



## DIVISION OF MATHEMATICS, SCIENCE & ENGINEERING

### Methylene Chloride Management Program

September 2013

#### A. PURPOSE

1. The purpose of the Methylene Chloride Management Program is to protect employees from the hazards associated with Methylene Chloride and to maintain Methylene Chloride exposures below the regulatory limits. The Methylene Chloride Management Program complies with Cal/OSHA California Code of Regulations (CCR), Title 8, Section 5202, Methylene Chloride (MC), and Federal OSHA 29 CFR, Section 1910.1052, Methylene Chloride.

#### B. SCOPE

1. This program applies to all Departments within South Orange County Community College District (SOCCCD) that use Methylene Chloride or other Methylene Chloride-containing solutions of greater than 0.1%.

#### C. RESPONSIBILITIES

1. South Orange County Community College District (SOCCCD) Risk Management Department is responsible for:
  - Program development and implementation at Saddleback and Irvine Valley Colleges
  - Monitoring compliance with Cal/OSHA CCR, Title 8, Section 5202, and Fed/OSHA 29 CFR, Section 1910.1052
  - Providing general MC safety training
  - Conducting exposure assessments and evaluating exposure control measures as necessary
  - Providing or coordinating emergency response for chemical spills
  - Investigating accidents
  - Maintaining employee exposure records
2. Deans, Directors, and Department Heads are responsible for:
  - Ensuring departmental compliance with all the procedures outlined in this program
3. Supervisors' responsibilities include:
  - Ensuring compliance with this program in their work area(s)
  - Developing Standard Operating Procedures (SOP) that address the specific safety measures to be implemented when using MC
  - Coordinating the provision of medical examinations, exposure monitoring, and record keeping, as required
  - Ensuring employees with potential exposure to MC receive the appropriate training before working with it
  - Arranging for immediate emergency response, if necessary, for chemical spills, injuries, and overexposures
  - Maintaining an MSDS for the MC products used and all other hazardous chemicals in the work area
  - Notifying the District Risk Management Department when there is a change in equipment, processes, or controls that may result in additional exposure to MC
4. Employees/Student Employees/Students are required to:
  - Know the provisions of the MC Management Program
  - Report accidents, possible overexposures, or unsafe conditions to their supervisor

- Wear Personal Protective Equipment and utilize engineering controls when recommended and provided

#### **D. HAZARD DATA**

1. MC is a central nervous system (CNS) depressant (anesthetic), an irritant, and suspected carcinogen. It may affect the body through accidental ingestion, inhalation, skin contact, and/or eye contact. Your sense of smell becomes less sensitive over time as you adapt to MC odor; therefore, do not rely on MC's warning properties to alert you to the potential for overexposure. Ensure that students are continuously supervised when MC is used in any experiments.
2. Acute Health Effects – Short-Term Overexposure
  - Ingestion (swallowing). Ingesting MC liquid may cause irritation of the gastrointestinal tract and vomiting may occur. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through the gastrointestinal tract may produce symptoms of CNS depression ranging from light-headedness to unconsciousness.
  - Inhalation. The vapors may cause mental confusion, light-headedness, nausea, vomiting, and headache. Continued exposure may cause increased light-headedness, staggering, unconsciousness, and even death. High vapor concentrations may also cause irritation of the eyes and respiratory tract. Exposure to MC may make the symptoms of angina (chest pains) worse.
  - Skin Absorption (dermal contact) and Eye Contact. Contact with MC can cause skin irritation. If liquid MC remains on the skin, it may cause skin burns. Splashes of the liquid into the eyes may cause irritation, inflammation, and temporal eye damage.
3. Chronic Health Effects – Long-Term Overexposure
  - Long-term exposure to MC can cause headaches, mental confusion, depression, liver effects, kidney effects, bronchitis, loss of appetite, nausea, lack of balance, and visual disturbances. Prolonged skin contact can cause dermatitis. Individuals with pre-existing skin disorders, eye problems, impaired liver, kidney, respiratory, or cardiovascular function may be more susceptible to the effects of this substance.
  - There is scientific evidence that MC causes cancer. Laboratory studies in which rats, mice, and hamsters inhaled MC vapors six hours per day, five days per week, for two years, found that prolonged exposure produced lung and liver tumors in mice and mammary tumors in rats. No carcinogenic effects of MC were found in hamsters.
  - Some epidemiological studies show an association between occupational exposure to MC and increases in biliary (bile duct) cancer and a certain type of brain cancer. Other epidemiological studies have not observed a relationship between MC exposure and cancer. Federal OSHA interprets these results as suggestive (but not absolute) evidence that MC is a human carcinogen.
  - Employees must immediately report any adverse signs or symptoms that are suspected to be attributable to MC exposure to their supervisor.
4. Physical Hazards
  - MC may be combustible at high temperatures. Vapors may form a flammable mixture in an atmosphere that contains a high percentage of oxygen.

