May 19, 2015

Biology Department
HLS Building
701 South Mount Vernon Avenue
San Bernardino, California 92410

Re: Faculty/Staff SBVC Science Division - Exposure Assessment Interpretation/Medical Surveillance/Action Plan/Employee Rights Summary Letter
Task: Specimen Dissection San Bernardino Valley College
HLS Building
701 South Mount Vernon Avenue
San Bernardino, California 92410

Dear Science Faculty and Staff,

In response to requests for additional information received, SBCCCD has prepared this summary for the compliance air sampling conducted on March 27, 2015. It is important to recognize that industrial hygiene programs are not solely based on a single sampling event and that additional sampling is required to further characterize and validate potential hazards. As such, the District will continue to conduct testing as part of this program.

How was the sampling strategy determined?

- Selecting the contaminants to sample for:
  - Safety Data Sheets (SDSs) were reviewed for the Carolina’s Perfect Solution™ and indicated that the primary constituents were phenol and a proprietary chemical that was later found to be acetone. Further investigation identified the specimens were formalin-fixed before being placed into the Carolina’s Perfect Solution™ preservative so formaldehyde was added to the sampling strategy.

- Selecting the location of samples:
  - Industrial hygiene air monitoring to determine personal exposures is based on the selection of Similar Exposure Groups (SEGs). SEGs are chosen based on the work tasks being performed and the conditions in which the individuals are working. For the dissection process, two (2) SEGs were identified: 1) Instructor; and 2) Student. It is not feasible to sample every individual performing these tasks so representative sampling is adopted. In this case two (2) Instructors and two (2) Students were sampled. Students were used as there was not enough Faculty to sample. Additional area air sampling is also implemented to establish “ambient” concentrations in the room’s and/or adjacent areas where the employees (and Students in this particular case) participating in the exposure assessment will be working during their shift.
  - An additional area air sample was setup in the alcove of HLS-235 where specimens are stored prior to, and following class. This sample was collected to determine “ambient” concentrations of contaminants in the alcove that best represented “typical” conditions during specimen dissection. This sample was not collected to address specimen storage
off-gassing. Chemical and specimen storage off-gassing is being addressed by SBCCD as part of the HLS ventilation assessment.

Selecting the day to sample:
SBCCD wanted to capture the “worst case” scenario with regards to the dissection process. Therefore, the sampling was scheduled for March 27, 2015, when two (2) classes involving cat specimen dissections were scheduled in one lab. Also, a pig dissection was sampled in another lab.

What is a Permissible Exposure Limit?

Permissible Exposure Limits (PEL) are the maximum permitted 8-hour time-weighted average concentrations of an airborne contaminant. The Cal/OSHA Time Weighted Average for formaldehyde is 0.75 parts formaldehyde per million parts of air (0.75 ppm) as an 8-hour TWA. This means an employer shall assure that no employee is exposed to a concentration of airborne formaldehyde in excess of 0.75 ppm expressed as an 8-hour time weighted average. Cal/OSHA also has a Short Term Exposure Limit (STEL), which is a 15-minute time-weighted average exposure that is not to be exceeded at any time during a workday even if the 8-hour time-weighted average is below the PEL. The STEL for formaldehyde is two parts formaldehyde per million parts of air (2 ppm) as a 15 minute STEL. This means an employer shall assure that no employee is exposed to a concentration of airborne formaldehyde in excess of 2 ppm during any 15-minute exposure period. See California Code of Regulations, Title 8, sections 5155, 5217.

What is an Action Level?

The Action Level/Limit is the “trigger” for the need to implement industrial hygiene monitoring and a medical surveillance program. For example, the CAL/OSHA action limit (AL) for formaldehyde is 0.5 ppm.

[Remainder of this page intentionally blank]
What were the personal/area monitoring results?

**Acetone**

<table>
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<th>Citadel/Laboratory Sample ID</th>
<th>Sample Description</th>
<th>Result- Acetone (ppm)</th>
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<tr>
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<td>IH 013/331505820-0005</td>
<td>Room 235 – “Alcove”¹</td>
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<td>IH 016/331505820-0006</td>
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**CAL/OSHA PEL (8-Hour TWA)** 1000

Summary for Acetone: Area and personal sampling results were all reported at levels below the limit of detection (i.e. none detected), and as such were also found to all be below California Occupational Safety and Health Administration (Cal/OSHA) permissible exposure limit (PEL) expressed as an 8-hour time weighted average of 1,000 part per million (ppm).

**Phenol**

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**CAL/OSHA PEL (8-Hour TWA)** 5

Summary for Phenol: Area and personal sampling results were all reported at levels below the limit of detection (i.e. none detected), and as such were also found to all be below Cal/OSHA PEL expressed as an 8-hour time weighted average of 5 ppm.

