

REDWOODS COMMUNITY COLLEGE DISTRICT

Chemical Hygiene Plan

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Introduction

The Chemical Hygiene Plan is part of the District's health and safety program (California Code of Regulations Title 8, Section 3203, Injury and Illness Prevention Plan) to minimize exposures to chemical hazards in the laboratory. The College of the Redwoods Chemical Hygiene Plan has been developed in response to California Occupational Safety and Health Administration (CalOSHA) requirements; California Code of Regulations (CCR) Title 8, Section 5191, Occupational Exposure to Hazardous Chemicals in Laboratories. This standard, also known as the Laboratory Safety Standard, was developed to relieve laboratories from the burdens of complying with regulations directed at industrial activities and to protect the health of laboratory personnel at places like College of the Redwoods through training and communication of information.

This Chemical Hygiene Plan was prepared by College of the Redwoods Environmental Health and Safety. It is intended to serve as a basic guide to ensure the safety of District personnel, students and the public in the laboratory setting. We acknowledge permission to use and adapt materials used in the UC Davis Chemical Laboratory Safety Manual.

In a college setting, all work is pursued in a collegial environment. Each person's safety is affected by the action of others in the laboratory. It is in everyone's best interest to be familiar with the work of others, and to insist that fellow workers in the laboratory follow safe work practices. All conditions that pose a threat to the health and safety of the occupants of a laboratory must be reported immediately to the instructor, department chair, division dean and/or Environmental Health and Safety (EH&S). All injuries should be immediately reported to Campus Security and EH&S.

Scope and Application of the Laboratory Standard

The laboratory standard applies where hazardous chemicals are used and/or stored. Laboratory use of hazardous chemicals refers to the following: when the handling or use of chemicals occurs on a laboratory scale, that is, the containers used for reactions, transfers, and other procedures are designed to be easily and safely manipulated by one person. This standard applies to faculty and support staff working in or around facilities where hazardous chemicals are used or stored. This standard also covers maintenance, custodial, and clerical employees whose work assignments may require them to enter a laboratory or stockroom where potential exposures could occur. It is also District policy that students in laboratories, while not legally covered by this standard, are afforded the same level of protection as District employees.

Hazard Communication Program

As prescribed in the California "Workers' Right to Know" legislation, every employee and student at College of the Redwoods has a legal right to be informed about hazardous materials to

which they may be exposed during their work duties and/or class participation. The Hazard Communication Program is covered in detail in Board of Trustees Policy No. 815 and the "Hazard Communication Program."

Implementation of the Chemical Hygiene Plan

The Chemical Hygiene Plan must be readily available to all employees and students in the laboratory. "Readily available" means accessible to all staff any time, day or night. It must be available on request to EH&S staff and CalOSHA representatives.

Ideally, the plan as presented in this format will suffice for all normal activities in laboratories at College of the Redwoods. However, some experiments, processes, or inquiries will require addendums to the Plan in the form of Standard Operating Procedures (SOP's). SOP's are necessary when chemicals are extremely hazardous and not routinely used or procedures are non-routine. Depending upon the chemical or process SOP's will contain the following elements:

- Λ Element 1: Process
List the process(es) that involves the use of hazardous chemicals. The process may be described in general or specific terms.
- Λ Element 2: Hazardous Chemicals
For each process, list the hazardous chemicals and the expected by-products produced.
- Λ Element 3: Personnel Protective Equipment
Discuss the personal protective equipment and hygiene practices used with each process or chemical.
- Λ Element 4: Engineering/Ventilation Controls
Describe engineering controls designed to reduce employee/student exposures to hazardous chemicals.
- Λ Element 5: Special Handling Procedures and Storage Requirements
Describe storage requirements for the chemicals involved, including restricted access, special containment devices, and transportation methods.
- Λ Element 6: Spill and Accident Procedures
Indicate how spills and accidental releases will be handled and by whom.
- Λ Element 7: Waste Disposal
Describe waste disposal procedures for the chemicals and by-products.
- Λ Element 8: Approval Required
Discuss the circumstances of prior approvals or notifications

When, because of activities outside the norm, a SOP is written for an experiment, process or inquiry the SOP should be attached to the Chemical Hygiene Plan and provided to all persons involved with the SOP. The SOP should also be sent to EH&S for inclusion in the master file and dissemination to custodians, maintenance workers, or others whose activities may present them with a risk of exposure.

