

**OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION
DEPARTMENT OF CONSUMER AND BUSINESS SERVICES**

PROGRAM DIRECTIVE

Program Directive A-221
Issued June 29, 1998
Revised February 7, 2002

SUBJECT: Methylene Chloride.

PURPOSE: This instruction establishes policies and provides clarification to ensure uniform enforcement of the Occupational Exposure to Methylene Chloride Standard, OAR 437-002-1910.1052, and OAR 437-003-1926.1152.

SCOPE: This directive applies OR-OSHA wide.

BACKGROUND: A. The final Occupational Exposure to Methylene Chloride Standards, OAR 437-002-1910.1052 and OAR 437-003-1926.1152 supersede the current regulations for employee exposure to methylene chloride (MC), also known as dichloromethane (DCM), that are contained in the OSHA air contaminant standards OAR 437-002-0382, and OAR 437-003-1000, for general industry and the construction industry, respectively. The final rule establishes permissible exposure limits of 25 ppm (8-hour TWA) and 125 ppm (15-minute STEL). In addition to the PELs, the standard provides for medical removal protection (MRP) benefits for employees and contains provisions typical of those found in OSHA health standards. Depending on exposure conditions at the workplace, these provisions include requirements for:

1. Monitoring the exposures of workers,
2. Establishing regulated areas to reduce the number of workers potentially exposed,
3. Implementing engineering and work practice controls to achieve the necessary reductions in exposure,
4. Providing respiratory protection and protective clothing and equipment where necessary,
5. Making hygiene facilities available where necessary,

6. Making medical surveillance available,
7. Communicating information about methylene chloride to workers and training them in its safe use, and
8. Keeping records related to the standard.

B. The standard was published in the Federal Register on January 10, 1997, and took effect on April 10, 1997. In Oregon, it was adopted and became effective May 2, 1997. Federal OSHA issued two partial administrative stays on start up dates. Published in the Federal Register August 8, 1997 and December 18, 1997. Oregon OSHA adopted both. The standard was amended on September 22, 1998 and adopted by Oregon on March 22, 1999. The September 1998 amendments included periodic monitoring, written medical opinions, start up dates of monitoring, and medical removal monitoring. The following table provides the subsequent final dates for complying with the standard:

**Figure 1
Compliance Dates**

	Employers with fewer than 20 employees	Polyurethane foam manufacturers	Selected applications* with 20-49 employees and foam fabricators with 20-149 employees	Selected applications* with 50 or more employees and foam fabricators with 150 or more employees	All other employers with 20 or more employees
Initial monitoring	Feb. 4, 1998	Dec 21, 1997: 20-99 employees Sept 7, 1997: >99 employees	Sept. 7, 1997	Sept. 7, 1997	Sept. 7, 1997
Engineering controls	April 10, 2000	October 10, 1999: \$20 employees	April 10, 2000	April 10, 1999	April 10, 1998
Respirators to achieve 8-hour TWA PEL	April 10, 1998 (except April 10, 2000 for selected applications*, polyurethane foam mfrs., and foam fabricators)	October 10, 1999: \$20 employees	April 10, 2000	April 10, 1999	December 21, 1997
Respirators to achieve STEL	April 10, 1998	Jan 5, 1998: 20-99 employees Dec 21, 1997: >99 employees	December 21, 1997	December 21, 1997	December 21, 1997
September 22, 1998, modifications to the medical surveillance provisions to incorporate medical removal protection (MRP)	October 22, 1998	October 22, 1998	October 22, 1998	October 22, 1998	October 22, 1998
All other provisions	April 10, 1998	Jan 5, 1998: 20-99 employees Dec 21, 1997: >99 employees	December 21, 1997	December 21, 1997	December 21, 1997

*The selected applications are furniture refinishing; general aviation aircraft stripping; product formulation; use of MC-based adhesives for boat building and repair, recreational vehicle manufacture, van conversion, or upholstery; and use of MC in construction work for restoration and preservation of buildings, painting and paint removal, cabinet making, or floor refinishing and resurfacing.