¹ Note – there were no specimens in the alcove at the time of the sampling
² Note – there were no specimens in the alcove at the time of the sampling
Formaldehyde

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The 8-hour time weighted calculation for personal exposures is based on the following equation:

**Equation 1**

\[
\text{TWA (8-Hour)} = \frac{C_1T_1 + C_2T_2 + \ldots + C_nT_n}{480 \text{ minutes}}
\]

**NOTE:** Equation 1 above, assumes that the average contaminant concentration during any un-sampled portion(s) of the work shift is zero (0) and that the length of the work shift is 8 hours (i.e., 480 minutes).

Summary for Formaldehyde: Personal sampling results for one of the students conducting the specimen dissection in Room HLS 222 (Sample IH-005) were reported at levels above the CAL/OSHA Action Limit (AL) of 0.5 ppm and the Cal/OSHA PEL expressed as an 8-hour time weighted average of 0.75 ppm. Personal sampling results for the other student tested in the same room at the same time were below the Cal/OSHA AL and PEL.

Personal sampling results for the Instructor overseeing the practical examination in Room HLS 235 (Sample IH-017) were reported at levels above the CAL/OSHA Action Limit (AL) of 0.5 ppm.

Area sample results for Rooms HLS 222 and HLS 235 were below the Cal/OSHA AL and PEL.

Faculty and students whose exposure levels were sampled were notified of their exposure limits.

Questions on the results or OSHA definitions?

Contact: SBCCD Environmental Health & Safety at (909) 382-7070

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3 Lab results were calculated to represent an 8-hour time-weighted average (TWA). Results reported below the limit of detection for the method were not included in the calculations.

4 Note – there were no specimens in the alcove at the time of the sampling.
What is a medical surveillance program?

- A program implemented by the employer for all employees exposed to formaldehyde at concentrations at or exceeding the action level or exceeding the STEL.
- Examination by a physician. All medical procedures, including administration of medical disease questionnaires, shall be performed by or under the supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place.
  - Medical questionnaires shall be made available to employees prior to assignment to a job where formaldehyde exposure is at or above the action level or above the STEL, and annually thereafter.
  - Medical examinations shall be given to any employee who the physician feels, based on information in the medical disease questionnaire, may be of increased risk from exposure to formaldehyde and at the time of initial assignment and at least annually thereafter to all employees required to wear a respirator to reduce exposure to formaldehyde.
- The medical surveillance program is available to employees if assigned to a job where formaldehyde exposure is at or above the action level or above the STEL, and annually thereafter.
- The employer shall also make the following medical surveillance available promptly upon determining that an employee is experiencing signs and symptoms indicative of possible overexposure to formaldehyde.
  - Administration of a medical disease questionnaire
  - A determination by the physician based on evaluation of the medical disease questionnaire, of whether a medical examination is necessary for employees not required to wear respirators to reduce exposure to formaldehyde.
  - Medical examinations. Medical examinations shall be given to any employee who the physician feels, based on information in the medical disease questionnaire, may be of increased risk from exposure to formaldehyde at the time of initial assignment and at least annually thereafter to all employees required to wear a respirator.

Questions on the medical surveillance program?

Contact: SBCCD Human Resources at (909) 382-4042

What Happens Next?

Effective Immediately:
- Ceasing all dissection operations utilizing Carolina Perfect Solution™ until mechanisms are put in place to reduce formaldehyde exposure under the Action Limit.
- Posting of formaldehyde signage in impacted dissection locations.
- All impacted personnel are being offered enrollment into the District’s medical surveillance program (see above).

In Progress:
- Ongoing modifications to HLS’s ventilation system to include:
  - Installation of local exhaust ventilation for labs where dissections take place. Specifically, the installation of a snorkel system in the HLS labs, selected by the SBVC, Science Division, estimated to be installed by Fall 2015.
  - Ventilations system modifications to address nuisance odors. Citadel Environmental Services conducted a preliminary assessment of the number of air changes per hour in the Labs before and after filter changes, the HLS-Labs did have the required air changes as required by laboratory standards. Additional assessments are underway to ensure all components are the system are running as designed.
The sampling event on March 27, 2015, was the first of several needed. Additional air monitoring shall be conducted for specific tasks in accordance with the industrial hygiene sampling program that is under development by Citadel for the District.

Citadel will develop a Formaldehyde Exposure Program working with District EH&S, which will include additional details about the medical surveillance program.

District will provide appropriate PPE that is recommended for use when working with formalin products.

Questions on the ventilation system modification?

Contact: SBVC, Maintenance & Operations at (909) 384-8662.

Still have questions?

