Formaldehyde, Phenol, and Glutaraldehyde Program

San Bernardino Valley College
701 South Mount Vernon Avenue
San Bernardino, California 92410
&
Crafton Hills College
11711 Sand Canyon Road
Yucaipa, California 92399

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Policy Statement

The purpose of this program is to protect San Bernardino Community College District (SBCCD) employees and students at San Bernardino Valley College (SBVC) and Crafton Hills College (CHC) from the hazards associated with the use of formaldehyde, phenol, and glutaraldehyde, and to maintain formaldehyde, phenol, and glutaraldehyde exposures below the regulatory limits.

Scope and Application

This program applies to all SBCCD employees and students at SBVC and CHC who use formaldehyde, formalin, other formaldehyde-containing solutions and/or specimens preserved in such solutions, phenol, other phenol-containing solutions and/or specimens preserved in such solutions, glutaraldehyde, and other glutaraldehyde-containing solutions and/or specimens preserved in such solutions.

Responsibilities

Program Administrator

The College President is the program administrator, the Vice President of Administrative Services is the designee, and both have the authority and responsibility for implementing and maintaining this program for their respective campuses.

Assigned campus designees are as follows:

Vice President of Administrative Services/SBVC, Site Safety Officer
San Bernardino Valley College
Tel: (909) 384-8958

&
Vice President of Administrative Services/CHC, Site Safety Officer
Crafton Hills College
Tel: (909) 389-3210

The Program Administrators and designees may be assisted in their duties by the District Environmental Health & Safety Administrator. The Environmental Health & Safety Administrator can be reached at (909) 388-6935 or via email EHS@sbccd.edu

The duties of the Program Administrator include, but are not limited to the following:

- Identifying work areas, processes or tasks that present formaldehyde, phenol, and glutaraldehyde hazards.
- Arranging for and/or conducting training.
- Maintaining records required by the program.
- Evaluating the program.

Chemical Hygiene Officer

Chemical Hygiene Officers are responsible for ensuring that this program is implemented and to be knowledgeable about the program requirements in collaboration with the Program Administrator and District Environmental Health & Safety Administrator. Duties of the Chemical Hygiene Officer include:

- Implement the SBCCD Formaldehyde, Phenol, and Glutaraldehyde Program.
- Coordinate exposure control evaluations (such as communicating with staff on the scheduling of air monitoring in the lab and employee medical evaluations) in collaboration with the Site Safety Officer and Safety and Risk Management Department, as necessary.
- Ensures appropriate instructional and classified lab personnel obtain necessary general formaldehyde, phenol, and glutaraldehyde safety training
- Respond to emergency chemical spills and coordinate with first responders, the Site Safety Officer, and others as needed.
- Ensure compliance with specific safety measures when using formaldehyde, phenol, and/or glutaraldehyde.
- Ensure compliance with Fume Hood and Biosafety Cabinet Program for Laboratory Exhaust Ventilation Systems.
- Ensure employees and students adhere to personal protective equipment (PPE) standards.

Safety & Risk Management Department

In collaboration with the Site Safety Officer and Chemical Hygiene Officer the Safety and Risk Management Department is to:

- Monitor compliance with the Occupational Health & Safety Administration (OSHA) Standard for Formaldehyde, 29 CFR 1910.1048 and Cal/OSHA Standard for Formaldehyde 8 CCR 5217.
- Coordinate general formaldehyde, phenol, and glutaraldehyde safety training, use and Appendix D for employees to record and report training.
- Coordinate the provision of medical examinations, exposure monitoring and record keeping for applicable employees, as required.

Instructors

Each instructor has the responsibility to follow this program. Instructors must also:

- Ensure compliance with this program in their work area(s).
- Ensure compliance with specific safety measures when using formaldehyde, phenol, and/or glutaraldehyde.
- Report student accidents, possible overexposures, or unsafe conditions to the instructors or Chemical Hygiene Officer.

- Wear/utilize personal protective equipment (PPE) and use engineering controls when recommended and provided.
- Arrange for immediate emergency response, if necessary, for chemical spills, injuries, and overexposures.
- Notify the Chemical Hygiene Officer when there is a change in equipment, processes or controls which may result in additional exposure to formaldehyde, phenol, or glutaraldehyde.
- Ensure students with potential exposure to formaldehyde, phenol, or glutaraldehyde receive the appropriate training before working with it, use Appendix C to record and report training.

Lab Technicians/Employees

Each lab technician/employee has the responsibility to follow this program. Employees must also:

- Know the provisions of the SBCCD Formaldehyde, Phenol, and Glutaraldehyde Program.
- Maintain their work area(s) daily.
- Maintain an SDS for the formaldehyde, phenol, and glutaraldehyde products used, and all other hazardous chemicals in the work area.
- Report student accidents, possible overexposures, or unsafe conditions to the instructors or Chemical Hygiene Officer.
- Notify the Chemical Hygiene Officer when there is a change in equipment, processes or controls which may result in additional exposure to formaldehyde, phenol, or glutaraldehyde.
- Wear/utilize personal protective equipment (PPE) and use engineering controls when recommended and provided.
- Schedule medical examinations and exposure monitoring in collaboration with the Chemical Hygiene Officer and Site Safety Officer, as required.
- Arrange for immediate emergency response, if necessary, for chemical spills, injuries, and overexposures.
- Notify the Chemical Hygiene Officer when there is a change in equipment, processes or controls which may result in additional exposure to formaldehyde, phenol, or glutaraldehyde.

Students

Each student has the responsibility to follow this program. Students must also:

- Know the provisions of the SBCCD Formaldehyde, Phenol, and Glutaraldehyde Program.
- Report accidents, possible overexposures, or unsafe conditions to the instructors; and
- Wear/utilize personal protective equipment (PPE) and use engineering controls when recommended and provided.

