion on the list of campus recognized chemical carcinogens. These chemicals should be handled using Good Laboratory Practices.

The list of UC Davis Campus-Recognized Chemical Carcinogens does not include chemicals that act only as promoters of cancer.

1. The following activities must be performed in an enclosed glove box, or a ducted chemical fume hood with the appropriate safety controls in place as listed in the definitions (Appendix C).
 - a) Working with any solid campus-recognized chemical carcinogen (for example, mixing, weighing, etc.).
 - b) Working with any campus-recognized chemical carcinogen in concentrations greater than 1% by weight or volume.
 - c) High risk operations with a greater risk of exposure involving campus-recognized chemical carcinogens (for ex: aerosolizing the solution, sonicating, operations involving high volatile materials, working with a stock solution that is highly concentrated).
 - d) Working with large amounts of solvents that have the potential of being pre-cursors, or have previous studies indicating probable carcinogenic potential.

When a campus-recognized chemical carcinogen is already in a solution of less than 1%, has a low volatility and the scope of work does not include a high risk operation that is likely to increase exposure to the worker or other employees in the area, work may be conducted on the laboratory benchtop provided all other controls listed in this manual are followed.

IV. Procedures for Use of Campus-Recognized Chemical Carcinogens

The procedures outlined in this section apply to all laboratory use of campus-recognized chemical carcinogens.

A. *Registration and Reporting*

To register the use of chemical carcinogens the principal investigator or projects supervisor shall:

- Add the chemical carcinogen into the Chemical Inventory System (CIS) account
- Add the names of users of chemical carcinogens to the authorized personnel list
- Complete and post Safety Protocols in the format described below. An available link is here: [Chemical Carcinogen Safety Protocol](#)
- Train authorized personnel on the safety protocols for chemical carcinogens

If a campus-recognized chemical carcinogen is entered into a CIS Account, then the user is registered automatically with EH&S. A page will automatically appear to register review/update the authorized users, as well as perform a self-audit to confirm that the required elements of the Chemical Carcinogen Safety Program are in place. The database tracks the campus-recognized chemical carcinogen, the building and rooms, the Principal Investigator and the authorized users as identified by the CIS account holder. This information is used to comply with regulatory reporting requirements.

Note, the chemical carcinogen use and procedural requirements listed in this manual apply only to the use and/or storage of the campus-regulated chemical carcinogens listed in Appendix B. Suspect carcinogens from other lists (e.g. Prop 65, OEHHA and NTP) and chemicals otherwise not on the campus list are exempt from these carcinogen requirements. Such chemicals should be handled with Good Lab Practices.

The Principal Investigator is responsible for updating CIS within 15 days of any changes to chemical carcinogen possession, location or users.

B. Safety Protocols

The principle investigator or project supervisor is required to prepare this written Safety Protocol. This protocol shall include the following information for each chemical carcinogen used in the laboratory:

- Name of principal investigator and/or project supervisor and their phone numbers.
- Names of all other personnel associated with the project and their phone numbers.
- Names, amounts, physical form, concentrations, and storage/use locations of the carcinogens involved.
- Proper precautions for handling during normal use, including personal protective equipment and location restrictions.
- A brief description of the experiment, including:
 - a. Concentrations of stock and working solutions.
 - b. Techniques and equipment to assure containment.
 - c. Emergency procedures including deactivation and/or decontamination.
 - d. Personal protective measures to be employed and/or equipment to be used.
 - e. Duration of the proposed project.
- An appropriate means of detecting spills and contamination and decontaminating surfaces that may become contaminated with the chemical carcinogen. This information can often be found in the Material Safety Data Sheet (MSDS) for the chemical of concern.
- Emergency procedures for spills must be specified. Consideration should include the following:

When volatile liquid or gaseous chemical carcinogens (e.g. ethyleneimine, dibromochloropropane, vinyl chloride) are spilled ***in the fume hood or glove box***:

- a. Put on additional layers of gloves, ensure your laboratory coat is buttoned and don chemical splash goggles. Put on an apron if large amounts of liquid are present.
- b. Contain the spill by absorbing it with paper towels, rags, or suitable chemical absorbents place spill clean-up materials in a double layer of plastic bags. Seal the bag and label with a hazardous waste label. Leave the bag of spill waste in the hood.
- c. Decontaminate the spill area using the specified decontamination method.
- d. Check for residual spillage and decontaminate again if necessary.
- e. Thoroughly wash arms, hands, and face as soon as possible.