Information regarding additional employee rights and/or methods for reporting concerns can be found in the Valley College Injury & Illness Prevention Program, which can be found on the internet at:


Respectfully,

Dr. Lisa Norman
Vice Chancellor, Human Resources & Employee Relations

Enclosures: OSHA Formaldehyde Fact Sheet
CDPH Formaldehyde Fact Sheet
LA Testing  
11652 Knott Street, Unit F5, Garden Grove, CA 92841

Order ID: 331505782

Attn: Chris Roberts  
Citadel Environmental Services  
151 Kalmus Drive  
Suite F4  
Costa Mesa, CA 92626  
Fax: 818-679-3297  
Phone: 714-547-4647  
Email:  
Report Date: 04/06/15  
Project: 0069.1064.0

Customer ID: 32CITA50D  
Customer PO: 0069.1064.0  
Date Received: 3/30/15  
LA Testing Order: 331505782

FORMALDEHYDE by NIOSH 2016M, Issue 2, March 2003  
SKC 226-119

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Sample received in acceptable condition unless otherwise noted. This report relates only to the samples reported above. This report may not be reproduced except in full, without written approval by LA Testing. Quality Control Data associated with this sample set is within acceptable limits. The results for this sample set have been blank corrected. Tube front and tube back analyzed separately, tube backs are ND unless otherwise indicated. Note: Samples Labeled is IH-003, IH-006, IH-009, IH-012, IH-015, IH-019 and IH-022.

JD  
Analyst

Michael Chapman, Laboratory Manager

AIHA Accredited - Laboratory ID #101650

Page 1 of 1
Phenol in 226-95 with NIOSH 2546 Modified

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Sample received in acceptable condition unless otherwise noted. This report may not be reproduced except in full, without written approval by LA Testing. Unless otherwise noted, the results in this report have not been blank corrected. Note: Sample labels were IH-002, IH-005, IH-008, IH-011, IH-014, IH-017, IH-021

MNH
Analyst

Michael Chapman, Laboratory Manager
Or other approved signatory

AIHA Accredited - Laboratory ID #101650
Page 1 of 1
Acetone on 226-01 with NIOSH 1300 Modified

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Sample received in acceptable condition unless otherwise noted. This report may not be reproduced except in full, without written approval by LA Testing. Unless otherwise noted, the results in this report have not been blank corrected. Quality Control Data associated with this sample set is within acceptable limits, unless otherwise noted.

Michael Chapman, Laboratory Manager
Or other approved signatory
Formaldehyde

Formaldehyde is a colorless, strong-smelling gas often found in aqueous (water-based) solutions. Commonly used as a preservative in medical laboratories and mortuaries, formaldehyde is also found in many products such as chemicals, particle board, household products, glues, permanent press fabrics, paper product coatings, fiberboard, and plywood. It is also widely used as an industrial fungicide, germicide and disinfectant.

Although the term formaldehyde describes various mixtures of formaldehyde, water, and alcohol, the term “formalin” is used to describe a saturated solution of formaldehyde dissolved in water, typically with another agent, most commonly methanol, added to stabilize the solution. Formalin is typically 37% formaldehyde by weight (40% by volume) and 6-13% methanol by volume in water. The formaldehyde component provides the disinfectant effects of formalin.

What Employers Should Know

The OSHA Formaldehyde standard (29 CFR 1910.1048) and equivalent regulations in states with OSHA-approved state plans protect workers exposed to formaldehyde and apply to all occupational exposures to formaldehyde from formaldehyde gas, its solutions, and materials that release formaldehyde.

- The permissible exposure limit (PEL) for formaldehyde in the workplace is 0.75 parts formaldehyde per million parts of air (0.75 ppm) measured as an 8-hour time-weighted average (TWA).
- The standard includes a second PEL in the form of a short-term exposure limit (STEL) of 2 ppm which is the maximum exposure allowed during a 15-minute period.
- The action level – which is the standard’s trigger for increased industrial hygiene monitoring and initiation of worker medical surveillance – is 0.5 ppm when calculated as an 8-hour TWA.

Harmful Effects on Workers

Formaldehyde is a sensitizing agent that can cause an immune system response upon initial exposure. It is also a cancer hazard. Acute exposure is highly irritating to the eyes, nose, and throat and can make anyone exposed cough and wheeze. Subsequent exposure may cause severe allergic reactions of the skin, eyes and respiratory tract. Ingestion of formaldehyde can be fatal, and long-term exposure to low levels in the air or on the skin can cause asthma-like respiratory problems and skin irritation such as dermatitis and itching. Concentrations of 100 ppm are immediately dangerous to life and health (IDLH).

Note: The National Institute for Occupational Safety and Health (NIOSH) considers 20 ppm of formaldehyde to be IDLH.