## E. PERMISSIBLE EXPOSURE LIMITS

1. Cal/OSHA and Fed/OSHA have issued the following guidelines for employee exposures to reduce the potential for adverse health effects:
  - Action Level (AL). The concentration of MC in the air, calculated as an eight-hour, time-weighted average (TWA) that initiates certain required activities such as exposure monitoring and medical surveillance. **The action level for MC is 12.5 parts per million (12.5 ppm).**
  - Permissible Exposure Limit (PEL). The greatest concentration, calculated as an eight-hour, time-weighted average that nearly all workers may be repeatedly exposed during their eight-hour work shift without experiencing adverse health effects. **The PEL for MC is 25 parts per million (25 ppm).**
  - Short Term Exposure Limit (STEL). The greatest concentration that nearly all workers may be exposed during any one 15-minute period without experiencing adverse health effects. **The STEL for MC is 125 parts per million (125 ppm).**

## F. EMPLOYEE EXPOSURE ASSESSMENTS

1. Whenever MC is used in a work area, the District Risk Management or designee will conduct air monitoring to determine employee exposures. Measurements of employee exposures will be representative of a full shift or STEL and will be taken for each job classification in each work area.
2. If employee exposures are found to be at or above the action level, the District Risk Management or designee will repeat air monitoring every six (6) months. (Please see monitoring chart below). Monitoring will continue until exposures can be reduced below these levels by engineering or administrative controls.
3. Air monitoring will be conducted promptly in a work area if employees are experiencing signs or symptoms of MC exposure. Air monitoring will be repeated in an area each time there is a change in equipment, processes, or controls that may result in additional exposure to MC. The District Risk Management must be notified to conduct this monitoring.

### Methylene Chloride Exposure Monitoring Requirements

MC Exposure	Required Monitoring Activity
Below the AL and at or below the STEL	No eight-hour TWA or STEL monitoring required
Below the AL and above the STEL	No eight-hour TWA monitoring required; monitor STEL exposures every three months
At or above the AL, at or below the TWA, and at or below the STEL	Monitor eight-hour TWA exposures every six months and monitor STEL exposures every three months
At or above the AL, at or below the TWA, and above the STEL	Monitor eight-hour TWA exposures every six months and monitor STEL exposures every three months
Above the TWA and at or below the STEL	Monitor eight-hour TWA exposure every three months
Above the TWA and above the STEL	Monitor eight-hour TWA exposures and STEL exposures every three months

## G. REDUCING EMPLOYEE EXPOSURE TO METHYLENE CHLORIDE

### 1. Substitution

- When possible, substitution of a less hazardous chemical or process will be used to reduce or eliminate MC exposures.

### 2. Engineering Controls

- Carcinogens (MC and Formaldehyde) must be used at designated chemical fume hoods and/or designated local exhaust ventilation systems to reduce exposures. Local exhaust is used to capture and exhaust carcinogen vapors, preventing high exposures in the employee's breathing zone.

*Please note that designated laboratory fume hoods where carcinogens are used require an average linear face velocity of 150 feet per minute (fpm) with a minimum of 125 fpm (Refer to CCR T8 Section 5209 (11), Carcinogens).*

### 3. Administrative Controls

- If engineering controls cannot be implemented, alteration of work practices will be used to reduce MC exposures. This could include limiting the amount of time employees spend working in high exposure areas by rotating personnel.