When volatile liquid or gaseous chemical carcinogens (e.g. formalin, benzene) are spilled ***in the general room outside of a fume hood or glove box***:

- a. Evacuate the room and close the door behind you.
- b. Call the Fire Department (911) and EH&S (530-752-1493), in that order, for assistance.
- c. Do not re-enter the room until cleared by EH&S.
- d. Shower if advised to do so by EH&S.
- e. When dealing with formalin: Evaluate the amount of the spill. If less than 1 liter follow established spill protocols and clean up the minor spill yourself.

With nonvolatile liquids (i.e., dilute aqueous solutions, tissue cultures):

- a. Put on additional protection if needed
- b. Place the contaminated absorbent in double bags for disposal by EH&S.
- c. Decontaminate the spill area using the specified decontamination method.
- d. Check for residual spillage and decontaminate again if necessary.
- e. Thoroughly wash the arms, hands, and face of exposed individuals.

When a substance is a particulate:

- a. Isolate the area by barricading or other means so that the spill is not spread.
- b. Put on additional protection (gloves, lab coat, apron). If the spill is extensive, respirators and/or impermeable coveralls may be necessary. Contact EH&S (752-1493) for guidance.
- c. Gradually push particles from outside of the spill area towards the center, using moist towels. Do Not Dry Sweep!!
- d. Pick up particulates by using moist towels or sponges. All carcinogen wastes must be managed and disposed as hazardous waste.
- e. Additional wet-mopping or special vacuum may be necessary depending on the extent of the spill.
- f. Decontaminate the spill area using the specified decontamination method.
- g. Check for residual spillage and decontaminate again if necessary.
- h. Thoroughly wash arms, hands, and face after cleanup.

The use of chemicals not listed as campus recognized chemical carcinogens that may be used to generate a carcinogenic chemical (i.e. paraformaldehyde) should be conducted under an appropriate Safety Protocol.

C. *Labels and Signs*

All entrances to designated campus-recognized chemical carcinogen work areas should be posted with a sign stating "CAUTION: Cancer Suspect Agent" (Appendix D). These yellow signs are available from EH&S.

All primary and secondary containers, storage cabinets and glove boxes containing campus-recognized chemical carcinogens should be labeled with the following information:

- The name of the carcinogen and any other hazardous substance
- Caution: Cancer Suspect Agent
- Other hazard warnings such as corrosive, flammable etc.

Containers must also have one of the following on the label:

- Name and address of the manufacturer of pure materials
- The date and initials of the person who prepared mixtures

D. *No Eating and Drinking in Areas Where Hazardous Chemicals are Used or Stored*

The Committee of Safety Chairpersons, with the goal of providing a safe work environment and for the purposes of consistency, has established the following standardized policy statement regarding eating and drinking in areas where hazardous chemicals are used or stored as stated in P&P 290-65:

Storage, consumption, and use of food, beverage, medicines, tobacco, chewing gum, and the application of cosmetics or handling of contact lenses are prohibited in areas where hazardous chemicals are used or stored.

E. *Containment Systems and Engineering Controls*

1. *Glove boxes*

A glove box is a fully enclosed and ventilated containment device fitted with arm holes for attachable flexible gloves which allows work with materials within a contained enclosure. Glove boxes are required to be totally exhausted to the outside. Glove boxes used with campus-recognized chemical carcinogens are to be tested annually. Contact EH&S for more information. Glove boxes must also be tested after modification of the box and after maintenance. Users must replace the gloves when worn or damaged. Glove boxes should be used for storing and diluting stock solutions of carcinogens when feasible.