Routes of Exposure

Workers can inhale formaldehyde as a gas or vapor or absorb it through the skin as a liquid. They can be exposed during the treatment of textiles and the production of resins. In addition to healthcare professionals and medical lab technicians, groups at potentially high risk include mortuary workers as well as teachers and students who handle biological specimens preserved with formaldehyde or formalin.

How Employers Can Protect Workers

Airborne concentrations of formaldehyde above 0.1 ppm can cause irritation of the respiratory tract. The severity of irritation intensifies as concentrations increase.

Provisions of the OSHA standard require employers to do the following:
- Identify all workers who may be exposed to formaldehyde at or above the action level or STEL through initial monitoring and determine their exposure.
• Reassign workers who suffer significant adverse effects from formaldehyde exposure to jobs with significantly less or no exposure until their condition improves. Reassignment may continue for up to 6 months until the worker is determined to be able to return to the original job or to be unable to return to work – whichever comes first.

• Implement feasible engineering and work practice controls to reduce and maintain worker exposure to formaldehyde at or below the 8-hour TWA and the STEL. If these controls cannot reduce exposure to or below the PELs, employers must provide workers with respirators.

• Label all mixtures or solutions composed of greater than 0.1 percent formaldehyde and materials capable of releasing formaldehyde into the air at concentrations reaching or exceeding 0.1 ppm. For all materials capable of releasing formaldehyde at levels above 0.5 ppm during normal use, the label must contain the words “potential cancer hazard.”

• Train all workers exposed to formaldehyde concentrations of 0.1 ppm or greater at the time of initial job assignment and whenever a new exposure to formaldehyde is introduced into the work area. Repeat training annually.

• Select, provide and maintain appropriate personal protective equipment (PPE). Ensure that workers use PPE such as impervious clothing, gloves, aprons, and chemical splash goggles to prevent skin and eye contact with formaldehyde.

• Provide showers and eyewash stations if splashing is likely.

• Provide medical surveillance for all workers exposed to formaldehyde at concentrations at or above the action level or exceeding the STEL, for those who develop signs and symptoms of overexposure, and for all workers exposed to formaldehyde in emergencies.

**Recordkeeping Requirements**

Employers are required to do the following regarding worker exposure records:

• Retain exposure records for 30 years.

• Retain medical records for 30 years after employment ends.

• Allow access to medical and exposure records to current and former workers or their designated representatives upon request.

**Additional Information**

For more information on this, and other health-related issues affecting workers, visit OSHA’s web site at www.osha.gov.
How to find out if you are working with formaldehyde

Your employer must tell you if you are working with formaldehyde, and must train you to use it safely, under California’s Formaldehyde Standard and the Hazard Communication Standard (see page 8). If you think you may be exposed to formaldehyde on the job, ask to see the Material Safety Data Sheets (MSDSs) for the products you are using. The MSDS must identify formaldehyde in Section 2, by the Chemical Abstract Service (CAS) number 50-00-0.

Formaldehyde is commonly used as formalin, a mixture of 30-50% formaldehyde and 10-20% methyl alcohol in water. Formalin readily gives off irritating vapors with a strong odor.

Some synonyms and trade names of formaldehyde products

- formalin
- methaldehyde
- methanal
- methyl aldehyde
- methylene glycol
- methylene oxide
- oxomethane
- oxymethylene
- paraform
- paraformaldehyde
- BFV
- Fannoform
- Formalith
- Formol
- Fyde
- Ivalon
- Karsan
- Lysoform
- Morbicid

How formaldehyde is used and where it’s found

Formaldehyde is used as a...

- disinfectant and sterilant,*
- fumigant,
- preservative, and in...
- embalming fluid,
- some keratin-based hair smoothing treatments.

* (other aldehydes used include glutaraldehyde and ortho-phthalaldehyde)
It is used in making...
• chemical resins  • wrinkle-proof fabrics
• rubber products  • latex paints  • dyes
• plastics  • paper products, and  • cosmetics.

It is found in...
• insulation materials  • plywood  • particle board
• adhesives  • glues  • paint primers, and
• fingernail products.

Any of these materials may give off formaldehyde vapors.

Formaldehyde is also present in combustion products, such as vehicle exhaust and tobacco smoke.

---

**Some workers who may have substantial exposure to formaldehyde**

chemical and rubber workers
embalmers
laboratory workers
health care workers
clothing and textile workers
furniture or wood product makers
foundry workers
insulation workers

---

**How formaldehyde affects your body**

Formaldehyde can affect you when you breathe its vapors or touch the liquid. Because formaldehyde reacts quickly with body tissues, it mainly affects the place of direct contact, such as the eyes, nose, and skin. The most common effect of overexposure is irritation of the eyes, nose, and throat.