Program Elements

Formaldehyde Hazard Data

Formaldehyde exposure has been associated with irritation to the human respiratory tract, cancers of the nose and lung, and loss of vision. Formaldehyde may affect the body through inhalation, skin/eye contact or accidental ingestion. One's sense of smell and eye irritation become less sensitive with time as one adapts to formaldehyde exposure; therefore, one cannot rely on formaldehyde's warning properties to alert oneself to the potential for overexposure. The dose, or amount of exposure, determines the type and degree of beneficial or adverse health effects.

Acute Health Effects

Acute Health Effects are symptoms that occur at very high concentrations of exposure. Table 1.0 below describes some of the health effects correlated to the various routes of formaldehyde exposure.

Table 1.0 – Acute Health Effects, Formaldehyde

Routes of Exposure	Health Effects
Inhalation	❖ Formaldehyde is highly irritating to the eyes, nose and throat. ❖ Affects the nasal cavity. ❖ Severity of the symptoms depends upon the concentration in air coupled with the length of the exposure. ❖ Wheezing, nausea, bronchitis, teary eyes, watery nose, headache, sinus fullness, sore throat, throat hoarseness, severe coughing, chest pains, chest tightness, swelling of the throat, and spasms in the throat. ❖ Concentrations of 100 ppm are immediately dangerous to life and health (IDLH).
Skin Absorption	❖ Formaldehyde is a severe skin irritant and sensitizer. ❖ Contact with formaldehyde causes white discoloration, drying, cracking and scaling of the skin. ❖ Prolonged or repeated contact can cause numbness or hardening/tanning of the skin.
Eye Contact	❖ Formaldehyde solutions splashed in the eyes can cause injuries ranging from mild discomfort (such as watery eyes, itchy eyes) to severe, permanent corneal clouding and loss of vision. ❖ The eyes can become itchy, tear, and can eventually close. ❖ The severity of the effects depends on the concentration of formaldehyde, length of contact, and whether or not the eyes were flushed with water immediately after the accident.
Ingestion	❖ Severe irritation of the mouth, throat, and stomach. ❖ Nausea, vomiting, abdominal pain, diarrhea, hypertension, hypothermia, lethargy, dizziness, convulsions, coma, acidosis, kidney inflammation, and liver toxicity. ❖ Corrosion of the gastrointestinal tract.

	❖ Inflammation and ulceration of the mouth, esophagus, and stomach. ❖ Severe stomach pains will follow ingestion with possible loss of consciousness and death.

Chronic Health Effects

Formaldehyde has the potential to cause various respiratory impairments, such as bronchitis and nasal cancer that may appear over a relatively long period of time after repeated and prolonged exposures above the OSHA permissible exposure limits (PEL). In humans, formaldehyde exposure has been associated with cancers of the lung, nasopharynx and oropharynx, and nasal passages.

Physical Hazards

Formaldehyde poses a moderate fire and explosion hazard when exposed to heat or flame. The flash point for 37% formaldehyde is 185ºF with an explosion range of 7 to 73% by volume in air. Avoid contact with strong oxidizing agents, caustics, strong alkalies, isocyanates, anhydrides, oxides, and inorganic acids. Formaldehyde reacts with nitrogen dioxide, nitromethane, peroxyformic acid, perchloric acid and aniline to yield explosive compounds. Formaldehyde reacts with hydrochloric acid to form the potent carcinogen, bischloromethyl ether. A violent reaction occurs when formaldehyde is mixed with strong oxidizers. Oxygen from the air can oxidize formaldehyde to formic acid, especially when heated; formic acid is corrosive.

Permissible Exposure Limits (PELs)

CAL-OSHA has issued several types of limits for employee exposure to trigger various regulated requirements.

Table 2.0 – CAL-OSHA Formaldehyde Exposure Limits and CAL-OSHA Required Actions (Reference CCR Title 8 Section 5217)

Limit Types	Limits	Required Actions
Exposure Threshold	0.1 part formaldehyde per million parts of air (0.1 ppm)	❖ Annual formaldehyde training
Action Level (AL)	0.5 ppm (calculated as an 8-hour time-weighted average)	❖ If exposures are found to be at or above the AL the following will be conducted: o Air monitoring at least once every 6 months o Medical surveillance for employees
Permissible Exposure Limit (PEL)	0.75 ppm (calculated as an 8-hour time-weighted average)	❖ If at or above the PEL, CAL-OSHA requires employers to do the following: o Provide personal protective equipment (PPE) such as respirators; o Establish administrative controls, to study and install engineering controls (if feasible); and

Limit Types	Limits	Required Actions
		○ Establish regulated areas, and perform other OSHA-required procedures and duties.
Short Term Exposure Limit (STEL)	2 ppm (averaged over any one 15-minute period)	❖ If at or above the STEL, CAL-OSHA requires employers to do the following: ○ Provide personal protective equipment (PPE) such as respirators; ○ Establish administrative controls, to study and install engineering controls (if feasible); and ○ Establish regulated areas, and perform other OSHA-required procedures and duties.

Phenol Hazard Data

Phenol exposure has been associated with irritation to the skin, eyes, and mucous membranes. The skin is the primary route of entry into the human body. Phenol may affect the body through inhalation, skin/eye contact or accidental ingestion. Acute exposure in humans can result in irregular breathing, muscle weakness, muscle tremors, loss of coordination, convulsions, coma, respiratory arrest, and death. The dose, or amount of exposure, determines the type and degree of beneficial or adverse health effects.