C. The amendments also:

1. Modify the medical surveillance provisions to incorporate temporary medical removal protection (MRP). The temporary MRP is accorded employees who are removed or transferred to another job because of a medical determination that exposure to methylene chloride may aggravate or contribute to the employee's existing skin, heart, liver, or neurological disease. The compliance date for the new MRP provisions was October 22, 1998 for all employers.
2. Require employers who have been granted a time extension for implementing engineering controls and respiratory protection in order to achieve the 8-hour TWA PEL, and who have done exposure monitoring indicating that the STEL is not exceeded, to nonetheless continue to monitor the STEL exposures at 3-month intervals until they have implemented such engineering controls and/or respiratory protection. The startup date for these employers to resume STEL exposure monitoring was October 22, 1998.

**GENERAL
CONSIDER-
ATIONS:**

The final standards, OAR 437-002-1910.1052 and OAR 437-003-1926.1152, apply to all occupational exposures to methylene chloride in general industry and the construction industry. General industry standard, OAR 437-002-1910.1052, applies to marine terminal and longshoring employment only insofar as affected employees are exposed to hazards that are not addressed by compliance with parts 1917 and 1918, respectively.

OSHA will be finalizing standards for marine terminals and longshoring operations that will set forth the requirements that apply to chemical handling in the cargo handling environment. It does not apply to agriculture. OAR 437-004 includes only the methylene chloride permissible exposure limit.

**INSPECTION
GUIDELINES:**

- A. Collecting Information from the Employer. During the opening conference the compliance officer should collect information that will be of assistance in the conduction of the inspection. The compliance officer should request:
 1. That the employers provide required documents, e.g., medical surveillance records, training records, the respiratory protection program for all affected employees, and material safety data sheets (MSDS) for products containing methylene chloride.

2. That the employers provide a copy of any written program, if available, for improving or instituting engineering and work practice controls for limiting employee exposure to methylene chloride; (**Note:** The standard does not require the employer to develop a written compliance program. however, whenever monitoring results indicate that employee exposure is above the STEL or the 8-hour TWA PEL, then in accordance with OAR437-002-1910.1052(d)(5)(ii), the employer must describe in the written employee notification of the monitoring results the corrective action being taken to reduce employee exposure to or below the STEL or 8-hour TWA PEL and the schedule for completion of this action.)
3. That prior to the walk-around, the employer provides copies of employee exposure monitoring data, objective data, and any other employee exposure assessment data that may be available. These data provide the compliance officer with information necessary to develop a strategy for inspecting the workplace and to determine the level of protection needed to safely conduct the inspection.

B. Inspecting a workplace where the employer has not assessed the methylene chloride exposure.

1. The best approach for conducting the inspection will depend on the circumstances and will have to be determined on a case by case basis. Some possible approaches are as follows:
 - a. Keep close track of methylene chloride exposures, avoid exposures above the PELs, and avoid the use of a respirator to reduce exposure to methylene chloride. In some cases the compliance officers may have to do remote sampling of employee exposures to methylene chloride in order to avoid overexposures.
 - b. Keep close track of methylene chloride exposures and use a self-contained breathing apparatus (SCBA) as required for protection against methylene chloride concentrations above the PELs. The compliance officer must be trained in using and wearing an SCBA.

2. Upon initiation of the inspection, compliance officers will:
 - a. Screen the methylene chloride air concentration levels and track their exposures with an instantaneous direct reading instrument or detector tubes. (Some guidance on selecting a monitoring device is contained in Appendix B.)
 - b. Determine what approach to use that will best protect them from methylene chloride concentrations above the PELs or that will enable them to avoid methylene chloride concentrations above the PELs while conducting the inspection and documenting violations. (Note: The use of air-purifying respirators for protection from methylene chloride concentrations above the PELs is not an option, since the methylene chloride standard only permits this type of respirator for escape. However, compliance officers who will not be overexposed to methylene chloride, may wear an air-purifying respirator as an added precaution if they wish to do so.)
 - c. Consult with the field Manager and obtain their approval of the approach before proceeding further with the inspection.
3. Remote sampling.
 - a. If remote sampling is to be performed the compliance officer will observe the monitoring from a distance such as through a window or by closed circuit television.
 - b. In a case where the compliance officer never sees the employees at work or the work processes, potential problems with remote sampling include:
 - (1) Tampering with the sampling device such as turning the pump off or placing the sampler nearer or farther away from the point that would best indicate an employee's exposure.
 - (2) A pump failure or malfunction could occur without the compliance officer immediately noting the event.