**Eyes, Nose, and Throat.** The eyes, nose, and throat are irritated by formaldehyde vapors at levels as low as about 0.3 part formaldehyde per million parts of air (0.3 part per million, or 0.3 “ppm” — see “Legal Exposure Limits”). This exposure can cause red, teary, burning eyes, sneezing and coughing, and sore throat. Some people have irritant symptoms at these very low exposure levels, while others can tolerate levels as high as a few ppm with little or no reaction.

Liquid formaldehyde solutions contacting the eyes can damage the cornea, possibly causing blindness.

**Lungs.** High levels (5-30 ppm and higher) can severely irritate the lungs, causing chest pain and shortness of breath.

Repeated exposure to formaldehyde can cause allergic asthma. Symptoms of asthma include chest tightness, shortness of breath, wheezing, and coughing. Formaldehyde’s long-term effects on the lungs are not fully understood.

**Skin.** Formaldehyde solutions can destroy your skin’s natural protective oils, causing dryness, flaking, cracking, and dermatitis (skin rash). Skin contact can also cause an allergic reaction (redness, itching, hives, and blisters). As many as one in twenty workers who are regularly exposed to formaldehyde develop an allergic skin reaction.

**Cancer.** Formaldehyde exposure can cause cancer of the nose and sinuses in humans, as well as some types of leukemia and lymphoma. Formaldehyde is regulated as a carcinogen by Cal/OSHA and Cal/EPA.

**Reproductive System.** Formaldehyde’s effect on pregnancy and the reproductive system has been studied in both humans and in laboratory animals. Formaldehyde has been shown to decrease fertility and increase the risk of spontaneous abortion (miscarriage) in humans. In laboratory animals, formaldehyde can harm the developing fetus and damage sperm. In order to avoid risk to pregnancy and the reproductive system, HESIS recommends minimizing workplace exposures to formaldehyde prior to and during pregnancy.
Legal exposure limits

Permissible Exposure Limits. The Occupational Safety and Health Standards Board sets Permissible Exposure Limits (PELs) for the amounts of chemicals in workplace air. PELs are intended to protect the health of most workers who are exposed every day over a working lifetime.

The PEL for formaldehyde is 0.75 part of formaldehyde per million parts of air (0.75 part per million, or 0.75 ppm). Legally, your exposure may be above the PEL at times, but only if it is below the PEL at other times, so that your average exposure for any 8-hour workshift is no more than 0.75 ppm.

The Short-Term Exposure Limit (STEL) for formaldehyde is 2 ppm. Your average exposure during any 15-minute period must not exceed 2 ppm. Exposure at or above the STEL triggers special requirements.

The Action Level for formaldehyde is 0.5 ppm averaged over an 8-hour period. Air monitoring, medical surveillance, and other special requirements are triggered at or above this level.

Cal/OSHA’s formaldehyde standard, California Code of Regulations, Title 8, Section 5217, contains many other specific requirements (see information on page 8).

Monitoring your exposure

To reduce your risk of developing health problems from exposure to formaldehyde, your employer must...

- Identify employees who may be exposed at or above the action level or STEL.
- Test the air to accurately determine how much formaldehyde each identified employee is breathing.
- Test the air periodically if the first tests show that exposures are at or above the action level or STEL.
- Re-test the air for formaldehyde each time there is a change that may result in new or additional exposure.
- Determine exposures promptly, if employees are having formaldehyde-related respiratory or skin symptoms.
- Allow employees or their designated representatives to observe any required exposure monitoring.
- Notify employees in writing within 15 days after receiving the exposure monitoring results.

See the formaldehyde standard (information on page 8) for additional exposure monitoring requirements.

Tests for exposure and medical effects

Blood or urine tests. Formaldehyde does not stay in your body. No medical or laboratory test can accurately measure the amount of formaldehyde to which you have previously been exposed. There is no medical reason to do blood or urine tests for formaldehyde.

Medical Surveillance. If you are exposed to formaldehyde at or above the action level or above the STEL, your employer must have a medical surveillance program to monitor effects on your health.

Your employer also must...

- Provide the medical surveillance program if you develop signs and symptoms of overexposure to formaldehyde, or if you are exposed to formaldehyde during an emergency.
- Provide a medical disease questionnaire before assignment to jobs where exposures are at or above the action level or above the STEL, and promptly when you experience signs and symptoms that indicate overexposure to formaldehyde.
Ensure a medical examination

- if evaluation of the questionnaire indicates that you may be at increased risk for health effects;
- at the time you first start using a respirator (if you are required to wear one) and then once a year;
- as soon as possible if you are exposed to formaldehyde in an emergency.