General Safety Rules

1. Know the location of all exits for the laboratory and the building.
2. Know the location/use of safety showers and eyewashes.
3. Know the location of fire extinguishers and alarm stations and how they operate.
4. Know the location of the nearest phone for use in an emergency. Critical phone numbers should be posted near the phone.
5. Know the potential hazards of the materials, facilities, and equipment with which you will work.
6. Use the proper safety equipment for your procedure. This could include a fume hood, glove box, shields, personal protective equipment (PPE), or other equipment.
7. Wear eye protection at all times in the laboratory. Splash goggles are required for wet chemical work or work with dusts and powders. Contact lenses are not eye protection.
8. Wear personal protective equipment where laboratory or experimental conditions dictate. This could include aprons, lab coats, gloves, face shields, dust masks, respirators, or other PPE's.
9. Wear clothes that protect the body against spills, dropped objects, and other accidental chemical contact. Shorts, open shoes, sandals, and bare feet are prohibited.
10. Long hair should be tied back or otherwise confined. Secure ties or other articles of clothing or jewelry that might become entangled in equipment.
11. Eating, drinking, gum chewing, and application of cosmetics are not allowed in laboratories. Food must not be kept in refrigerators with chemicals.
12. Do not pipette by mouth.
13. Remove all protective gear before leaving the laboratory. Wash hands before leaving the laboratory.
14. Follow written protocols or instructions. Perform only authorized experiments. Do not create shortcuts to procedures.
15. Do not use unfamiliar equipment without instruction and permission
16. Do not move or disturb equipment in use without the consent of the user.
17. Do not leave operating equipment or experiments unattended.
18. Do not work alone in the laboratory after normal working hours.
19. Do not horseplay in the laboratory. Avoid practical jokes or other behavior that may confuse, startle, or distract another worker.
20. Follow good housekeeping practices. Clean up as you go and keep work areas aisles, corridors, and exits uncluttered. Maintain clear accessibility to eyewash/showers, fire extinguishers, alarm stations, and electrical panels.
21. Report all accidents and injuries immediately to your laboratory instructor, supervisor, or Campus Security.
22. Report unsafe conditions to your instructor, supervisor, or EH&S.

Additional Rules for Instructors and Supervisors

1. Take responsibility, in attitude and action, for the safety conditions of your laboratory.
2. Observe all rules and see that they are enforced.

3. Set an example by wearing protective equipment and by following proper laboratory procedures to promote safe work habits.
4. Carefully review all laboratory experiments for possible safety problems before the experiments are assigned to students.
5. Make both preventative and remedial safety measures part of your instruction. Be sure all students and laboratory workers are familiar with emergency procedures and equipment.
6. Be alert for unsafe conditions. inspect often and intelligently; take effective corrective action promptly.
7. Assume responsibility for visitors and require that they follow the same rules as students and other laboratory workers.
8. Keep a current file of publications on laboratory safety. Material Safety Data Sheets (MSDS), and equipment manuals should be readily available to students, visitors, and others. Encourage their use.
9. Provide or arrange for all general safety and job specific training required for each employee under your direction.

Rules for Custodial Workers

1. Rooms or cabinets that have a caution sign or any other warning signs on the door, may contain materials or equipment which, if used improperly, could cause harm.
2. Any container (box, bottle, carton, etc.) that holds a potentially hazardous material should be clearly marked with an appropriate warning label. Containers of any chemicals or materials except those issued to you by your department should not be touched, moved, handled, or disturbed. If chemicals need to be moved in order to perform your duties, have the stockroom technician or instructor perform this task or contact your supervisor.
3. If the contents of any containers (other than those issued) are spilled, do not touch them or attempt to clean them up. Evacuate the area, closing the doors as you leave, and contact your supervisor or EH&S.
4. Wear protective goggles if there are people working in the laboratory.
5. Do not eat, drink, or apply cosmetics or medications in a laboratory or stockroom.
6. Be sure of what you are doing at all times. If you have questions, contact your supervisor or EH&S.
7. Do not dispose of chemical containers. Only stockroom technicians or instructors will handle this task. Chemical containers should not be disposed of as regular trash unless they have been completely emptied, rinsed, dried, label defaced and cap removed. If in doubt about containers leave them be.

Rules for Maintenance Workers

1. Before working on roofs of laboratory buildings first check to see if fume hoods are in use or will be used while you are working on roofs. If fume hoods are in use do not work on roofs.