- (3) An employee may not return at the appropriate time for changing the sampling media.
 - (4) Inability of the compliance officer to fully evaluate the work practices and engineering controls for determining whether the employer has instituted all feasible controls.
 - c. If a compliance officer can set the employee up with sampling equipment, and stand far enough away from the process to avoid overexposure, but still close enough to observe the process, remote sampling may not present any significant problems. In such a case the compliance officer would be able to assure the validity of the sample and also observe the work processes for evaluating the work practices and engineering controls. Plus, the compliance officer may be able to occasionally approach the employee for a short period to more closely observe the work process and sampling equipment and still avoid overexposure.
 - 4. The compliance officers will keep a running record of the estimated time spent in various air concentrations of methylene chloride for calculating their daily the compliance officers' exposures.
- C. Additional Inspection Guidance. Appendices A and C contain additional information methylene chloride standard.

**SPECIFIC
PROVISIONS OF OAR**

437-002-1910.1052: Guidelines and clarifications relating to specific provisions of the standard are provided in Appendix A, Questions and Answers and Appendix C, **FACTORS TO CONSIDER IN EVALUATING METHYLENE CHLORIDE CONTROL AND EMPLOYEE EXPOSURE.**

**CLASSIFICATION
AND GROUPING**

OF VIOLATIONS: The procedures in the Field Inspection Reference Manual, Chapter III, paragraphs C.5 should be followed. If deviations appear appropriate, they must be discussed and coordinated with the Field Manager.

**AUTHORIZATION TO
REVIEW LIMITED
MEDICAL**

INFORMATION: Compliance personnel, under the direction of the of the Enforcement Manager, are authorized to review medical records and medical opinions necessary to determine compliance with the methylene chloride standard. This authorization has limitations and procedures set forth in Program Directives A-91, A-131, which must be followed.

**TRAINING FOR
OR-OSHA**

PERSONNEL: Only experienced and trained compliance officers will lead methylene chloride inspections. Compliance officers are expected to know the following:

- A. The potential hazards which may be encountered at the site, including the potential hazards of methylene chloride.
- B. The contents of the methylene chloride standard including the appendices.
- C. The contents of this instruction.
- D. The appropriate protective equipment to be worn. Each compliance officer who uses protective equipment will be trained in the proper care, use, and limitations of the equipment. Use of respiratory protection by compliance officers is covered in Program Directive A-47.
- E. The appropriate emergency procedures.

**PERSONAL
PROTECTIVE
EQUIPMENT**

(PPE): Enforcement Managers must ensure that appropriate PPE is available and used by compliance officers when required.

- A. Air-purifying respirators may be used only where methylene chloride exposure does not exceed the PEL.
- B. For inspections in which the compliance officer could experience skin or eye exposure to liquid methylene chloride, protective clothing and eye protection that is resistant to methylene chloride must be worn.
- C. Inspection of a workplace where the employer has not assessed the methylene chloride exposure.