Provide the medical exam at a reasonable time and place, at no cost to you, and without loss of pay.

Have a licensed physician or someone under the physician’s supervision perform all medical procedures, including administration of the medical disease questionnaire.

Provide specific information about your job, and a copy of the formaldehyde standard and the appendices, to the health care provider.

Provide you with a copy of the physician’s written opinion within 15 days after receiving it.

Medical Removal. If you experience significant irritation of the eyes, throat, or lungs, or asthma-like symptoms such as chest tightness, shortness of breath, coughing, or wheezing, a physician must determine whether you need to be removed from exposure to formaldehyde. A physician must also evaluate skin irritation or skin allergies caused by products that contain at least 0.1% formaldehyde.

See the Cal/OSHA formaldehyde regulation for other specific medical removal requirements including job transfer or job training with retention of current earnings, seniority and other benefits, and provisions for multiple physician review of evaluation results.

Reducing exposure

By law, employers must provide a safe and healthy workplace. Here are some ways employers and workers can work together to reduce exposures to formaldehyde. See the formaldehyde regulation for specific Cal/OSHA requirements (information on page 8).

Use safer substitutes whenever possible

- Hydrogen peroxide-based solutions often can be used as disinfectants.
- Ethyl alcohol, polyethylene glycol, or phenoxyethanol can be used as fixatives or preservatives.

Ventilate the work area

- Install professionally designed ventilation systems to maintain formaldehyde exposures below legal exposure limits.
- Conduct regular maintenance on ventilation systems and ensure that they are functioning properly.
- Do not allow ventilation systems to recirculate formaldehyde vapors.

Use personal protective equipment

- Protective clothing and equipment must be provided at no cost to prevent skin and eye contact with liquids containing 1% or more formaldehyde. Employers must ensure that employees use it.
- Change rooms as specified in Title 8, Section 3367 must be provided for employees who are required to change from work clothes to protective clothing.
- Gloves made of nitrile, neoprene, butyl rubber or polyethylene laminate protect against incidental hand or skin contact with formaldehyde. Gloves made of latex may not provide adequate protection and can cause allergic reactions.
Chemical resistant aprons protect against splashes to the body. Chemical safety goggles protect eyes from splashes. Face shields with chemical safety goggles protect the entire face from splashes. Respirators should be used as specified in the formaldehyde regulation, only if ventilation and other control methods are not effective or feasible. Employers also must comply with the Cal/OSHA Respiratory Protection Standard (Title 8, Section 5144).

Inform and train workers

- Explain and discuss the formaldehyde regulation and MSDSs.
- Educate employees about formaldehyde health hazards and symptoms of overexposure. Emphasize the importance of reporting symptoms early.
- Instruct employees on the use of safe work procedures.
- Demonstrate the proper use and maintenance of fume hoods and other local exhaust ventilation systems.
- Explain the purpose and limitations of personal protective clothing and equipment and demonstrate how to use them properly.
- Instruct employees on how to respond to spills and emergencies, and on safe clean-up procedures.
- Conduct drills on emergency procedures that include each employee’s specific duties.
- Ensure that employees understand the information and training.

Establish and use safe work procedures

- Identify regulated areas where formaldehyde concentrations exceed the PEL or the STEL. Post with signs required by the regulation, and limit access to persons trained on the hazards of formaldehyde.
- Provide eyewash facilities in areas where splashing may occur with solutions that contain 0.1% or more formaldehyde. Provide emergency showers in areas where solutions of 1% or more formaldehyde are used. Where both are required, locate them together within 10 seconds of the splash area (Title 8, Section 5162).
- Use laboratory fume hoods when working with open containers of formaldehyde and specimens preserved in formaldehyde.
- Label all containers as specified in the formaldehyde regulation.
- Cap storage containers immediately when formaldehyde is not in use.
- Do not use formaldehyde on surfaces like carpets that can’t be cleaned easily.

Minimize exposure from spills and contaminated material

- Perform preventive maintenance on equipment and inspect frequently to detect leaks and spills.
- Develop procedures to contain spills, decontaminate work areas, and dispose of waste in work areas where spills may occur.
- Use formaldehyde neutralization pads or sheets where small spills or drips may occur on work surfaces.
- Repair all leaks and clean up spills promptly. Ensure that employees are wearing suitable protective equipment and are trained.
- Use formaldehyde neutralization products that neutralize quickly and don’t generate hazardous by-products.
- Promptly remove contaminated material, such as towels, clothing, and sponges from the work area.
- Ventilate contaminated clothing and equipment in properly labeled and established storage areas. Have only persons trained in formaldehyde hazards remove them.
- Place contaminated waste and debris for disposal in sealed, labeled containers that warn of formaldehyde hazards.
SPECIFIC WAYS TO REDUCE EXPOSURES FOR VARIOUS INDUSTRIES

FUNERAL

➢ Use embalming fluid substitutes that contain ethyl alcohol, polyethylene glycol, or phenoxyethanol. Be aware that embalming creams and drying and hardening powders may also contain formaldehyde.