Acute Health Effects

Acute Health Effects are symptoms that occur at very high concentrations of exposure and short term exposures. Table 3.0 below describes the health effects correlated to the various routes of phenol exposure.

Table 3.0 – Acute Health Effects, Phenol

Routes of Exposure	Health Effects
Inhalation	❖ Phenol is extremely irritating to the skin, eyes, and mucous membrane.
Skin Absorption	❖ Phenol is extremely irritating to the skin. ❖ Chemical burns, redness, edema, tissue necrosis, and gangrene.
Eye Contact	❖ Irritation ❖ Conjunctival swelling where the cornea becomes white and loses sensation. ❖ Loss of vision, blindness.

Ingestion	❖ Shock, collapsing, coma, convulsions, cyanosis, muscular weakness, and death ❖ Severe burns in the mouth and throat, abdominal pain, cyanosis, muscular weakness

Chronic Health Effects

Phenol has the potential to cause anorexia, progressive weight loss, diarrhea, vertigo, salivation and dark coloration of the urine in those after repeated and prolonged exposures above the OSHA permissible exposure limits (PEL). In humans, phenol exposure has been associated with gastrointestinal irritation and respiratory, eyes, skin, blood, liver, and kidney effects, and systemic disorders such as digestive disturbances and nervous system effects. The Agency for Toxic Substances and Disease Registry (ATSDR)[1] indicated that application of phenol to the skin resulted in dermal inflammation and necrosis, and exposure in high phenol concentration resulted in cardiac arrhythmias in humans. It can cause clastogenic and possibly very weak mutagenic effects.

Physical Hazards

Phenol poses a moderate fire and explosion hazard when exposed to heat, flames, or sparks. The flash point for 30-60% phenol is 175ºF. Avoid phenol contact with strong oxidizing agents (especially calcium hypochlorite), acids, and halogens as they yield explosive compounds. Liquid phenol attacks rubber, coatings, and some forms of plastic. Hot liquid phenol attacks aluminum, magnesium, lead, and zinc metals.

Permissible Exposure Limits

CAL-OSHA has issued limits for employee exposures to trigger various regulated requirements.

Table 4.0 – Phenol Exposure Limits and Recommended Actions

Limit Types	Limits	Recommended Actions
Cal-OSHA Permissible Exposure Limit (PEL)	5 ppm [skin][2] (calculated as an 8-hour time-weighted average)	❖ If employee exposures are found to exceed the PEL, air monitoring will be conducted at least once every 6 months. ❖ If at or above the limit, OSHA requires employers to do the following: o Annual phenol training; o Provide personal protective equipment (PPE) such as respirators; o Establish administrative controls, to study and install engineering controls (if feasible); and

[1] Agency for Toxic Substances and Disease Registry (ATSDR). *Toxicological Profile for Phenol (Update)*. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 1998.
[2] "Skin" notation, indicates that the cutaneous route of exposure (including mucous membranes and eyes) contributes to overall exposure.

		○ Establish regulated areas, and perform other OSHA-required procedures and duties.

Glutaraldehyde Hazard Data

Glutaraldehyde exposure has been associated with irritation to the eyes, skin, and respiratory system. Other symptoms include dermatitis, sensitization, cough, asthma, nausea, and vomiting. Glutaraldehyde may affect the body through inhalation, skin absorption, ingestion, and skin and/or eye contact. The dose, or amount of exposure, determines the type and degree of beneficial or adverse health effects.

Acute Health Effects

Acute Health Effects are symptoms that occur at very high concentrations of exposure and short term exposures. Table 5.0 below describes the health effects correlated to the various routes of glutaraldehyde exposure.

Table 5.0 – Acute Health Effects, Glutaraldehyde

Routes of Exposure	Health Effects
Inhalation	❖ Irritates nose, throat, and respiratory tract ❖ Causes coughing and wheezing, nausea, headaches, drowsiness, nosebleeds, and dizziness
Skin Absorption	❖ Irritates skin and can cause dermatitis (skin rash), with dryness, redness, flaking, and cracking of the skin ❖ At higher concentrations can burn skin
Eye Contact	❖ Severely irritates eyes ❖ Can cause permanent eye damage
Ingestion	❖ Severe irritation of digestive tract with burning sensation in chest, abdominal pain, cramping, vomiting, diarrhea, vascular collapse, and coma ❖ May also affect liver, spleen, blood, metabolism, behavior, urinary system

Chronic Health Effects

Glutaraldehyde is a sensitizer. This means some workers will become very sensitive to glutaraldehyde and have strong reactions if they are exposed to even small amounts. Workers may get sudden asthma attacks with difficulty breathing, wheezing, coughing, and tightness in the chest. Prolonged exposure can cause a skin allergy and chronic eczema, and afterwards, exposure to small amounts produces severe itching and skin rashes. It has been implicated as a possible cause of occupational asthma.

Physical Hazards

Glutaraldehyde is a combustible liquid. When heated to decomposition, it emits acid smoke and irritating fumes. Avoid glutaraldehyde contact with strong oxidizers and strong bases. Alkaline solutions of glutaraldehyde (i.e. activated glutaraldehyde) reach with alcohol, ketones, amines, hydrazines, and proteins.

Permissible Exposure Limits

CAL-OSHA has issued several types of limits for employee exposures to trigger various regulated requirements

Table 6.0 – Glutaraldehyde Exposure Limits and Recommended Actions

Limit Types	Limits	Recommended Actions
Cal-OSHA Permissible Exposure Limit (PEL)	None	N/A
Cal-OSHA Ceiling Limit (C)	0.05 ppm (0.2 mg/m^3) (maximum concentration employee may be exposed at any time)	❖ If employee exposures are found to be above the Ceiling Limit, air monitoring will be conducted at least once per year. ❖ If at or above the ceiling limit, the following steps may also be taken: ○ Provide annual glutaraldehyde training; ○ Provide personal protective equipment (PPE) such as respirators; ○ Establish administrative controls, to study and install engineering controls (if feasible); and ○ Establish regulated areas, and perform other OSHA-required procedures and duties.