1. Some employers will neither have established regulated areas nor determined the airborne levels of methylene chloride in their workplaces. In this situation it may be very difficult to recognize by observation whether in a specific area the methylene chloride air concentrations are above or below the relevant PEL's. If this is the case:
 - a. Before the inspection call the OR-OSHA Resource Center Coordinator for historical OSHA methylene chloride sampling data results.
 - b. At the preliminary stage of the inspection, screen the methylene chloride air concentration levels to aid in deciding the approach for proceeding with the inspection.
2. The best approach for conducting an inspection in the face of uncertain methylene chloride exposure hazard will have to be determined on a case by case basis. Some possible approaches are as follows:
 - a. Keep close track of the air concentration levels with a direct reading instrument. Use this information to avoid methylene chloride exposures above the PEL's and the need for respiratory protection during the conduct of your inspection. In some cases it might be a good idea to carry a gas mask with an organic vapor cannister in the event you encounter an emergency escape situation. (**Note:** The use of air-purifying respirators for protection from methylene chloride concentrations above the PELs is not an option, except for gas mask with an organic vapor cartridge in an emergency escape situation.) In some cases you may need to conduct remote sampling of employee exposures to methylene chloride in order to avoid overexposure.
 - b. Keep close track of methylene chloride air concentration levels with a direct reading instrument and don a self-contained breathing apparatus (SCBA) when you need protection against methylene chloride concentrations above the PEL. **WARNING: The use of an SCBA is stringently controlled. Refer to paragraph ix.d.3. in instruction cpl 2-2.54a, respiratory protection program guidelines, for the controls on using an SCBA.**

Appendix A

QUESTIONS AND ANSWERS

Background Information.

- Q. What are the adverse health effects associated with exposure to methylene chloride?
- A. These effects include cancer, effects on the heart and central nervous system, and skin or eye irritation.
- Q. Why does the standard contain a short-term exposure limit (STEL) of 125 ppm, measured over a 15-minute period?
- A. The STEL protects employees from the acute toxicity of methylene chloride, the carcinogenic metabolites of methylene chloride, and complements the protection from methylene chloride's carcinogenic effects provided by compliance with the 8-hour time-weighted average (TWA) exposure limit of 25 ppm.
- Q. How does the STEL protect employees from the carcinogenic metabolites of methylene chloride?
- A. Compliance with the STEL limits metabolism by the most likely carcinogenic pathway and protects the employee from excessive exposure to potentially carcinogenic metabolites of methylene chloride.
- Q. What are the acute toxic effects of methylene chloride?
- A. Acute toxicity of methylene chloride is characterized by central nervous system (CNS) effects, such as decreased alertness and coordination, headaches and dizziness, which may ultimately lead to accidents and further exposure to methylene chloride. Methylene chloride also increases carboxyhemoglobin levels. Carboxyhemoglobin can interfere with the oxygen carrying capacity of blood and is a particular problem for individuals who smoke, those who have limited oxygen carrying capacity, those with silent or symptomatic heart disease, and pregnant women. The eyes and skin are irritated by contact with liquid methylene chloride.
- Q. How does exposure to methylene chloride occur?
- A. Employee exposure can occur through inhalation or through skin absorption.
- Q. What are common uses for methylene chloride?

A. It is frequently used as a process solvent, as a degreasing agent, as a cleaning solvent, as a component of paint strippers, in propellant mixtures in containers for spraying aerosols such as adhesives, and as an auxiliary blowing agent in Polyurethane foam manufacturing.

Q. What types of work operations are sources of overexposure to methylene chloride?

A. Many different kinds of work operations, such as methylene chloride manufacturing, furniture paint stripping, metal cleaning, foam blowing, and pharmaceutical manufacturing may overexpose employees to methylene chloride.

Regulatory Text Information.

A. Scope and Application.

Q. How do you determine which parts of the standard applies to an employer.

A. The extent of coverage depends on the level of employee exposure to methylene chloride. The highest level of coverage occurs when employees are exposed above both the 8-hour time-weighted average permissible exposure limit (PEL) and the short term exposure limit (STEL) and could contact liquid methylene chloride. In that case all the requirements of the standard apply. The lowest level of coverage occurs when employees are exposed below both the action level (AL) and the STEL and are not subject to skin contact with liquid methylene chloride. In that case, employers are only required to document that exposures are this low and to provide employee information and training.

Q. What workplaces are covered by the standard?

A. The standard applies to all workplaces in general industry, construction and shipyards, where methylene chloride is produced, released, stored, handled, used, or transported. It applies to workplaces in the marine terminal and longshoring industries only where the industry-specific standards do not address hazards to which employees are exposed. The standard does not apply to the agriculture industry. The agriculture standard addresses only the permissible exposure limit for methylene chloride.