➢ Use embalming tables with local exhaust ventilation that draws air down at the sides and carries it out of the room through ducts. These systems are sold for existing tables.

➢ Use small quantities for easy and safe handling.

➢ Use personal protective equipment such as gloves, chemical safety goggles, face shields, and aprons.

APPAREL AND TEXTILE

➢ Use low formaldehyde-containing cross-linking agents in textile manufacturing processes, when possible.

➢ Use a roof exhaust fan or other ventilation systems to remove formaldehyde vapors from stored apparel and to provide a continuous supply of fresh air.
MEDICAL AND HEALTH SERVICES

- Use other sterilization methods, such as *low temperature plasma* or *autoclaving*, instead of formaldehyde whenever possible.
- Use non-formaldehyde disinfectants. *Hydrogen peroxide-based solutions* may be suitable.
- Use formaldehyde-free fixatives for histopathological procedures, when possible.
- Use formaldehyde-based fixatives with the lowest concentration of formaldehyde possible.
- Incorporate *automatic dispensing systems* to replace manual formaldehyde handling procedures, such as washing, disinfecting, or dispensing.
- Conduct work with open containers in laboratory fume hoods or using other local exhaust ventilation systems.
- Ensure that *hemodialysis* drain line connections are airtight to prevent formaldehyde vapors from escaping into treatment rooms.
- Spend as little time as possible in areas where *hemodialyzers are reprocessed*.

FOUNDRY AND FURNITURE

- Convert to *low-emitting formaldehyde resins*, when possible.
- Use *formaldehyde-free wood products*.
- Provide a *continuous supply of fresh air* where furniture is stored.

ELECTRONICS

- Consider switching to *formaldehyde-free alternatives* in printed circuit boards. Carbon, graphite, organic-palladium, tin-palladium, sodium hypophosphite electroless copper, and conductive polymer technology are examples.
REGULATIONS THAT HELP TO PROTECT WORKERS

► **Formaldehyde Standard.** This comprehensive standard, California Code of Regulations (CCR), (Title 8, Section 5217) requires employers to take specific actions to protect workers from allergic reactions, irritation, and cancer that can result from exposure to formaldehyde. See www.dir.ca.gov/title8/5217.html.

► **Hazard Communication Standard.** Under this standard (Title 8, Section 5194), your employer must tell you if you are working with any hazardous substances, must train you to use them safely, and must make Material Safety Data Sheets available. See www.dir.ca.gov/title8/5194.html.

► **Injury and Illness Prevention Program.** Every employer must have an effective, written Injury and Illness Prevention Program (IIPP) that identifies a person with the authority and responsibility to run the program (Title 8, Section 3203). The IIPP must include methods for identifying workplace hazards, methods for correcting hazards quickly, health and safety training at specified times, a system for communicating clearly with all employees about health and safety matters (including safe ways for employees to tell the employer about hazards), and recordkeeping to document the steps taken to comply with the IIPP. See www.dir.ca.gov/title8/3203.html.

► **Access to Medical and Exposure Records.** You have the right to see and copy your own medical records, and any records of toxic substance exposure monitoring (Title 8, Section 3204). These records are important in determining whether your health has been affected by your work. Employers who have such records must keep them and make them available to you for at least 30 years after the end of your employment. See www.dir.ca.gov/title8/3204.html.

WHERE TO GET HELP

► **HESIS.** Answers questions about formaldehyde and other workplace hazards for California workers, employers, and health care professionals. Call 1-866-282-5516. HESIS also has many free publications available. To request publications, leave a message at (866) 627-1586, visit our website at www.cdphe.ca.gov/programs/ohb, or write to HESIS at 850 Marina Bay Parkway, Building P, 3rd Floor, Richmond, CA 94804.


► **California Division of Occupational Safety and Health (Cal/OSHA).** Investigates workers’ complaints and answers questions about workplace health and safety regulations. Complainants’ identities are kept confidential. Contact the nearest Cal/OSHA Enforcement District Office. They are listed in the blue government section near the front of the phone book, under “State Government / Industrial Relations /Occupational Safety and Health /Enforcement” or visit their website at www.dir.ca.gov/DOSH.

► **Other resources for employees** may include your supervisor, your union, your company health and safety officer, your doctor, or your company doctor.