Exposure Assessments

Whenever formaldehyde, phenol, or glutaraldehyde is used in a work area, Safety & Risk Management Department will coordinate with an industrial hygienist to conduct air monitoring to determine employee exposures. Measurements of employee exposure will be representative of a full shift or STEL and will be taken for each job classification in each work area.

The industrial hygienist will utilize special sampling equipment to collect representative air samples for laboratory analysis of formaldehyde, phenol and/or glutaraldehyde. Exposure records and determinations shall be

kept for at least 30 years.

Employee Exposure Assessments

If conditions exist which warrant periodic exposure assessments (see preceding exposure limit tables), monitoring will continue until exposures can be reduced below these levels by engineering or administrative controls.

Air monitoring will be conducted promptly in a work area if employees are experiencing signs or symptoms of formaldehyde, phenol, or glutaraldehyde exposure. Air monitoring will be repeated in an area each time there is a change in equipment, processes or controls which may result in additional exposure to formaldehyde, phenol, or glutaraldehyde.

Periodic monitoring shall occur if the determined exposure to formaldehyde is at or above the action level or STEL. If the exposure is at or above the action level, monitoring shall be repeated every 6 months. If the exposure is at or above the STEL, monitoring shall be repeated once a year.

Periodic monitoring of the employees may be discontinued if the results from 2 consecutive sampling periods taken at least 7 days apart show that employee exposure is below the AL and the STEL for formaldehyde, below the PEL for Phenol, and below the Ceiling Limit for glutaraldehyde.

Affected employees shall be notified of the monitoring results in writing within 15 days of receiving the results. If the employee exposure is over the PEL, the written notice shall contain a description of the corrective action being taken by the employer to decrease exposure.

Exposure records shall be kept for 30 years. Access to exposure records must be allowed to current and former employees or their designated representatives upon request. These records shall include:

- Date of measurement.
- The operation being monitored.
- Methods of sampling and analysis and evidence of their accuracy and precision
- The number, duration, time, and results of samples taken.
- The types of protective devices worn.
- The names, job classification, and exposure estimates of the employees who exposures are represented by the actual monitoring results.

If no monitoring is required, a record shall be retained of the objective data relied upon to support the determination that no employee is exposed to formaldehyde at or above the action level.

Employees have the right to have the opportunity to observe employee exposure monitoring or to have their designated representative observe the exposure monitoring. If exposure monitoring is occurring in an area requiring protective clothing or equipment, SBCCD shall provide it.

Student Exposure Assessments

Student exposure assessments are currently not conducted by SBCCD. Students are to report to the health center and their instructors if students are experiencing signs or symptoms of formaldehyde, phenol, or glutaraldehyde exposure.

Methods of Reducing Employee/Student Exposure to Formaldehyde & Phenol

Substitution

When possible, substitution of a less hazardous chemical or process will be used to reduce or eliminate formaldehyde, phenol, and/or glutaraldehyde use and exposures.

Engineering Controls

When possible, chemical fume hoods and/or local exhaust ventilation will be used to reduce exposures to formaldehyde, phenol, and glutaraldehyde. Local exhaust is used to capture and exhaust formaldehyde, phenol, and glutaraldehyde vapors, preventing the accumulation of high exposures in a person's breathing zone. General dilution ventilation will also be used, which involves continuous introduction of fresh air into the laboratory/workroom to mix with the contaminated air and lower the breathing zone concentration of formaldehyde, phenol and glutaraldehyde. Effectiveness of general dilution ventilation will depend on the number of air changes per hour and where sources emitting formaldehyde, phenol and glutaraldehyde are located in the area.

Administrative Controls

If engineering controls cannot be implemented, alteration of work practices will be used to reduce exposures to formaldehyde, phenol, and glutaraldehyde. This could include limiting the amount of time employees spend working in high exposure areas, such as by reassigning or rotating personnel among various job duties. Reassignment may continue for up to six (6) months until the employee is determined to be able to return to the original job or to be unable to return to work – whichever comes first.

Personal Protective Equipment (PPE)
Prevent direct contact with the eyes or skin with liquids containing 1% or more of formaldehyde, phenol and/or glutaraldehyde, by the use of protective garments and equipment which are resistant to formaldehyde, phenol, and glutaraldehyde. The type of PPE necessary will vary on the concentration, amount used and the potential for splashing. The Safety & Risk Management Department can provide you with guidance regarding the appropriate PPE for your area.

Hand protection
Butyl or polyethylene gloves are recommended when handling phenol. Butyl gloves are recommended when handling 37% or greater concentrations of formaldehyde. Nitrile gloves (8-mil) may be used solely when handling formaldehyde/formalin solutions. Butyl rubber, neoprene, polyvinyl chloride, or Viton gloves should be used when handling glutaraldehyde.

Eye Protection
Goggles must be worn during formaldehyde, phenol, or glutaraldehyde use when there is potential for splashing/disturbance. Face shields may be used to supplement the protection provided by goggles but must never be used without other eye protection.

Respiratory Protection
If employee exposures are found to exceed the PEL, STEL or C, respirators will be provided until feasible engineering or administrative controls can be implemented and during emergencies.