### 4. Personal Protective Equipment (PPE)

- Contact with the eyes or skin with liquids containing 0.1% or more MC will be prevented by the use of protective garments and equipment that are impervious to MC. The type of Personal Protective Equipment necessary will vary depending on the concentration, amount used, and the potential for splashing. It may include goggles, face shields, gloves, gowns, lab coats, aprons, and arm sleeves. Review the MSDS and glove/clothing selection guides for proper protection. The District Risk Management or designee can provide your area with guidance on the appropriate PPE.
- Respirators. If employee exposures are found to exceed the PEL or STEL, respirators will be provided until feasible engineering or administrative controls can be implemented. The District Risk Management or designee will determine respirator use and type based on air monitoring results. If respirator use is necessary, employees must be medically-cleared by the District Risk management or designee to wear a respirator and be fit-tested and trained on the Respiratory Protection Program by the District Risk Management or designee before using a respirator.
- In areas where the MC concentration is unknown, full-body protective clothing and Self-Contained Breathing Apparatus (SCBA) are required. This concentration may be encountered during a large quantity spill of MC. **Currently, no District or College personnel are trained to handle this type of situation.**
- Employees must inspect all Personal Protective Equipment prior to each use. All PPE must be stored in a clean and sanitary manner. Supervisors should inspect respirators each month to ensure they are being used, stored, and cleaned properly.

### 5. Hygiene

- To prevent the accidental ingestion of MC, eating, drinking, smoking, and applying cosmetics are prohibited in areas where hazardous materials, including MC, are used. In addition, employees must wash their hands after using MC.

- If employees are required to change from work clothing into protective clothing, changing rooms will be provided. Employees must not take home any protective clothing contaminated with MC. The college, or a company that is trained to recognize the hazards of MC, must launder reusable protective clothing.
6. Emergency Eyewash Stations and Showers
- If there is a possibility that employees' skin may be splashed by MC-containing solutions, an emergency shower, plumbed eyewash station, or drench hose will be provided in the work area.
  - Employees must be instructed on the proper use of the eyewash stations and emergency showers. If an employee's eyes or skin are splashed by MC-containing solutions, the employee must flush the areas immediately and continue flushing for fifteen minutes. The employee should then seek medical attention.

## H. LABELS AND REGULATED AREAS

### 1. Container Labels

- If a chemical product containing greater than 0.1% MC is transferred into a container other than the original, it must be labeled according to CCR T8 Section 5194, Hazard Communication Program, with the following information:
  - Identity of the hazardous substance
  - Hazard warning statements, including Proposition 65 warnings, if applicable
- MC containing materials shall also list the following possible health hazards:
  - Cancer
  - Cardiac effects (including elevation of carboxyhemoglobin)
  - Central nervous system effects
  - Liver effects
  - Skin and eye irritation
- An example of a label that would satisfy this requirement would be:

**DANGER!**

**Contains Methylene Chloride  
Potential Cancer Hazard**

**May worsen heart disease because MC is converted to carbon monoxide in the body.  
May cause dizziness, headache, irritation of the throat and lungs, loss of consciousness,  
or death at high concentrations in areas such as a poorly ventilated room.  
Avoid skin contact. Contact with liquid causes skin and eye irritation.**

- When labeling containers, use the following hazard ratings: **Health-2, Flammability-0, Reactivity-0;** and **Personal Protective Equipment – this will vary based on the use and must be at least a “B” (safety glasses and gloves) as shown on the Personal Protection Index.** Labels are provided by the District Risk Management. Refer to the *District Risk Management's Hazard Communication Program* for more information.
5. Regulated Areas
- Areas where the airborne levels of MC are found to exceed the PEL or STEL shall be established as regulated areas. Regulated areas will be demarcated (with yellow barrier tape or signs) from the rest of the workplace to alert employees to the boundaries of the area and minimize the number of authorized employees exposed to MC within the regulated area.

Access to these areas will be limited to authorized employees only (persons trained to recognize the hazards of MC). All entrances and access ways will be posted with signs bearing the following information:

**DANGER**  
**Methylene Chloride**  
**Irritant and Potential Cancer Hazard**  
**Authorized Personnel Only**

**I. STANDARD OPERATING PROCEDURES**

1. Work with MC requires a written Standard Operating Procedure (SOP) that addresses the following:
  - The hazards of MC
  - The containment devices (i.e., chemical fume hoods, glove boxes) that will be used when working with MC
  - The Personal Protective Equipment that is required
  - Designated storage and use areas
  - How to dispose of MC solutions waste
  - Decontamination procedures