2. *Chemical Fume Hoods*

Chemical fume hoods must be tested annually or after modification or maintenance and have an average face velocity of 100-125 feet per minute. Testing is done by Facilities Management. Ductless hoods are not approved for use with campus-recognized chemical carcinogens.

3. *Local Exhaust*

Potentially airborne carcinogens (i.e. produced by analytical instruments) should be captured through the use of a local exhaust ventilation system connected to the building fume hood mechanical exhaust system.

4. Biosafety Cabinets

Biosafety cabinets should not be used for chemical carcinogen work without prior approval from EH&S.

5. Clean Benches (Laminar Flow Hoods)

Clean Benches are work areas using laminar flow hoods that provide product protection not worker protection and must not be used for work with campus-recognized chemical carcinogens.

6. Exhaust from Ventilation Control Systems

Use of some campus-recognized chemical carcinogens may require that laboratory exhaust ventilation, glove boxes, laboratory fume hoods and biosafety hoods and cabinets be equipped with approved exhaust treatment systems. Examples of treatment are HEPA filters (particulates only), activated charcoal filters, exhaust incinerators and chemical scrubbers. The exhaust discharge must be located to prevent re-entrainment into the building.

7. Laboratory Ventilation

The laboratory ventilation system must meet the following requirements:

- Six room air changes per hour (1 cfm/sq ft) minimum;
- Laboratory should be under negative pressure relative to hallways and non-laboratory areas;
- Ducted chemical fume hood or use of approved, filtered glove box.

8. Vacuum Lines

Building vacuum systems should not be used for campus-recognized chemical carcinogen work. Dedicated vacuum pumps must be protected by an appropriate chemical trap.

F. Protective Clothing and Equipment

The Committee of Safety Chairpersons, with the goal of providing a safe work environment and for the purpose of consistency, has established the following standardized policy statement for the use of protective clothing and equipment:

Minimum laboratory protective clothing and equipment for handling hazardous materials or animals include, but are not limited to, a laboratory coat, closed-toe/heel shoes, safety glasses, goggles and/or face shield if there is a risk of a splash hazard, and gloves if there is a risk of skin irritation, absorption or injury. Additional safety equipment and clothing requirements e.g. respiratory protection and/or disposal garments, may be required as part of a specific protocol (radiological, biological, carcinogen, or animal care and use).

Appropriate and necessary protective clothing and personal protective equipment (PPE) will be determined by performing a job hazard analysis risk assessment as part of the Illness and Injury Prevention Plan (IIPP). The risk assessment is to be administered by the supervisor and employee(s).

Clothing contaminated by chemical carcinogens should be removed immediately. Place contaminated clothing in double plastic bags, labeled with the name of the carcinogen and send to an approved industrial laundry. When clothing decontamination methods are not known or are not practical, disposable protective clothing should be worn.

Gloves should be selected based on the properties of the chemicals being used as well as the physical operation being performed. Multiple layers may be necessary to prevent permeation when working with a mixture. Disposable gloves should be discarded after each use and immediately after contamination with a chemical carcinogen. Gloves must be removed before touching doorknobs, telephones, elevator controls or in other situations where contamination could be transferred to non-laboratory areas.

Eye protection should be worn in the laboratory any time chemical work is performed. The type of protection used depends on the hazard presented by the operation and the chemical in use. Glasses do not always provide adequate protection. Chemical splash goggles are appropriate for most laboratory procedures when there is a risk of splash hazards. Face shields may be required for some operations. EH&S can provide recommendations on appropriate eye protection. For medical advice about wearing contact lens in areas where chemical carcinogens are used or stored, contact Occupational Health Services at (530) 757-3200. Refer to [Safety Net #5, Eye and Face Safety Protection for Laboratory Workers](#), for more information. Generally, properly use of engineering controls will provide sufficient protection to maintain exposure levels below Cal/OSHA permissible exposure limits. In some instances, non-routine operations may require the use of respirators. Contact EH&S for further evaluation of non-routine operations.

G. Information and Training

Hazard information and safety procedures should be reviewed and updated annually with laboratory and animal care personnel who work with or who may be exposed to chemical carcinogens. Training records should be documented with the name and signature of each attendee, the name of the trainer, the content of the class and the date. Training is generally conducted in house and provided by the PI or a laboratory supervisor, competent in the risks and hazards associated with the scope of work.