Respirator use and type will be based on air monitoring results in accordance with SBCCD's Respiratory Protection Plan. Air-purifying respirators that do not contain end-of-service-life indicators shall be replaced at

the end of each work shift. For employees who are unable to wear a negative pressure respirator, SBCCD shall make available a powered air purifying respirator.

For escape, employees shall be provided one of the following options: A self-contained breathing apparatus operated in the demand or pressure-demand mode; or a full facepiece respirator having a chin-style, or a front- or back-mounted industrial-size, canister or cartridge approved for protection against formaldehyde.

If respirator use is necessary, employees must comply with *SBCCD's Respiratory Protection Program.*

Protective Clothing

Protective (impervious) gowns, lab coats, aprons and arm sleeves are provided for use. Closed toe shoes shall be worn at all times in areas where formaldehyde, phenol and/or glutaraldehyde is/are used. Protective clothing will be replaced as necessary. If needed, changing areas shall be provided.

Protective clothing that has become contaminated with formaldehyde shall be cleaned or laundered before its reuse. Only persons trained to recognize the hazards of formaldehyde shall remove contaminated materials. Those who launder the protective clothing will be informed of formaldehyde contamination. Employees will not be permitted to take contaminated clothing home.

If a large quantity spill of formaldehyde, phenol, or glutaraldehyde is encountered in a confined or small enclosed area such as a laboratory or classroom, evacuate the room and follow the procedures as outlined in the District Chemical Hygiene Plan. Contact the SITE SAFETY OFFICER, Chemical Hygiene Officer, Environmental Health and Safety Administrator or District Police (after hours) in these situations.

Hygiene

To prevent the accidental ingestion of formaldehyde, phenol, or glutaraldehyde, eating, drinking and smoking are prohibited in areas where formaldehyde, phenol, or glutaraldehyde are used. In addition, employees/students must wash their hands after formaldehyde, phenol, and/or glutaraldehyde use.

Protective clothing contaminated with formaldehyde, phenol, or glutaraldehyde must be decontaminated prior to reuse and no contaminated clothing may be taken home. Disposable clothing may not be reused.

Containers for contaminated clothing and equipment shall have the following labels and signage:

DANGER: FORMALDEHYDE CONTAMINATED CLOTHING AND EQUIPMENT
AVOID INHALATION AND SKIN CONTACT
OR
DANGER: PHENOL CONTAMINATED CLOTHING AND EQUIPMENT
AVOID INHALATION AND SKIN CONTACT
OR
DANGER: GLUTARALDEHYDE CONTAMINATED CLOTHING AND EQUIPMENT
AVOID INHALATION AND SKIN CONTACT

Emergency Eyewash and Shower

If there is a possibility that employee's/students' skin may be splashed by formaldehyde, phenol, or glutaraldehyde-containing solutions at concentration of 1% or greater, an emergency shower will be provided in the work area. If there is a possibility that employee's/students' eyes may be splashed by formaldehyde, phenol, or glutaraldehyde-containing solutions of 0.1% of greater, a plumbed eyewash station will be provided in the work area. Both emergency

showers and eyewash stations have to be within 10 seconds of unobstructed travel.

Employee/students must be instructed on the proper use of the eyewash and emergency showers. If an employee's/students' eyes or skin are splashed by formaldehyde, phenol, or glutaraldehyde-containing solutions, the employee/student must flush them immediately and continue for 15 minutes. The employee/student should then seek medical attention.

Housekeeping

Preventative maintenance of equipment, including surveys for leaks, shall be undertaken at regular intervals. All leaks shall be repaired promptly. Those repairing leaks shall have suitable protective equipment to complete the job.

Formaldehyde contaminated waste and debris resulting from leaks or spills shall be placed for disposal in sealed containers bearing a label warning of formaldehyde's presence and of the hazards associated with formaldehyde.

Signage and Labeling

Regulated Areas

Areas where the airborne levels of formaldehyde, phenol, or glutaraldehyde are found to exceed the PEL, STE: and/or C will be designated as regulated areas. Access to these areas will be limited to persons trained to recognize the hazards of formaldehyde, phenol, or glutaraldehyde. All entrances and access ways will be posted with signs bearing the following information:

DANGER
Formaldehyde Exposure Area
May cause cancer
Causes, skin, eye, and respiratory irritation
Authorized Personnel Only
OR
DANGER
Phenol Exposure Area
Avoid any contact with skin or eyes
Avoid breathing vapor or aerosol

OR

DANGER
Glutaraldehyde Exposure Area
Causes severe skin burns and eye damage
Harmful if swallowed or if inhaled

Container Labels

The OSHA Hazard Communication Standard (HCS) and Globally Harmonized System of Classification and Labeling of Chemicals (GHS) require that all containers must be labeled with the name of the product and the most significant hazards(s) associated with the contents. Label all mixtures or solutions composed of greater than 0.1% formaldehyde and materials capable of releasing formaldehyde into the air at concentrations reaching or exceeding 0.1 ppm with the

following information:

DANGER

Contains Formaldehyde
Toxic if swallowed/in contact with skin
Fatal if inhaled
Causes severe skin burns and serious eye damage
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause genetic defects and cancer
Flammable liquid and vapor

Label all containers of phenol at concentration of 1% phenol or greater with the following information:

DANGER

Contains Phenol
Harmful if swallowed
Toxic in contact with skin
Fatal if inhaled
May cause allergy or asthma symptoms or breathing difficulties if inhaled
Causes damage to organs

Label all containers of glutaraldehyde at concentration of 25% glutaraldehyde or greater with the following information:

DANGER

Contains Glutaraldehyde
Causes severe skin burns and eye damage
May cause an allergic skin reaction
Harmful if swallowed or if inhaled
May cause allergy or asthma symptoms or breathing difficulties if inhaled

Do not breathe dust/fume/gas/mist/vapors/spray

*CHEMICAL HYGIENE OFFICER will provide these labels upon request.