2. Before working on laboratory equipment notify the stockroom technician, instructors, department chair or division dean about the problem and the length of time to repair. It is important that adequate prior notice be given laboratory staff before work begins so that all equipment that could be adversely affected can be secured.
3. Do not handle or move chemicals in the laboratory. If you need chemicals moved in order to perform your duties, have the stockroom technician, instructors, or EH&S arrange for this to be done.
4. Do not eat, drink, or apply cosmetics in the laboratory.
5. If there is a chance your work could bring you in contact with chemical hazards (e.g. working on laboratory sinks, stockrooms, etc.) or when working in rooms where chemical experiments are taking place, necessary protective equipment must be worn. Contact the stockroom technician, instructor, or EH&S for guidance as to what hazards may be present and what PPE's to wear.
6. If working on a hood, ask the stockroom technician, instructors, department chair, or division dean if the hood is used for perchloric acid. Contact EH&S before performing any work on any part of a perchloric acid hood system. Lubricate perchloric acid fume hood fans with fluorocarbon grease only.
7. Be sure of what you are doing at all times. If you have questions, contact your supervisor or EH&S.

Seismic Safety Guidelines

1. Secure free-standing bookshelves, cabinets, and equipment by attachment to building walls or other immovable fixtures.
2. Install latches on sliding or swinging cabinet doors.
3. Restrain compressed gas cylinders using approved brackets or metal chains which have been firmly attached to benches or walls.
4. Employ the use of flexible gas, water, and electrical connections on equipment.
5. Store flammable materials in flammable storage cabinets.
6. Store heavy items low to the floor or restrained.
7. Establish well-defined responsibilities among laboratory personnel for ensuring that sensitive or dangerous materials are secured before evacuating the laboratory (extinguish flames, turn off gas cylinders and burners, close cabinet doors, cap chemical containers, etc.).
8. Never exit a building during an earthquake. Take cover until the shaking stops. Secure your area then exit the laboratory, closing doors behind you. Proceed to a prearranged gathering place. Do not reenter the building until official clearance is given.

Emergency Procedures

Emergency procedures are covered in detail in the District's Emergency Action and Fire Prevention Plan. Emergency response for spills, releases, or threatened releases of hazardous materials, waste, or chemistry are detailed in the District's Business Plan.

In addition, the District's Emergency Procedures Manual places all this information in one document with distribution to every employee of the District.

Laboratory Safety and Personal Protective Equipment

Chemical Fume Hoods

Chemical fume hoods are used as an effective means of controlling exposure to toxic substances. A chemical fume hood is an enclosure which is vented directly to the outdoors. It is designed to efficiently remove hazardous fumes, gases, and vapors. Portable, ductless fume hoods are not permitted for control of emissions that may exceed the CalOSHA Permissible Exposure Limits at College of the Redwoods.

Chemical fume hoods must be surveyed and inspected annually. . The procedure and specifications are attached to this document as Appendix I, Fume Hood Survey Procedure.

The following guidelines should be followed whenever a vertical sash chemical fume hood is being used:

- Λ Use the chemical fume hood with the vertical sash lowered to 18" or the indicated operating height. The operating height should be clearly marked on the sash track. Do not work in the hood with the sash fully open. To be effective, the fume hood must be operated with the sash at the designated operating height, Additionally, this will allow the sash to serve as a physical barrier between your face and the contents of the hood.
- Λ Do not place equipment or chemicals close to the slot openings in the baffles at the rear of the hood, or close to the front edge of the hood. Clutter in the hood disrupts the air flow, reducing its capture efficiency. Use care that paper towels or other light weight materials are not drawn into the duct system of the hood. These items can clog the duct system or fan reducing the efficiency of the hood.
- Λ Keep the sash(es) glass clean. Never obstruct your view with paper, notices, decals, or other items on the sash(es).
- Λ Have observers remain away from the front of the hood so as to not restrict air intake to the hood. Avoid sudden movements while working in the hood. Walking briskly past the hood can disrupt air currents and pull vapors out of the hood.
- Λ Perchloric acid can leave explosive residues in a fume hood, duct system, or on a hood fan. Perchloric acid can also form explosive mixtures with organic compounds. For this reason, the use of perchloric acid in fume hoods must be carefully evaluated prior to use.
- Λ Hang a small (approximately 1" x 4") piece of tissue, Kimwipe, or similar lightweight material from the bottom of the sash. This should be drawn into the hood when operating

normally, and will hang straight down when the hood is operating marginally or not at all. If air flow has ceased, quickly close the sash and IMMEDIATELY call Maintenance or EH&S for service.

Biological Safety Cabinets

Biological safety cabinets (BSCs) are primary containment devices used in laboratories for working safely with biohazardous agents. There are three types of BSCs: classes I, II, and III, each with different performance characteristics and applications. BSCs use High Efficiency Particulate Air (HEPA) filters to control the airborne particles and may be ventilated into the room or ducted out of the building.