**J. EMPLOYEE INFORMATION AND TRAINING**

1. Every employee working with MC must receive training of the hazards of MC. A training module will be provided to supervisors with employees working with MC. Supervisors should review this information with employees annually. It will cover the following:
  - Requirements of Cal/OSHA California Code of Regulations (CCR) Title 8, Section 5202, Methylene Chloride (MC)
  - Explanation of the District's MC Management Program
  - Contents of the Material Safety Data Sheet for MC
  - Description of the medical surveillance program
  - Description of the health hazards associated with exposure
  - Signs and symptoms of exposure
  - Instructions to report any signs or symptoms that may be attributable to MC exposure
  - Description of the operations in the work area where MC is present
  - Work practices to reduce exposure, including engineering and administrative controls, and Personal Protective Equipment required
  - Instructions for handling spills and emergency procedures
2. This training must be conducted whenever a new hazard is introduced into the work area, when the employee transfers to another job, and whenever the employee demonstrates behavior that indicates a lack of understanding of the safe handling of chemicals. Supervisors are responsible for ensuring that employees with potential exposure to MC receive the appropriate training before working with it. To ensure that supervisors are knowledgeable of their training responsibilities, the District Risk Management or designee will conduct training courses and provide training modules for all supervisors. The individual presenting the training session must document all training, and a copy of the training records will be submitted to the District Risk Management.

## **K. MEDICAL SURVEILLANCE**

1. Employees found to have exposures that exceed the AL or the STEL will be included in a medical surveillance program. These employees will fill out a medical questionnaire form annually and receive a physical examination, if the District Risk Management or designee determines it is necessary based on the questionnaire.
2. Employees exposed to MC will be provided with the opportunity to receive medical attention under the following circumstances:
  - Whenever an employee has developed signs or symptoms associated with exposure to MC
  - Whenever an employee is involved in a spill, leak, or other occurrence resulting in a possible overexposure to MC
  - Whenever an employee has concerns about MC exposures
3. It is the intent of the District to provide a work environment that does not compromise the reproductive health of any employee or student, regardless of gender, or the health of a fetus. Employees, who are required to wear respirators, as determined by the District Risk Management or designee must be medically cleared by the District.
4. Medical Removal
  - Employees experiencing significant irritation of the eyes, upper airways, or skin, respiratory sensitization or dermal sensitization attributed to MC exposure will be seen by the District Risk Management or designee. If the District Risk Management or designee determines that the symptoms may be the result of a possible overexposure, they will evaluate the work area to determine if further control measures are necessary. If the employee's symptoms have not subsided within a two-week period, and the District Risk Management or designee has determined that the employee was sensitized, restrictions or transfer from the work area may be recommended.

## **L. SPILLS**

1. Small spills (<200 ml of 5% or less MC, <30 ml of greater concentrations) can be cleaned up with absorbent material. The appropriate Personal Protective Equipment, such as safety glasses and MC resistant gloves, must be used to prevent skin contact with the MC. The spill clean-up materials must be double-bagged, tightly closed, labeled, and picked up by the Facilities Department, or their designee, for disposal. If you experience any eye or upper respiratory irritation while cleaning up the spill, stop immediately and call campus police to initiate 911 emergency procedures. Campus Police will contact the District Risk Management to assist you with clean-up.
2. Employees should not attempt to clean up large quantity spills of MC. In the event of a large spill, evacuate the area and call campus police. ***Avoid contacting 911 directly; otherwise emergency fire/hazardous material response team will not know where on campus the spill is located.*** If an area contains large quantities of MC, procedures to be followed in the case of an emergency must be included as part the Standard Operating Procedures for MC in that area. Refer to the District's Chemical Spill Response Program for more information.

## **M. DISPOSAL**

1. All chemical waste must be disposed of according to the District's Hazardous Chemical Waste Program. This document must be referenced before any chemical is disposed of into the trash, sewer, or allowed to evaporate. When in doubt, contact the District Risk Management for clarification.

**N. STORAGE**

1. Ideally, MC should be stored in a well-ventilated cabinet in an unbreakable, chemically-resistant, secondary container to contain spills. The storage area should exhibit a sign warning of the hazard of MC. MC should not be stored with incompatible chemicals. Refer to the District's Chemical Storage Program for more details.

**O. REVIEW AND UPDATE**

1. This Methylene Chloride Management Program will be reviewed and updated annually.