Standard Operating Procedures

Work with formaldehyde, phenol, or glutaraldehyde requires a written Standard Operating Procedure (SOP) if these chemicals are at or above the threshold quantity established by 29 CFR 1910.119(a)(1)(i) appendix A

If an SOP is determined to be necessary, it shall address the following:

- the hazards of formaldehyde, phenol, and glutaraldehyde;
- what containment devices (i.e., chemical fume hoods, local exhaust ventilation) will be used when working with formaldehyde, phenol, or glutaraldehyde;
- what PPE is required;
- designated storage and use areas;
- how to dispose of waste formaldehyde, phenol, or glutaraldehyde solutions; and
- decontamination and spill clean-up procedures.

The *SBCCD Chemical Hygiene Plan* serves as a general guideline.

Information and Training

Employee and Student Information and Training
Every employee/student working with formaldehyde, phenol, and glutaraldehyde must receive training regarding the hazards using Appendix C or D respectively. Instructors shall provide training to students. The Chemical Hygiene Officer should ensure this information is reviewed with instructors and lab technicians annually and with students at the start of each semester. The training shall cover the following:

- requirements of the Cal-OSHA formaldehyde, phenol, and glutaraldehyde regulations;
- explanation of the formaldehyde, phenol, and glutaraldehyde Safety Data Sheets (SDSs);
- explanation of the *SBCCD Formaldehyde, Phenol, & Glutaraldehyde Program* in its entirety;
- description of the medical surveillance program (applicable to employees);
- description of the health hazards associated with exposure;
- Instructions to report any signs or symptoms that may be attributable to formaldehyde, phenol, or glutaraldehyde exposure;
- description of the operations in the work area where formaldehyde, phenol, or glutaraldehyde is present;
- explanation of the work practices to reduce exposure, including engineering and administrative controls and PPE required; and
- instructions for handling spills and emergency procedures.

This training must be conducted whenever a new hazard is introduced into the work area, when the employee transfers to another job, at the beginning of each semester, and whenever the employee/student demonstrates behavior that indicates a lack of understanding of the basic rules for the safe handling of chemicals. Training must be re-occurring on an annual basis.

The written training materials shall be readily available to all affected employees.

Instructors are responsible for ensuring that students with potential exposure to formaldehyde, phenol, or glutaraldehyde receive the appropriate training before working with it. All training must be documented by the individual presenting using Appendix C, the training session and a copy of the training records will be submitted to the CHEMICAL HYGIENE OFFICER.

Medical Surveillance (Employees Only)

Employees exposed to formaldehyde, phenol, or glutaraldehyde will be provided with the opportunity to receive medical attention under the following circumstances:

- Whenever exposure monitoring indicates exposures above the Action Level, STEL or C;
- Whenever an employee has developed disease signs or symptoms associated with exposure to formaldehyde, phenol, or glutaraldehyde; and/or
- When an employee is involved in a spill, leak or other occurrence resulting in a possible overexposure to formaldehyde, phenol, or glutaraldehyde.

It is the intent of SBCCD to provide a work environment which does not compromise the reproductive health of any employee or student, regardless of gender, or the health of a fetus.

SBCCD employees may obtain free medical consultation or counseling regarding concerns about formaldehyde and/or exposures by contacting the Human Resources Department at 909-388-6950.

If respirator use is necessary, employees/students will consult and comply with the SBVC & CHC consolidated Respiratory Protection Program, which can be accessed at here under SAFETY PROGRAMS.

Formaldehyde

Employees found to have exposures that exceed the action level, or the STEL of formaldehyde will be included in a medical surveillance program. These employees will fill out a medical questionnaire form annually and receive a physical examination if SBCCD's designated medical personnel determine it is necessary based on a review of the employee's responses on the questionnaire. Required medical surveillance should be provided at the time of initial assignment and once a year afterward for as long as the exposure continues. If the physician determined based on the medical questionnaire that medical examination is not necessary, there shall be a two-week evaluation period to observe if the employee(s)' symptoms subside through additional protective measures. If symptoms do not subside after two weeks, the employee will be referred to the physician for medical examination.

Medical examinations shall include a physical examination, laboratory examinations for respirator wearers, any other test deemed necessary by the physician, and counseling of employees having medical conditions that would be directly or indirectly aggravated by exposure to formaldehyde. Medical examination will be able available as soon as possible for those employees who have been exposed to formaldehyde during an emergency. SBCCD will provide the physician the following information:

- A copy of the CalOSHA Formaldehyde Standard 8 CCR 5127 5217 and associated appendices.
- A description of the affected employee's job duties as they relate to the employee's exposure to formaldehyde.
- The representative exposure level for the employee's job assignment.
- Information concerning any personal protective equipment and respiratory protection used or to be used by the employee.
- Information from previous medical examinations of the affected employee within the control of the employer.

- In the event of a non-routine examination because of an emergency, the employer shall provide to the physician as soon as possible a description of how the emergency occurred and the exposure the victim may have received.

Physicians will provide a written opinion including if the employee has any medical conditions (without revealing specific diagnoses) that would put the employee at an increased health risk from formaldehyde, any recommended limitations on the employee's exposure or changes in PPE, and a statement that the employee has been informed by the physician of any medical conditions which would be aggravated by exposure to formaldehyde. A copy of this opinion shall be provided to the employee within 15 days of its receipt.

Employees have a right to get a second medical opinion after each occasion that an initial physician conducts a medical examination.