1. Training Information

Training should include the following:

- A description of the use that could result in exposure including written experimental procedures;
- The nature of the physical and health hazards (i.e. fire, explosion, carcinogenic, toxicity) associated with exposure. Training should include both local and systemic toxicity, and should include review of the Material Safety Data Sheet for the carcinogen;
- Engineering controls, administrative controls, personal protective equipment and laboratory or general work practices to limit exposure;
- Employee responsibilities for following prudent laboratory practices to reduce risk of exposure;
- Monitoring methods and observations that may be used to detect or evaluate the presence or release of a carcinogen;
- Proper storage, labeling and disposal practices;

- Job responsibilities;
- Waste disposal procedures.

2. Training Frequency

Training is required prior to the employee's initial work with the carcinogen. Refresher training should be completed and documented at least annually.

3. Custodians, Maintenance Personnel, and Laboratory Visitors

Custodians and maintenance personnel should be advised of any risk of contamination that is not clearly marked with warning signs or labels. Laboratory visitors should be escorted at all times or provided with training on laboratory hazards.

H. Spills and Emergencies

Before beginning an activity that involves a chemical carcinogen, plans for emergency response to spills, exposures or accidents should be developed and incorporated in the Safety Protocol. Emergency planning should include procedures for:

- Evacuating the area and contacting the Fire Department (911);
- Restricting access to the area;
- Showering or washing;
- Obtaining emergency medical treatment;
- Eliminating hazards that may still exist;
- Decontaminating the area.
- Cleaning up a minor spill yourself, if appropriate based on size of spill, etc...

1. Medical consultation

If inhalation, contact, needle stick or ingestion occurs during working hours (8 AM-5 PM) report to Occupational Health Services or Student Health Services for evaluation. Call 911 for emergency assistance after hours.

2. Emergency Phone Numbers

Hazardous Materials Spill, Fire, Police, Ambulance **911**

Davis (area code 530)

Occupational Health Services (Russell Blvd. and Oak St.)	757-3200
Student Health Services	752-2300
Sutter Davis Hospital Emergency Room (nights and weekends)	757-5111
Environmental Health and Safety (8am-5pm weekdays)	752-1493

Sacramento (area code 916)

Employee Health Services (7 a.m. – 4 p.m., M-F)	734-3572
After Hours Urgent Care Clinic MedClinic, 3160 Folsom Blvd. (4 p.m. -10 p.m. M-F) (10 a.m. – 6 p.m. Weekends)	733-3377

UC Davis Medical Center Emergency Room
(10 p.m. – 7 a.m. M-F) (6 p.m. – 10 a.m. Weekends)
EH&S Research Specialist - EH&S Sacramento
EH&S Occupational Safety - EH&S Sacramento
(8 a.m. – 12 p.m., 1 p.m. – 5 p.m. Weekdays)

734-3624

734-7321

734-2740

I. Purchasing, Custody, Inventory, and Shipping

Only the amount of chemical carcinogen that is needed for a particular project should be ordered.

The Principal Investigator or Course Instructor is responsible for the custody of recognized chemical carcinogens.

A current inventory of carcinogens must be maintained at all times. Laboratories are to use the Chemical Inventory System (CIS) to report any quantity of any campus- recognized chemical carcinogen listed in Appendix B. The Chemical Inventory System (CIS) is available at <http://safetyapps.ucdavis.edu/EHS/cis/index.cfm>. The CIS database will indicate the campus-recognized chemical carcinogen. Requests for transfer of materials should be directed to EH&S. Addition or deletion of all chemicals must be promptly updated in the CIS.

For guidance on packing and shipping chemical carcinogens off campus, contact Mail Services (530) 752-8223 (Davis) or (916) 734-3851 (Sacramento). Campus-recognized chemical carcinogens must be packed to withstand shock, pressure changes, and any other conditions that may cause leakage of contents. The packaging must be designed to hold leaks if the primary container breaks. Off-campus shipments must comply with US Department of Transportation regulations, and international regulations if going out of the United States.