Exposure Monitoring.

Q. Which employers in the covered industry sectors must make an initial determination of their employees' exposures to methylene chloride?

A. All employers in the covered industry sectors with workplaces where methylene chloride is known to be present must make an initial determination of employee exposure.

- Q. When is exposure monitoring not required in order to make initial determinations of employee exposure to methylene chloride?
- A. Initial exposure monitoring is not required where:
The employer has objective data which demonstrate that employees cannot be exposed at or above the action level or the STEL for methylene chloride.
- The employer has performed exposure monitoring which meets the requirements of this section within the year prior to the effective date of the final rule. The monitoring must have been of workplace conditions that are similar to conditions existing at the time the rule became effective.
- Q. When is it not necessary to monitor employee exposure to methylene chloride with the accuracy specified in the standard?
- A. The accuracy of monitoring requirement does not apply when the workplace or work operation is transient and employees are exposed on fewer than 30 days a year. In this situation, employers are permitted to use direct reading instruments, such as detector tubes, to estimate exposure and determine what protective measures to provide. While these simple measurement tools often do not meet the accuracy requirements that other types of monitoring methods do, they have the advantage of immediate results and no delay in the provision of protection. Since some short-term jobs, for example, construction projects, may not last long enough for analytical results to be returned from conventional monitoring methods, these direct reading instruments provide an effective compromise that will nevertheless ensure protection for employees in these types of operations.
- Q. What conditions must objective data satisfy in order to exempt an employer from the requirement to perform initial monitoring of employee exposure to methylene chloride?
- A. The objective data must establish the highest methylene chloride exposures likely to occur under reasonably foreseeable conditions of processing, use, or handling in the workplace. The employer must document the data and the analysis of the data that leads to the conclusion that employees cannot be exposed at or above the action level or the STEL for methylene chloride.
- Q. What would be an example of when objective data might be used to provide an exemption from the initial employee exposure monitoring requirement?
- A. In a number of products made from, containing or treated with methylene chloride it is likely that an insignificant amount of methylene chloride will be present and there will be minimal exposure to it. Where this is the case, the exemption provides fabricators or users of the products a means to avoid the burdens of compliance with the standard. The determination that airborne concentrations of methylene chloride will not exceed the action level or the STEL need not be based on data generated by the employer but may, for example, be based upon information provided by the manufacturer of the product being used by the employer.

- Q. What are the minimum conditions when a personal breathing zone air sample taken for one employee can be considered representative of another employee's 8-hour time-weighted average (TWA) exposure to methylene chloride?
- A. A personal breathing zone air sample may be considered to be representative of another employee's 8-hour time-weighted average (TWA) exposure when the employer has taken one or more personal breathing zone air samples covering the duration of exposure for at least one employee who is expected to have the highest methylene chloride exposures in the same job classification in the same work area during every work shift. As long as the employees in the same job classification have similar exposures, the employer may use the result from the employee who was selected for exposure sampling to represent the exposure of the group of employees.
- Q. May an employer also use one or more employees to represent the maximum 15-minute exposure to methylene chloride of all of the employees in each job classification in a work area during every work shift?
- A. Yes. If the personal breathing zone air samples taken indicate the highest likely 15-minute exposures that would occur to employees in that job classification during the work shift.
- Q. May an employer use representative monitoring to comply with a requirement to perform initial monitoring of employee exposures to methylene chloride?
- A. Yes, although the best way to characterize employee exposure is to measure each employee's exposure individually.
- Q. OAR 437-002-1910.1052(4)(i), requires the employer to perform exposure monitoring when a change in workplace conditions indicates that employee exposure may have increased. Is this additional monitoring required after every change in production, process, etc.?
- A. Additional monitoring is not required after those changes in production, process, etc., for which the employer has another sound basis for concluding that the changes have not resulted in a significant increase in employee exposures.
- Q. What is a significant increase in employee exposures?
- A. OSHA interprets a significant increase in employee exposures to be:
- An instance where at least one previously unexposed employee is exposed at or above the action level for methylene chloride, an instance where at least one employee's exposure increases from below the action level to at or above the action level,
- An instance where at least one employee's exposure increases from below one or both of the PELs to above one or both of the PELs, or

An instance where an employee exposed at or above the action level or above the STEL incurs a 50 percent or greater increase in exposure.