Emergency Showers and Eyewash Stations

Each campus laboratory or workplace where, during routine operations, the eyes of an employee may come in contact with any substance which can cause corrosion, irritation, or permanent tissue damage or which is toxic by absorption should have an approved emergency eyewash or eyewash/shower equipment. Eyewash and eyewash/showers are to be inspected monthly by laboratory personnel.

In the event of contact with a chemical or substance, immediately irrigate the eyes and/or other parts of the body for 15 minutes. Clothing that has been in contact with injurious substances must be removed. Fire blankets or clean lab coats may be used for warmth or modesty. Medical attention must be sought immediately, call Campus Security and EH&S. In all cases, make an effort to obtain MSDS for the attending medical personnel and provide the name of the chemical(s) or substance(s) involved.

Eye Protection

- Λ Safety Glasses: safety glasses with side shields should be worn at all times while in the laboratory. The purpose of wearing eye protection at all times while in the laboratory is to protect the eyes from accidental exposure to flying particles, chemical splashes, and dust. Contact lenses should not be worn while working in the laboratory since they are extremely difficult to remove from the cornea in the event of chemical contact with the eye. They may also allow chemical vapors to collect behind the lens, causing possible burns to the cornea. Additional eye protection, such as splash goggles or face shields, should be used as necessary to more fully protect the eyes when handling solvents, corrosives, and/or other hazardous materials when splashing could occur.
- Λ Splash Goggles: eyes are particularly sensitive to any contact with chemicals. Even momentary contact with strong chemicals can cause irreparable damage to the corneal surface. Therefore, splash goggles, that cover the entire area around the eyes, must be worn at all times when hazardous chemicals (corrosives-acids and bases), dusts, or powders are used. Splash goggles of the indirect vent style are the only approved type.

- Λ Shields: standing shields and face shields protect the face and neck. Shields of good rigidity and strength that protect the face and neck should be used for vacuum work, when working with low or high pressure systems, where over-pressurization may occur, or where major splashing may occur.

Respiratory Protection

Dust masks, cartridge respirators, and self-contained breathing apparatus should not be necessary in a properly designed laboratory. If you believe you require such protection contact EH&S for information and recommendations.

Skin and Body Protection

- Λ Gloves: protect the hands against contact with chemicals, also against abrasion and extremes of heat and cold. Before use, check gloves for worn spots, cracks, or other signs of wear. When removing gloves, be careful to avoid touching the outside of the gloves with your bare hands; also avoid touching door knobs, light switches, etc. with the gloves. Gloves should be left in the laboratory so as not to spread contamination.

Different kinds of gloves offer different levels and types of protection. Disposable gloves should be used whenever you are handling laboratory materials to avoid possible contamination of your hands. Gloves made of cotton or cotton/leather protect against abrasion, sharp objects, and glass, but they offer no protection against wet chemicals or fine dusts and powders. They may actually absorb chemicals and keep them in contact with your skin. Gloves of various materials offer protection against different chemicals. No one glove is appropriate for all chemical or materials. Gloves must be selected based on protection and compatibility. Appendix II lists suggested glove materials for various chemicals and compounds.

- Λ Aprons and Lab Coats: protect the body as gloves do the hands. All precautions and selection criteria pertaining to gloves apply to aprons and lab coats.
- Λ Shoes: sturdy closed-toed shoes should be worn in the laboratory at all times to protect against spills and splashes that reach the floor. Leather shoes offer better protection than canvas shoes. Open-toed shoes, sandals and bare feet are prohibited in the laboratory.

Hearing Protection

Standards for hearing protection and acceptable noise levels are established by federal and state regulation. Generally, typical science laboratories are well below threshold standards for noise. If you feel that a noise hazard is present in your laboratory contact EH&S for evaluation and

recommendation.

Standard Microbiological Practices

The following standard microbiological practices, known as Biosafety Level 1, are suitable for work involving well-characterized agents not known to cause disease in healthy adult humans, and of minimal potential hazard to laboratory personnel and the environment. The laboratory is not necessarily separated from the general traffic patterns in the building. Work is generally conducted on an open bench using standard microbiological practices. Special containment equipment or facility design is not required nor generally used. Students are supervised by instructors or others with specific training in the procedures, agents and materials in use.

Work with indigenous or exotic agents associated with human disease, serious or lethal consequences, and/or unknown means and risk of transmission require practices, equipment, and facilities associated with Biosafety Level 2 - 4, as set forth in Biosafety in Microbiological and Biomedical Laboratories; U.S. Department of Health and Human Services, (CDC, NIH); 3rd Edition. For questions about Biosafety Levels greater than Level 1, contact EH&S.