► **Cal/OSHA Consultation Service.** Helps employers who want free non-enforcement assistance to improve health and safety conditions. Employers can call 1-800-963-9424.

To obtain a copy of this document in an alternate format, please contact: (510) 620-5757. (CA Relay Service: 800-735-2929 or 711). Please allow at least ten (10) working days to coordinate alternate format services.
MEMO

To: San Bernardino Valley College, Health Sciences Building Personnel

From: San Bernardino Community College District, Human Resources

Subject: Formaldehyde/Phenol/Acetone, Air Monitoring/Exposure Assessment Results

Date: April 16, 2015

On March 27, 2015, the San Bernardino Community College District’s Health and Safety vendor, Citadel Environmental Services, conducted personal and area air sampling in the following rooms: HLS-222 (specimen dissection) and HLS-235 (practical examination utilizing specimens).

The air sampling was performed to provide a preliminary quantitative assessment of your representative exposure to various chemicals identified to be present; specifically phenol and acetone which are the largest components of the Carolina’s Perfect Solution™ (specimen preservative) and (formaldehyde (formalin), a lesser constituent that is used as a fixing agent for the specimens during initial preparation).

The following Cal/OSHA occupational exposure limits represent the level under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working lifetime without adverse health effects:

<table>
<thead>
<tr>
<th>Regulatory Occupational Exposure Limits</th>
<th>Acetone</th>
<th>Phenol</th>
<th>Formaldehyde</th>
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<td>CAL/OSHA Permissible Exposure Limit (8-Hour TWA)</td>
<td>1000 ppm</td>
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<td>CAL/OSHA Action Level (8-Hour TWA)</td>
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The following is a summary of the sampling results for March 27, 2015:

- Area and personal air sampling results conducted for acetone and phenol were all found to be below the occupational exposure limits as stated above.
• Area sampling results (i.e. representative of formaldehyde levels for the ambient air inside the labs) for formaldehyde were also found to be below occupational exposure limits as stated above.

• Individual exposures for the select individuals participating in the personal air sampling averaged for a full 8-hour shift were found to be at 0.545 ppm and 1.421 ppm for two of the individuals. Both of these results are above the action limit and the latter result is also above the personal exposure limit for the day of the sampling. The third individual tested below the limits.

• Laboratory reports for the sampling performed are attached.

• It is important to understand that regulatory occupational exposure limits target workers that are expected to have exposures for 8-hours per day, 40-hours per week for the span of their working career. Specimen dissections for a given class are performed for a duration of 1-2 hours at a time over a period ranging from 2-3 days up to 3 weeks depending on the class.

SBCDD Environmental Health and Safety and Valley College Administrative Services are currently implementing changes to existing engineering controls (e.g. ventilation system) and administrative controls (e.g. standard operating procedures for specimen dissection and additional training) to reduce exposures to as low as feasibly possible. Additional compliance air sampling shall also be performed in conjunction with the ongoing industrial hygiene program review for the HLS Building, regular progress updates shall be provided.

If you have any questions or would like additional information regarding the testing or the corrective action the District is taking, please contact Whitney J. Fields, SBCCD Environmental Health & Safety Administrator at 909.382.4070.
### FORMALDEHYDE by NIOSH 2016M, Issue 2, March 2003  
SKC 226-119

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Sample received in acceptable condition unless otherwise noted. This report relates only to the samples reported above. This report may not be reproduced except in full, without written approval by LA Testing. Quality Control Data associated with this sample set is within acceptable limits. The results for this sample set have been blank corrected. Tube front and tube back analyzed separately, tube backs are ND unless otherwise indicated. Note: Samples Labeled is IH-003, IH-006, IH-009, IH-012, IH-015, IH-019 and IH-022.

**JD**  
Analyst

Michael Chapman, Laboratory Manager

*AIHA Accredited - Laboratory ID #101650*
Acetone on 226-01 with NIOSH 1300 Modified

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Sample received in acceptable condition unless otherwise noted. This report may not be reproduced except in full, without written approval by LA Testing. Unless otherwise noted, the results in this report have not been blank corrected. Quality Control Data associated with this sample set is within acceptable limits, unless otherwise noted.

MNH
Analyst

Michael Chapman, Laboratory Manager
Or other approved signatory
Phenol in 226-95 with NIOSH 2546 Modified

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Sample received in acceptable condition unless otherwise noted. This report may not be reproduced except in full, without written approval by LA Testing. Unless otherwise noted, the results in this report have not been blank corrected. Note: Sample labels were IH-002, IH-005, IH-008, IH-011, IH-014, IH-017, IH-021

MNH
Analyst

Michael Chapman, Laboratory Manager
Or other approved signatory

AIHA Accredited - Laboratory ID #101650
Page 1 of 1