J. Waste Management

Before beginning an activity that involves the use of a campus-recognized chemical carcinogen, plans should be developed for the handling and disposal of contaminated wastes and surplus carcinogens. Whenever practical, carcinogens should be inactivated prior to disposal as hazardous waste. It is the responsibility of the Principal Investigator to document the validity of the inactivation method. Waste containing or contaminated with any amount of chemical carcinogen is considered hazardous unless and until evaluated and determined to be non-hazardous by the EH&S Waste Coordinator. Reducing the amount of waste produced will assist with meeting the campus Source Reduction and Waste Minimization Plan goals.

Before requesting a waste pick-up:

- Segregate carcinogen waste from other waste;
- Contaminated materials that are to be transferred from work areas to disposal areas should first be placed in a plastic bag, or other suitable impermeable container, and then in a primary container. Label the outer container with (a) the name of the carcinogen and (b) "CAUTION: Cancer Suspect Agent";
- Waste must be labeled with a standard Hazardous Waste label. The forms are available from the EH&S website at: <http://safetyservices.ucdavis.edu/environmental-health-safety/hazardous-materials/waste-disposal-information-1/hazardous-waste-labels>
- Waste containing more than 0.1% of a campus-recognized chemical carcinogen must be labeled: "CAUTION: CANCER SUSPECT AGENT". Labels are available from EH&S;

- Submit chemical waste pick-up requests via the EH&S web site at: <http://safetyapps.ucdavis.edu/EHS/wasterequest/chems.cfm> Web site pick-up requests are also available for radiological, biological and mixed wastes at: <http://safetyapps.ucdavis.edu/EHS/wasterequest/index.cfm> Alternatively, a form can be downloaded from EH&S at: <http://safetyservices.ucdavis.edu/environmental-health-safety/chemical/forms/chemdisp.doc> or obtained by calling EH&S at (530) 752-1493. Submit the completed chemical waste pick-up request form to EH&S by fax (752-2785) or via campus mail using the disposal request form. A separate form is used for sharps disposal;
- Animal bedding may be disposed as hazardous waste. Animal bedding waste that does not qualify as hazardous waste may be disposed as biological waste with other bedding materials;
- Spill waste must be collected, labeled and disposed as hazardous waste;
- Mixed chemical and radiological or biological waste requires special consideration. Contact EH&S for guidance.

K. Annual Review and Self-Audits

Principal Investigators with Chemical Carcinogens must conduct an annual review and self-audit. An e-mail will be sent to the Principal Investigator and lab contact to notify them that an annual chemical inventory review and self-audit is due.

The self-audit must include:

- A check of engineering controls (e.g. chemical fume hood, glove box, local exhaust) and other safety equipment;
- Verification that the Safety Protocol is posted and followed;
- Verification that a current Material Safety Data Sheet for the carcinogen is available;
- Verification that materials required to cope with minor spills and other emergencies are readily available;
- Verification that personnel and others sharing the laboratory are familiar with work procedures and emergency procedures and are aware of potential hazards and fully trained
- Verification that procedures for containment are consistent with approved protocols;
- A review of the inventory of chemical carcinogens.

L. Carcinogen Use in Animals

Campus-recognized chemical carcinogen use in animal experiments may present a significant risk of exposure to animal handlers. The Principal Investigator must take special precautions to ensure that animal handlers are not at risk of exposure to chemical carcinogens and other hazardous materials. For example, contamination may be present on the fur or skin of an animal, in animal body fluids or vomit. Carcinogen-treated food may contaminate the floor of the animal room. Rooms housing animals treated with recognized carcinogens must meet the same containment and engineering controls as required for laboratories.

Selection of Animal Handlers: Animal care staff should not be expected to care for animals treated with campus-recognized chemical carcinogens without substantial additional training. When there is a significant risk of exposure, all animal care, including feeding and cage changing,

should be performed by trained laboratory employees. If the PI will be conducting the routine husbandry it needs to be clearly described in the Special Husbandry Requirements section of the animal care protocol.