Biosafety Level 1 - Standard Practices

1. Access to the laboratory is limited or restricted at the discretion of the instructor when experiments or work with cultures and specimens are in progress.
2. Persons wash their hands after they handle viable materials and animals, after removing gloves, and before leaving the laboratory.
3. Eating, drinking, handling contact lenses, and applying cosmetics are not permitted in laboratories.
4. Mouth pipetting is prohibited.
5. All procedures are performed carefully to minimize the creation of splashes or aerosols.
6. Work surfaces are decontaminated at the beginning and end of each laboratory session and after all any spill of viable material.
7. All cultures, stocks, and other regulated wastes are decontaminated before disposal by an approved decontamination method, such as autoclaving. Materials to be decontaminated outside the immediate laboratory are to be placed in a durable, leakproof container for transport from the laboratory.
8. An insect and rodent control program is in effect.

Biosafety Level 1 - Safety Equipment

1. Special containment devices or equipment such as biological safety cabinet are generally not required for manipulations of agents assigned to Biosafety Level 1.
2. It is recommended that laboratory coats, gowns, or uniforms be worn to prevent

- contamination or soiling of street clothes.
3. Gloves should be worn if the skin on the hands is broken or if a rash exists.
 4. Protective eyewear should be worn for anticipated splashes of microorganisms or other hazardous materials to the face.

Biosafety Level 1 - Laboratory Facilities

1. Each laboratory contains a sink for hand washing.
2. The laboratory is designed so that it can be easily cleaned. Rugs are not appropriate.
3. Bench tops are impervious to water and resistant to acids, alkalis, organic solvents, and moderate heat.
4. laboratory furniture is sturdy, Spaces between benches, cabinets, and equipment are accessible for cleaning.
5. Windows that open are fitted with screens.

Handling Chemicals

Handling and usage of chemicals should be conducted in such a manner as to reduce to a minimum the risk of personal exposure to the substances. Persons working with chemicals must be informed about the individual hazards of working with hazardous chemicals. Training should be well documented and conducted at all levels in the organization. Students should be informed of the hazards of chemicals and precautions necessary. This information should be a part of every laboratory experiment or exercise and can take the form of information in laboratory manuals and procedures or in lecture. In no case should personal exposure exceed the permissible exposure levels (PEL), threshold limit values (TLV), or recommended exposure limits (REL). PEL's are law and may be referenced in 8 CCR 5155, TLV's are set by the American Conference of Governmental Industrial Hygienists, and REL's set by the National Institute for Occupational Safety and Health.

Recommendations on the safe handling, storage, and hazards is included as Appendix III. This information is reprinted from the UC Davis [Chemical Laboratory Safety Manual](#).

Chemical Waste Disposal

Federal and state regulatory control over hazardous waste has become extraordinarily stringent in recent years. These changes have dramatically increased the complexity of handling hazardous waste produced by the college community and noncompliance can be very expensive. These guidelines are provided to ensure, safe, efficient, environmentally sound, and legally compliant handling and disposal of hazardous waste.

Never dispose of any solid or liquid chemical or other hazardous materials in the regular trash or down the drain. All chemical hazardous waste must be disposed of through the Office of Environmental Health and Safety.

Source Reduction and Waste Minimization

Wherever and whenever possible, experimental protocols should include provisions to both reduce the volume of the source and minimize the generation of hazardous waste. Examples of steps that can be taken include "miniaturization" of experiments and substituting nonhazardous or less hazardous chemicals for more hazardous ones.

Hazardous Waste Accumulation

The College of the Redwoods at all three locations accumulates hazardous waste under the regulations and time frames of "satellite accumulation" as codified in 8 CCR 66262.34. On the Eureka Campus a variance has been granted by the Department of Toxic Substance Control allowing for satellite accumulation in PS 112 for all hazardous waste generated in the Physical Science Building.

"Satellite Accumulation" means a generator, an individual who in the course of their work (teaching, maintenance, etc.) creates hazardous waste, may accumulate no more than 55 gallons of hazardous waste or one quart of extremely hazardous waste when all of the following conditions are met:

1. waste must be accumulated in containers at or near the area where the waste is generated and under the control of the person generating the waste (this is the "rule" our variance, noted above, allows us to accumulate in PS 112).
2. waste is not held onsite for more than one year, or more than 90 days when limits are met.
3. the accumulation start date, generator's name, location, contents and characteristics of the waste are clearly noted on the container.
4. Containers holding hazardous waste are compatible with the waste, the container is in good condition, and the container is closed at all times except when waste is being added.

NOTE: The above is a summary of the regulations governing satellite accumulation. If you have specific questions about the regulations or what constitutes hazardous waste or extremely hazardous waste call EH&S.