Q. OAR 437-002-1910.1052(d)(6)(i), requires the employer to provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to methylene chloride conducted in accordance with the standard. May employers choose who will be provided the opportunity to observe the monitoring?

A. No. The affected employees choose who will observe the monitoring.

Regulated Areas.

Q. Must every employee entering the regulated area wear a respirator?

A. Where a reliable estimate of the air concentration of methylene chloride and the time to be spent by the employee in the regulated area shows that there is no potential for overexposure, the employee is not required to wear a respirator while in the regulated area.

Q. Must the regulated area consist of a fixed location or locations within the plant?

A. No, the extent of a regulated area may vary depending on the work activity involved. For example, an area in which employee methylene chloride exposures are not normally over the 8 hour TWA or STEL because the methylene chloride is contained inside sealed equipment may need to be designated a regulated area during the time that maintenance work that requires the equipment to be opened takes place.

Q. Must an employee who is exposed over the 8 hour TWA limit wear a respirator at all times while in the regulated area?

A. Yes. However, as explained in the preceding answer, the extent of the regulated area may vary during the work shift. If an employee's work station is only within a regulated area during a portion of the work shift, the employee must only use a respirator during that period.

Q. If the location or boundaries of the regulated area changes during the work day, how must the regulated area be demarcated?

A. The employer may demarcate the regulated area in any manner that adequately establishes and alerts employees to the boundaries. Movable signs, temporary barriers, or a system of warning lights are among the methods employers could use to demarcate a regulated area that changes in size during the work day.

Q. What factors must employers consider in determining how to demarcate regulated areas?

- A. Employers are to consider such factors as the configuration of the area, whether the regulated area is permanent, the airborne methylene chloride concentration, the number of employees in adjacent areas, and the period of time the area is expected to have exposure levels above either PEL.
- Q. What employee activities are prohibited in regulated areas?
- A. The employer must ensure that within a regulated area employees do not engage in nonwork activities which may increase dermal or oral exposure to methylene chloride. For example, employees are not allowed to do eat, drink, smoke, chew tobacco or gum, or apply cosmetics in a regulated area.
- Q. Does the methylene chloride standard require written compliance plans?
- A. No. In 1991 OSHA proposed a requirement that employers establish and implement a written compliance plan which would describe how employee overexposures to airborne methylene chloride would be reduced or brought below the PELs. However, the Agency removed this provision from the final rule in order to reduce employer paperwork. Regardless of size, employers are not required to produce written compliance plans. NOTE: According to OAR 437-002-1910.1052(d)(5), within 15 working days after an employer receives monitoring results, they must notify the employee in writing of these results, and if the results indicate an overexposure, the employer must describe in the written notification the corrective action being taken to reduce employee exposure to or below the 8-hour TWA PEL or STEL and the schedule for completion of this action.

Respiratory Protection.

- Q. When does the standard require employers to use supplied-air respirators to protect employees overexposed or subject to overexposure to methylene chloride?
- A. The standard requires that for all circumstances except during emergency escape, the employer must use supplied-air respirators to protect employees overexposed or subject to overexposure to methylene chloride.
- Q. Why does the standard require employers to use supplied air respirators?
- A. The standard requires supplied air respirators because methylene chloride breaks through the chemical cartridges and canisters used on air purifying respirators in too short a time for these respirators to provide reliable protection. Moreover, methylene chloride provides inadequate warning of when it breaks through chemical cartridges and canisters because the odor threshold concentration level is higher than the PEL values.
- Q. May employers use the controlled negative pressure (CNP) method or the ambient aerosol method for quantitative fit testing of respirators?