The Principal Investigator must prepare and submit a "Protocol for Animal Use and Care" for each project planned using animals. The Animal Room/Lab Safety Information Sheet must be posted in the animal facility as a precaution to animal handlers. Generally these are posted on the animal room door to alert the animal handlers prior to entering the room. Cages/racks used for animals that have been treated with carcinogens must be identified with a "CAUTION: Cancer Suspect Agent" label.

Evaluation of potentially contaminated animal waste (e.g. bedding, carcasses) must be made in coordination with EH&S. Documentation of this waste determination must be in the carcinogen files.

V. General References

National Toxicology Program, *Annual Report on Carcinogens*, US Department of Health and Human Services, Research Triangle Park, NC (latest edition).

International Agency for Research on Cancer, *Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man*, World Health Organization, Lyon, France (latest edition).

National Research Council, *Prudent Practices for Handling Hazardous Chemicals in Laboratories* (National Academy Press, Washington, D.C., 1995).

R. Lewis, *Carcinogenically Active Chemicals: A Reference Guide* (Van Nostrand Reinhold, N.Y., 1991).

A. Furr, *Handbook of Laboratory Safety*, 4th ed. (CRC Press, Boca Raton, FL, 1995).

U.S. Department of Health and Human Services, National Institutes of Health (1978), *Guide for the Care and Use of Laboratory Animals*, DHEW Publication No. (NIH) 78-23.

8 CCR 5209, *Carcinogens*. Cal-OSHA.

8 CCR Article 110, *Recognized Carcinogens, sections 5200 et seq.* Cal-OSHA.

8 CCR 5217, *Formaldehyde*. Cal-OSHA.

8 CCR 5191, *Occupational Exposure To Hazardous Chemicals in Laboratories*. Cal-OSHA.

EH&S, *Chemical Laboratory Safety Manual*, (UC Davis, 1996).

VI. Appendices

A. *Chemical and Laboratory Safety Administrative Advisory Committee*

Composition:

8 Faculty/Academic Federation
3 University Staff/ Graduate Students
5 Ex Officio, Non-Voting:
 Occupational Health Physician
 Environmental Health & Safety Chemical Safety Officer
 Environmental Health & Safety Director or designee
 University Fire Marshall
 Worker's Compensation/Risk Management Services Representative

The Faculty/Academic Federation, University Staff, and Graduate Student members should include one or more representatives from the following areas: Organic Chemistry, Physical Chemistry, Pharmacology/Toxicology, Medicine/Veterinary Medicine, Engineering, other Biological Sciences, and other Physical Sciences. All members should have extensive research and/or teaching experience with hazardous chemicals.

Justification:

It is the intent of the Davis Campus to limit hazards from use of harmful chemical agents, including those posing toxic, carcinogenic, genetic, or physical hazards. These limits are necessary to assure that uses of chemicals will not adversely affect: 1) the health, safety, and well-being of students, staff, visitors, and people in surrounding areas; 2) the wild and domestic animals maintained on the campus or in the surrounding areas; and 3) the environment.

It is recognized that only a small number of chemicals and processes encountered in laboratories are regulated by specific requirements in applicable health and safety codes. Research, teaching, and other activities at this campus require the use of many chemicals and unique processes in laboratory settings which are not expressly addressed in the health and safety code. This committee's role will be to identify these chemicals and processes and ensure that appropriate measures are in place to control the risk to people, animals, property and the environment.

Responsibilities:

To advise on campus policies and procedures for the safe acquisition, storage, use and disposal of hazardous chemical agents, nanoparticle research and unique laboratory processes. These will be exclusive of radiological materials, biological materials, lasers, and animal use, all of which are covered under the auspices of their appropriate committee. This committee will perform the following specific functions.

- Determine what chemicals and processes encountered in laboratories and shops pose risks to the campus community;
- Develop policy related to chemical use and laboratory processes potentially injurious to human health or the environment;
- Provide direction to the campus in the area of nanotechnology research;

- Provide instructions to the Office of Environmental Health and Safety to terminate projects when, in the opinion of the Committee, a project entails an unacceptable risk to health and safety.