Labeling

Use the "Hazardous Waste" label supplied by EH&S for all hazardous waste containers. For satellite accumulation use the line, "Initial Accumulation Start Date" when the "first drop" of waste is accumulated. Every container must be labeled. Every label must be complete with the

date, name, building and room, composition and physical state of waste, and hazardous properties of the waste. Chemical names must be specific. Nonspecific labels such as "organic waste," "waste solvents, and "acid waste" are not sufficient. Chemical formulas or abbreviated chemical name are not acceptable. Notice the label is three-part carbonless, the white is returned to EH&S, the yellow the generator retains, and the card is attached to the container.

"Unknowns" are not accepted for disposal. If you have any unknown material it must be tested by certified laboratories before disposal. "Hazcat" identification of "unknowns" is not accepted.

Containers

Containers must be leak-proof. Liquids must be in a screw-capped container that will not leak if tipped over. Containers sealed with corks, parafilm, or laboratory beakers that will not stand by themselves are not acceptable.

The size of the container should correspond with the quantity of the materials being discarded, For example, it is not cost effective to ship 50 ml. of material in a 4 L container.

Contaminated labware such as glassware, gloves, paper towels, etc. must be placed in clear, double plastic bags and properly labeled with a Hazardous Waste label. Do not use red bags with the Biohazard label.

Glass or plastic tubing, pipettes, and stirring bars must not be placed in liquid waste containers. These items are not accepted by vendors that receive the waste.

The material must be compatible with the container; acids or bases cannot be transported in metal containers, hydrofluoric acid cannot be transported in glass.

Empty chemical bottles or other containers may be disposed of by triple rinsing, allow it to air dry, deface or remove labels, remove cap and dispose of the empty container in the ordinary trash. Custodians are instructed not to prepare containers for disposal. Only instructors or stockroom personnel should prepare containers for disposal.

Some Do's and Don'ts in Hazardous Waste

DO:

- Λ Call EH&S with any problem or question.
- Λ Complete and affix hazardous waste labels when accumulation begins.
- Λ Use only screw-top containers and keep containers closed except when being filled.
- Λ Leave head space for expansion.
- Λ Keep waste in secondary containers and properly labeled.

- Λ Substitute less hazardous chemicals whenever possible.

DO NOT:

- Λ Mix chemicals, i.e., halogens, metals, solvents, etc.
- Λ Put hazardous waste in red or Biohazard bags.
- Λ Put sharps or pipettes in plastic bags.
- Λ Leave waste in open containers.
- Λ Guess at the contents of an unknown container.

Medical Waste

Medical waste is regulated by the State Medical Waste Management Act (MWMA), California Health and Safety Code Division 20, Chapter 6,1. This Act regulates the handling, storage, treatment, and disposal of medical waste and requires permitting of haulers and treatment facilities and registration of generators.

Medical waste includes *biohazardous waste* and *sharps waste*.

Biohazardous wastes are:

1. All liquid and solid waste generated while collecting, producing, processing, testing, immunizing, treating, and/or storing specimens from humans or animals (vertebrate or invertebrate, wild or laboratory) that are known or reasonably suspected of containing agents infectious to humans, and cultures of agents infectious to humans classified as Biosafety Level II or greater with evidence of human pathogenicity; and
2. All human anatomical remains (except teeth) and any fluid human blood and blood products.

Medical waste must be contained separately from other waste in the laboratory at the point of generation. Medical waste must be placed in RED biohazard bags labeled with the words "Biohazardous Waste" or with the biohazard symbol and the word "Biohazard." Non-biohazardous waste should not be placed in labeled red biohazard bags. Medical sharps waste must be contained in approved medical waste sharps containers.

When ready for disposal contact your area custodian. He/she will transport the waste to a central collection point for pick-up by the hauling vendor.

Blood-borne Pathogen Regulations

The District's procedures for compliance with blood-borne pathogen standards is addressed in Board of Trustees Policy No. 531/819 and Exhibit No. 531.01/819.01, Redwoods Community College District Exposure Control Plan for Blood-borne Pathogens. For specific information refer to the document, your supervisor, or EH&S.

Reproductive Hazards

Little is known about the effects of low-level chemical exposures on reproduction. Therefore, it is difficult to determine whether or not a particular exposure or chemical can cause reproductive harm. To decrease the chances of reproductive harm, it is prudent to minimize exposures to hazardous chemicals. This may be accomplished by substitution of a less hazardous chemical, the use of engineering controls, or the use of personal protective equipment.