Medical records shall be kept for the duration of employment plus 30 years. Access to medical records must be allowed to current and former employees or their designated representatives upon request. These medical records shall include at a minimum:

- The name and classification of the employee
- The physician's written opinion.
- A list of any employee health complaints that may be related to exposure to formaldehyde.
- A copy of the medical examination results, including medical disease questionnaires and results of any medical tests required by the standard or mandated by the examining physician.

Phenol and Glutaraldehyde

Medical records shall be kept for the duration of employment plus 30 years. Access to medical records must be allowed to current and former employees or their designated representatives upon request.

Medical Screening

Workers who may be exposed to phenol and/or glutaraldehyde should be monitored in a systematic program of medical surveillance that is intended to prevent occupational injury and disease. To detect and control work-related health effects, medical evaluations should be performed (1) before job placement, (2) periodically during the term of employment, and (3) at the time of job transfer or termination.

Preplacement Medical Evaluation

A preplacement medical evaluation is recommended to assess medical conditions that may be aggravated or may result in increased risk when a worker is exposed to phenol and/or glutaraldehyde at or below the prescribed exposure limit. The health care professional should consider the probable frequency, intensity, and duration of exposure as well as the nature and degree of any applicable medical condition. Before a worker is placed in a job with a potential for exposure to phenol and/or glutaraldehyde, a licensed health care professional should evaluate and document the worker's baseline health status with thorough medical, environmental, and occupational histories, a physical examination, and physiologic and laboratory tests appropriate for the anticipated occupational risks. These should concentrate on the function and integrity of the skin, central nervous system, respiratory system, liver, and kidneys. Medical surveillance for respiratory disease should be conducted using the principles and methods recommended by the American Thoracic Society.

Periodic Medical Evaluations

Occupational health interviews and physical examinations should be performed at regular intervals during the employment period. Evaluations should be conducted every 3 to 5 years or as frequently as recommended by an experienced occupational health physician if hazard is minimal. Current health status should be compared

with the baseline health status of the individual worker or with expected values for a suitable reference population.

Additional examinations may be necessary if a worker develops symptoms attributable to phenol exposure. The interviews, examinations, and medical screening tests should focus on identifying the adverse effects of phenol and/or glutaraldehyde on the skin, central nervous system, respiratory system, liver, or kidneys.

The medical, environmental, and occupational history interviews, the physical examination, and selected physiologic or laboratory tests that were conducted at the time of placement should be repeated at the time of job transfer or termination to determine the worker's medical status at the end of his or her employment. Any changes in the worker's health status should be compared with those expected for a suitable reference population.

Biological Monitoring – Phenol

Biological monitoring involves sampling and analyzing body tissues or fluids to provide an index of exposure to a toxic substance or metabolite. A worker's exposure to phenol can be determined by analyzing a urine sample taken at the end of the shift for total phenol. A 250 mg total phenol per gram creatinine level corresponds to an airborne phenol exposure at the TLV (5 ppm). It should be noted that dermal absorption of phenol may also contribute to the urinary levels found.

Medical Removal

Employees experiencing significant irritation of the eyes, central nervous system, respiratory system, liver, kidneys or skin, respiratory sensitization or dermal sensitization attributed to formaldehyde, phenol, or glutaraldehyde exposure will be seen by SBCCD's designated medical provider. If SBCCD's designated medical provider determines that the symptoms may be the result of a possible overexposure, the Safety & Risk Management Department will have the work area evaluated to determine if the symptoms are the result of an over-exposure. If exposures are at or above the OSHA PEL, STEL, or C, the CHEMICAL HYGIENE OFFICER or designated industrial hygienist will determine which further administration and/or engineering control measures are necessary.

If the employee's symptoms have not subsided within a two-week period and SBCCD's designated medical personnel has determined that the employee was sensitized, restrictions or transfer from the work area may be recommended. A follow-up medical examination shall take place within six months after the employee has been removed to determine if the employee can return to the original job status or if removal is permanent.

Medical removal provisions do not apply in the case of dermal irritation or dermal sensitization when the product suspected of causing the dermal condition contains less than 0.05% formaldehyde.

Spills

Laboratory personnel can clean up the vast majority of chemical spills that occur in the lab. **The individual(s) who caused the spill is (are) responsible for prompt and proper clean-up.** It is the responsibility of the instructor and/or lab technician to have spill control clean-up materials and PPE, which are appropriate for the chemicals being handled, readily available. Instructors are also responsible for ensuring that spills are cleaned up as soon as possible. Notify the CHEMICAL HYGIENE OFFICER, SITE SAFETY OFFICER, EHS Administrator or District Police (after hours) of a spill. Refer to the chemical Safety Data Sheet (SDS) for spill clean-up procedures and proper handling of the chemical.

The types and quantities of hazardous chemical substances used on the SBCCD campuses require preplanning in order for accidental chemical releases to be handled in a safe manner. Additionally, formaldehyde, phenol, and glutaraldehyde contaminated waste and debris from a spill must be disposed of as hazardous waste. Two categories of chemical spills and response procedures are identified for this purpose.

Small Spills

Small spills (<100 milliliters) can be cleaned up with absorbent material. The appropriate PPE, such as safety glasses and chemical-resistant gloves, must be used to prevent skin contact with the formaldehyde, phenol, or glutaraldehyde material. The spill clean-up materials must be double-bagged, tightly closed, labeled and picked up by SBCCD's designated hazardous waste contractor for disposal. If you experience any eye or upper respiratory irritation while cleaning up the spill, stop immediately and call CHEMICAL HYGIENE OFFICER, SITE SAFETY OFFICE, EHS Administrator or District Police (after hours) for assistance.