Contact:

Gerry Westcott, Manager, Research Safety
Debbie Decker, Chemical Hygiene Officer

B. UC Davis Campus-Recognized Chemical Carcinogens⁺

Chemical Name / [CAS #]	Chemical Name / [CAS #]	Chemical Name / [CAS #]
2-Acetylaminofluorene ¹ (2-AAF) / [53-96-3]	Cyclosporine ² / [79217-60-0]	4-Nitrobiphenyl ¹ / [92-93-3]
Acrylonitrile ¹ / [107-13-1]	1,2-Dibromo-3-chloropropane (DBCP) ¹ / [96-12-8]	Nitrosodimethylamine ¹ / [62-75-9]
4-Aminodiphenyl ^{1,2} / [92-67-1]	3-3'-Dichlorobenzidine and its salts ¹ / [91-94-1]	N'-Nitrosornicotine (NNN) ² / [16543-55-8]
Arsenic (Inorganic Arsenic Compounds) ^{1,2} / [7440-38-2]	Diethylstilboestrol ² / [56-53-1]	beta-Propiolactone ¹ / [57-57-8]
Asbestos ^{1,2} / [1332-21-4]	4-Dimethylaminoazobenzene ¹ / [60-11-7]	Silica, crystalline (inhaled in the form of quartz or cristobalite from occupational sources) ² / [14808-60-7]
Azathioprine ² / [446-86-6]	Erionite ² / [66733-21-9]	Talc containing asbestiform fibers ² / [14807-96-6]
Benzene ^{1,2} / [71-43-2]	Ethylene dibromide (EDB, 1,2-dibromoethane) ¹ / [8003-07-4]	Tamoxifen ² / [10540-29-1]
Benzidine and its salt / family of Benzidine ^{1,2} / [92-87-5]	Ethylene oxide ^{1,2} / [75-21-8]	2,3,7,8-Tetrachlorodibenzo-para-dioxin [TCDD] ² / [1746-01-6]
Benzo [a] pyrene (BAP) ² / [50-32-8]	Ethyleneimine ¹ / [151-56-4]	Thiotepa ² / [52-24-4]
Beryllium and Beryllium compounds ² / [7440-41-7]	Etoposide ² / [33419-42-0]	Ortho-Toluidine ² / [95-53-4]
N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine) ² / [494-03-1]	Formaldehyde ^{1,2} / [50-00-0]	Treosulfan ² / [299-75-2]
Bis (chloromethyl) ether (BCME) ^{1,2} / [542-88-1]	Gallium Arsenide ² / [1303-00-0]	Vinyl chloride ^{1,2} / [75-01-4]
1,3-Butadiene ^{1,2} / [106-99-0]	Lead (elemental, inorganic compounds and lead soaps) ¹ / [7439-92-1]	
1,4-Butanediol dimethanesulfonate (Busulphan; Myleran) ² / [55-98-1]	Melphalan ² / [148-82-3]	
Cadmium and its salts ^{1,2} / [7440-43-9]	4,4'-Methylene bis(2-chloroaniline) [MBOCA] ¹ / [101-14-4]	
Chlorambucil ² / 305-03-3]	Methylene Chloride ¹ / [75-09-2]	
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU; Semustine) ² / [13909-09-6]	Methylenedianiline ¹ / [101-77-9]	
Chloromethyl methyl ether (methyl chloromethyl ether; MCME) ¹ / [107-30-2]	Mustard Gas ² / [505-60-2]	
Chromium (hexavalent) compounds ^{1,2} / [18540-29-9]	1-Naphthylamine ¹ / [134-32-7]	
Coke oven emissions and by-products ¹ / [65996-81-8]	2-Naphthylamine ^{1,2} / [91-59-8]	
Cyclophosphamide ² / [50-18-0]	Nickel compounds ² / [7440-02-0]	