Appendix IV contains a chart listing chemicals that have implicated, either in animal or human studies, to cause adverse effects on reproduction. This is not a complete list of reproductive hazards. An adverse reproductive effect will not necessarily occur in response to exposure to these chemicals. Response depends on a number of factors, including dose and the point in the reproductive process at which exposure occurs. Just because a chemical is not on this list does not mean it is safe.

Appendix I

FUME HOOD SURVEY PROCEDURE

PURPOSE

The purpose for the fume hood survey is to help insure the safety of those persons required to work in and around the units. This procedure requires that accurate records be kept and that proper notification take place each time the units are surveyed. This Plan is in accordance with 8 CCR 5191 (e)(3)(C) and 8 CCR 5154.1.

GUIDE FOR CHEMICAL FUME HOOD USE

The purpose of this chemical classification is to aid in making a judgment about which type of ventilation control is necessary to perform chemical laboratory work. The general room air ventilation rate, the chemical form, chemical concentration, operating temperature and chemical evaporation rate should also enter in the judgment. DANGER: College of the Redwoods' Chemical Fume Hoods are not designed to allow the use of perchloric acid or other substances with similar hazards!

CLASSIFICATION OF CONTAMINANT SUBSTANCES

Contaminant Class	Contaminant Substances	
	<u>Gases & Vapors</u>	<u>Dusts, Fumes & Mists</u>
I	Substances with exposure limits of 100ppm and above	Substances with exposure limits of 10mg/M ³ and above
II	Substances with exposure limits of 1ppm and above (up to 100ppm)	Substances with exposure limits of 0.1mg/M ³ and above (up to 10mg/M ³)
III	Substances with exposure limits below 1ppm; also, high activity radioisotopes, carcinogens, and cancer-suspect agents	Substances with exposure limits below 0.1mg/M ³ ; also, high activity radioisotopes, carcinogens, and cancer suspect agents

Note: This classification does not include biological agents. It is based on the Threshold Limit Value list - ACGIH.

HOOD APPLICATIONS AND MINIMUM EXHAUST VOLUME REQUIREMENTS*

Contaminant Class	Chemical Fume Hood
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I	Face velocity: 100 fpm average; 50 fpm minimum
II	Face velocity: 100 fpm average; 75fpm minimum
III	Face velocity: 15 150 fpm average; 125 fpm minimum

* Minimum exhaust volumes or face velocities shall be based on the maximum hood face area.

FUME HOOD SURVEY PROCEDURE

I. Measurement Frequency

A. Fume hoods are to be measured on an annual schedule.

II. Measurement Standards

A. All fume hoods shall have a minimum average face velocity of 100 feet per minute (fpm). The maximum average face velocity shall be no higher than 165 fpm. No individual measurement shall be lower than 70 fpm or higher than 175 fpm.

A face velocity lower than 70 fpm is considered too low for containment of hazardous vapors or gases within a hood. A face velocity higher than 175 fpm usually disrupts hood design aerodynamics resulting in an eddy effect outside the hood. High face velocities may raise noise levels which result in complaints by the user.

B. All fume hoods where radioisotopes, chemical carcinogens and highly toxic chemicals (to be determined by Maintenance) are used shall have a minimum average face velocity of 150 fpm. The maximum average face velocity shall be no higher than 165 fpm. No individual measurement shall be lower than 125 fpm or higher than 175 fpm.

This special requirement can change from time to time because hood use can change. For example, a hood measuring 140 fpm ave. face velocity may be legal for ordinary chemicals, but the

following year illegal because carcinogens are being used.

See Table I, Chemical Fume Hood Standards

III. Measurement Method

- A. Velocity measurements are to be made in the plane of the hood face (see Figure 1). Be sure that the measuring probe of the thermoanemometer is oriented correctly.
- B. The hood face area should be mentally divided into one foot squares. A measurement within each square should be made (i.e., 12 sq. ft. = 12 measurements). An average face velocity profile is then established (see face velocity profile examples).
- C. Fume hoods with non-removable horizontal sliding sashes are to be measured with sashes positioned at outmost edges (see Figure 2).
- D. Hoods with vertical sliding sashes are to be marked at the 18" height with a marking sticker. The sticker will indicate the sash position to meet legal requirements (see Figure 3).

The 18" height is selected to standardize measurements. All prior readings are to be disregarded and crossed out. CAL-OSHA chemical fume hood requirements state that vertical sliding sash positions must be marked; or it is assumed that the hood will meet face velocity requirements with the sash all the way up. Older hoods usually can be upgraded to meet required face velocities. Usually the user's eyes and face are protected with the sash at the 18" position. It is the user's responsibility to work with the hood in this position. Sashes do not necessarily have to be fastened.