Large Spills

Employees should not attempt to clean up large quantity (≥100 milliliters) spills of formaldehyde, phenol, or glutaraldehyde, particularly in confined or restricted spaces, unless training has been received, appropriate spill clean-up materials, and PPE are readily available. In the event of a large spill for which you are not properly trained or prepared:

- Do not touch the spilled material; stop the leak if it is possible to do so without risk;
- Evacuate the area;
- Close doors;
- Alert others not to enter the area;
- Remove all sources of heat and ignition;
- Contact the CHEMICAL HYGIENE OFFICER, SITE SAFETY OFFICE, EHS Administrator or District Police (after hours) to coordinate clean-up of the spill. If a spill is larger than 1 liter, the Campus Police must be notified.
- Do not reenter the area until the area has been monitored.
- Read the Standard Operating Procedures for formaldehyde, phenol, or glutaraldehyde in that area.

Disposal

All chemical waste must be disposed of according to *SBCCD's Chemical Hygiene Plan.* Formaldehyde, phenol, or glutaraldehyde containing wastes should be placed in a labeled waste container in a flammable storage cabinet. Call SBCCD's designated hazardous waste contractor for pickup of waste materials and surplus chemicals.

Storage

Ideally, formaldehyde, phenol, and glutaraldehyde should be stored in a cool, dry, well-ventilated cabinet in an unbreakable, chemically resistant secondary container to contain spills. Containers of formaldehyde, phenol, and glutaraldehyde should be protected from physical damage and ignition sources. Phenol should be stored separately from strong oxidizers, acids, and halogens; Formaldehyde should not be stored with inorganic acids, caustics, strong alkalies, isocyanates, anhydrides or oxidizing agents; and glutaraldehyde should be stored away from incompatibles such as oxidizing agents, alkalis. The storage area should exhibit a sign warning of the presence and hazards of formaldehyde, phenol and/or glutaraldehyde. Refer to *SBCCD's Chemical Hygiene Plan*.

Record Keeping

Medical Records

SBCCD shall establish and maintain an accurate record for each employee subject to medical surveillance. This record shall include:

- The name and classification of the employee.
- The physician's written opinion.
- A list of any employee health complaints that may be related to exposure to formaldehyde.
- A copy of the medical examination results, including medical disease questionnaires and results of any medical tests required by the standard or mandated by the examining physician.

Air Monitoring

SBCCD shall establish and maintain an accurate record of all measurements taken to monitor employee exposure to formaldehyde. This record shall include:

- The date of measurement.
- The operation being monitored.
- The methods of sampling and analysis and evidence of their accuracy and precision.
- The number, durations, time, and results of samples taken.
- The types of protective devices worn.
- The names, job classifications, social security numbers, and exposure estimates of the employees whose exposures are represented by the actual monitoring results.

Where it has determined that no monitoring is required, a record shall be maintained of the objective data relied upon to support the determination that no employee is exposed to formaldehyde at or above the action level.

Respirators

SBCCD shall establish and maintain accurate records for employees subject to negative pressure respirator fit testing. This record shall include:

- A copy of the protocol selected for respirator fit testing.
- A copy of the results of any fit testing performed.
- The size and manufacturer of the types of respirators available for selection.
- The date of the most recent fit testing, the name and social security number of each tested employee, and the respirator type and facepiece selected.

Retention and Availability

Records shall be retained for at least the following periods:

- Exposure records and determinations shall be kept for at least 30 years.
- Medical records shall be kept for the duration of employment plus 30 years.
- Respirator fit testing records shall be kept until replaced by a more recent record.

SBCCD shall make employee exposure records, including estimates made from representative monitoring, available upon request for examination and copying to the subject employee, or former employee, and employee representative.

Employee medical records shall be provided upon request for examination and copying, to the subject employee or former employee or to anyone having the specific written consent of the subject employee or former employee.

Program Evaluation

The SBCCD Formaldehyde, Phenol and Glutaraldehyde Program will undergo regular review and necessary revisions periodically, by the Environmental Health and Safety Administrator in collaboration with the Program Administrator.

References

- California Code of Regulations, Title 8, Section 5217 Formaldehyde
- Occupational Health & Safety Administration, 29 CFR, Part 1910, Subpart Z, Standard 1910.1048 Formaldehyde
- Occupational Safety & Health Guideline for Phenol
- Occupational Safety & Health Administration – Best Practices for the Safe Use of Glutaraldehyde in Health Care
- Occupational Safety & Health Administration – Healthcare Wide Hazards – Glutaraldehyde
- Department of Health Services, Hazard Evaluation System, and Information Service – Glutaraldehyde Fact Sheet (dated November 1995)
- List of Highly Hazardous Chemicals 29 CFR 1910.119(a)(1)(i) appendix A

Appendix A: SBVC Site Specific Information

College President	• (909) 384-4477
VP Administrative Services	• (909) 384-8958
Adminstrative Services	• (909) 384-8965
Safety & Risk Management	• (909) 388-6935
Web Links	• **https://sbccd.org/ehs**

Appendix B: CHC Site Specific Information

College President	• (909) 389-3200
VP Administrative Services	• (909) 389-3210
Administrative Services	• (909) 389-3211
Safety & Risk Management	• (909) 388-6935
Web Links	• **https://sbccd.org/ehs**

Appendix C: Student Training Sign in Sheet

Training topic: Formaldehyde / Phenol / Glutaraldehyde Instructor: _____

Department: _____ Location: SBVC / CHC Date: _____

Student Name	Student Signature	Student ID#

Appendix D: Employee Training Sign in Sheet

Training topic: Formaldehyde / Phenol / Glutaraldehyde Presenter: _____

Department: _____ Location: SBVC / CHC Date: _____

Student Name	Student Signature	Student ID#