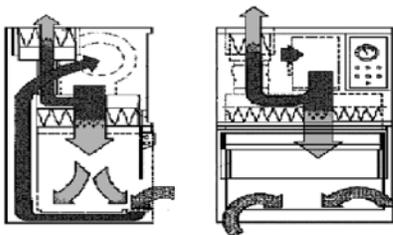
¹ Cal-OSHA recognized carcinogens

² IARC (International Agency for Research on Cancer – Group 1

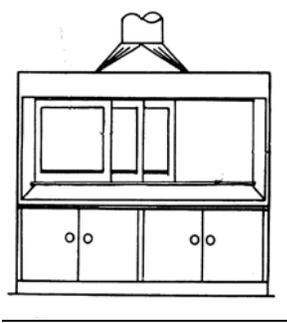
+The Chemical and Laboratory Safety Administrative Advisory Committee may make changes to this list at any time.

C. Definitions

Activated charcoal filter: A device containing activated charcoal to absorb and retain chemical carcinogens present in the vapor state.



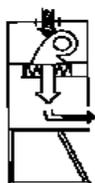
Biosafety cabinet: A ventilated cabinet that serves as a primary containment device for operations involving biohazardous agents or biohazardous materials. It is designed to draw air inward for user protection and downward flow of HEPA filtered air for product protection. Air is exhausted out of the cabinet through HEPA filters for environmental protection.



Campus recognized chemical carcinogen: A chemical carcinogen listed as a UC Davis Campus-Recognized Chemical Carcinogen (Appendix B). These include carcinogens recognized by Cal-OSHA and International Agency for Research on Cancer (IARC Group 1 Chemicals).

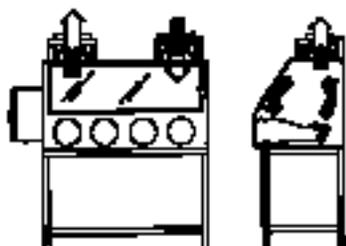
Chemical fume hood: A local exhaust unit with rear and side walls designed to effectively control atmospheric contamination (hazardous gases, vapors and/or fumes) at its source. The chemical fume hood depends upon the creation of air flow past the source of contaminant sufficient to remove the highly contaminated air around the source or issuing from the source and to draw the air into an exhaust system vented directly to the outdoors. It should have an average linear face velocity of 100-150 feet per minute (fpm), with a minimum of 70 fpm at any

point.



Clean bench: A laminar flow hood that provides only product protection, not worker protection. HEPA filtered air flows across the work area towards the user. A clean bench must not be used for chemical carcinogen or other hazardous materials work.

Emergency: An incident involving a chemical carcinogen that may result in exposure or release to the environment.

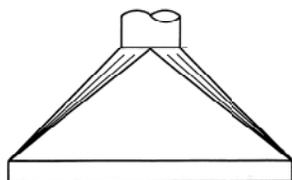


Glove box: A fully enclosed and ventilated containment device fitted with arm holes for attachable flexible gloves. Hands are inserted into the gloves to allow work with materials contained inside the box without contact with or exposure to the material. The glove box is under negative pressure relative to the room where it is located so that any air leakage is into the glove box.

HEPA filter: High Efficiency Particulate Air filter capable of removing 99.97% of particles down to 0.3 μm diameter.

Inactivation: Chemical alteration of a carcinogen to render it non carcinogenic.

Local exhaust system: A ventilation system designed to remove hazardous or other air contaminants at their point of origin using ducts, funnels, and cones. The system may partially enclose the source of generation. The system is exhausted to the building exterior.



Mixed waste: Waste containing both hazardous waste and radioactive substances. This waste requires special handling, transporting, treating, and disposal methods.

Personal protective clothing: Clothing which are designed to protect a worker against contact with or exposure to a chemical carcinogen such as gloves and a laboratory coat.

Personal protective equipment: Equipment used in addition to protective clothing, such as a face shield or respirator, which is designed to protect a worker against contact with or exposure to a chemical carcinogen.

Working quantity: The amount of a chemical carcinogen required to carry out a project on a day-to-day basis.

D. Warning Signs and Labels

The bright yellow sign shown below is available from the Office of Environmental Health & Safety at (530) 752-1493.