- E. All measurements are to be recorded by maintenance staff on the survey form and on the hood survey sticker. This includes measurements after corrections are made by the Maintenance Department. If stickers are illegible or missing, they are to be replaced with the latest reading indicated.

IV. Recording and Correcting Fume Hood Deficiencies

- A. Maintenance Responsibilities

1. All deficiencies are to be recorded on the survey and fume hood sticker. Fume hoods with greater than 175 fpm face velocities will not be posted since OSHA addresses only minimum face velocity requirements.
2. All deficient hoods are to be posted with a Notice. The Notice is to be removed only when the hood is in compliance with standards.
3. Deficiencies involving improper face velocities, missing sashes, missing distribution panels and improper construction require notification of the Maintenance Department for correction.

Maintenance will send a copy of the fume hood survey form to the Director of Facilities and Grounds and Division Chair or Deans at Mendocino and Crescent City. The deficiencies must be clearly indicated.

4. Notification of fume hood deficiencies involving improper face velocities, missing sashes, missing distribution panels and improper construction problems is made to the Director of Facilities and Grounds. Notification is made by receipt of a copy of the fume hood survey form with the indicated deficiencies.
5. When the deficiency is corrected, the survey form should be dated and signed by the mechanic with the correction indicated. The form should be returned to:

Director of Facilities and Grounds at Eureka with copies to
Division Chair or Associate, Campus Vice-Presidents at
Del Norte or Mendocino Coast.

6. Maintenance will notify the Department (user) when corrections are made.
7. Do not make any recordings on Notices or hood inspection stickers.

V. Employee Protection - Fume Hood Servicing

A. Maintenance Responsibilities

If general maintenance or repair requires shutdown of fume hood, maintenance staff person must notify the Principal Investigator or Laboratory Supervisor of the time and duration of the shutdown by posting a written notice on the hood.

Principal Investigator or Laboratory Supervisor should be contacted if there is any question as to the presence of hazardous agents and for proper protection of workers where hazardous agents are deemed to be present.

B. General Employee Protection

Before attempting to maintain, repair or survey any fume hood the following measures will be done:

1. Two pair of disposable gloves will be worn.
2. Approved respiratory equipment will be worn with the proper filters.
3. Disposable arm sleeves will be worn.

Once all work is complete, all disposable equipment will be placed into the proper laboratory garbage. **WASH HANDS WITH SOAP AND WATER THOROUGHLY BEFORE LEAVING THE WORK SITE.**

Appendix V

CADAVER TRANSPORTATION PROCEDURE

The purpose of these procedures is to insure the health and safety of employees while engaged in the transportation of cadavers. The hazards associated with the transportation of cadavers are musculoskeletal problems associated with lifting and moving the cadaver and exposure to formaldehyde, a key ingredient in the embalming fluid used in the preparation of cadavers.

When transporting cadavers, all of the following provisions must be met and adhered to:

1. All employees involved in the transportation of cadavers must be current in their training on the District's Illness and Injury Prevention Plan, Hazard Communication Plan, and Chemical Hygiene Plan.
2. A minimum of two employees of sufficient size, strength, and agility to load and unload cadavers are required.
3. Only District owned vans are to be used. All back seats should be removed, providing an unobstructed area to load and unload. The van's floor should be smooth and flat with no protuberances that might puncture the body bag. Use plywood or other suitable material if necessary.
4. Travel must be arranged so that the return trip to your campus occurs on the same day as the pickup. No overnight stays in San Francisco or on the road after taking possession of the cadavers.
5. When the cadaver is placed in the possession of District employees, the package (body bag) must be inspected for labels or other forms of warning bearing information about the identity of the hazardous substances, appropriate hazard warnings, and name and address of the manufacturer. If there is no label, a pre-prepared label bearing the following information must be affixed to the body bag: DANGER - Potential Cancer Hazard - Contains Formaldehyde - Redwoods Community College District, 7351 Tompkins Hill Road, Eureka, CA 95501. In addition to labeling, a MSDS for formaldehyde, CAS # 50-00-0, must be carried in the transport vehicle.
6. Suitable gloves must be carried in the transporting vehicle and worn by employees when handling the cadaver or body bag.
7. Each employee involved in the transport of cadavers must have available for use an air purifying respirator fitted with a suitable cartridge for formaldehyde vapors.
8. Suitable goggles for eye protection must be available to all employees transporting cadavers.
9. A spill kit containing absorbent material and sealable containers must be carried in the transport vehicle.
10. Prior to transportation, the District's Environmental Health and Safety Office must be contacted for verification as to the status of training of transporting employees and check-off for required equipment.