- A. These instruments are permitted for quantitative fit testing. Protocols for their use are contained in Appendix A of the revised respiratory protection standard (OAR 437-002-1910.134).

Medical Surveillance.

- Q. What action must employers take to comply with OAR 437-002-1910.1052(j)(1)(iii), which requires employers to make medical surveillance available to employees who may be exposed to methylene chloride during an emergency?
- A. Employers who have identified operations where a potential for an emergency involving methylene chloride exists must take the necessary action to ensure that, in the event an emergency occurs, facilities will be available and medical assistance will be rendered to exposure victims promptly by physicians or other licensed health care professionals knowledgeable about the toxic effects of methylene chloride.

Hazard Communication.

- Q. Does the methylene chloride standard contain requirements for labeling and for preparing material safety data sheets (MSDS)?
- A. Employers who have already met their longstanding requirements to comply with the Hazard Communication Standard (OAR 437-002-1910.1200) will have no additional duties with regard to labels and MSDS's under the methylene chloride standard. The methylene chloride standard simply indicates what specific hazard information must be provided on labels and material safety data sheets.

Employee Information and Training.

- Q. How does the employer determine when employee information and training must be updated?
- A. The standard does not provide a specific time period for updating the training and information. Instead, it requires that information and training be updated as necessary to ensure that each employee exposed above the action level or the STEL maintains a good understanding of the principles of safe use and handling of methylene chloride in the workplace. Employers can assess whether this understanding is generally present in exposed employees in various ways, such as by observing their actions in the workplace. For example, a pattern of not using appropriate protective equipment or following safe work practices may be an indication that additional information and training is required. This is a performance-oriented requirement that allows each employer to determine how much additional training and information to provide and how often to provide it. The employer must also update the training as necessary whenever there are workplace changes, such as modifications of tasks or procedures or the institution of new tasks or procedures, which increase employee exposure, and where those exposures exceed or can reasonably be expected to exceed the action level.

Recordkeeping.

Q. Does the methylene chloride standard permit electronic retention and transmission of records?

A. Electronic retention and transmission of records is acceptable provided the confidentiality of medical records is retained and there is compliance with all relevant provisions of the standard.

Q. How does the required exposure monitoring record for employers with fewer than 20 employees differ from the required exposure monitoring record for employers with 20 or more employees?

A. Employers with fewer than 20 employees may provide and maintain less information. These employers may exclude the following information from the record:

The operation involving exposure to methylene chloride which is being monitored;

Sampling and analytical methods used and evidence of their accuracy; and

Type of personal protective equipment, such as respiratory protective devices, worn, if any.

In OR-OSHA's view, an employer with fewer than 20 employees is very likely to know intimately the operations of the business, including information about exposure monitoring and the use of personal protective equipment. Therefore, the information can be excluded from the employee's records without compromising employee safety and health.

Q. Are laboratory test results obtained for the purpose of medical surveillance of employees exposed to methylene chloride included in the written medical opinion provided to the employer?

A. The written medical opinion provided the employer **must not** include any laboratory test results.

Q. Must the employer ensure the preservation, retention, and accessibility of laboratory test results obtained for the purpose of medical surveillance of employees exposed to methylene chloride?

A. Yes. The laboratory test results are employee medical records that must be retained, preserved, and made accessible in accordance with OAR 437-002-1910.1020, Access to employee exposure and medical records.

Dates.

Q. Are companies engaged solely in the fabrication of flexible foam products who use adhesives containing methylene chloride and have 20-99 employees considered to be "Polyurethane foam manufacturers" that are eligible for the

extended compliance deadlines for Polyurethane foam manufacturers with 20-99 employees?

- A. No. The extended compliance dates for Polyurethane foam manufacturers with 20-99 employees apply only to those manufacturers who use methylene chloride in blowing the foam. If the only use of methylene chloride is in an adhesive, the extended compliance dates do not apply.

- Q. Is a fabrication operation that uses an adhesive containing methylene chloride and is located within a Polyurethane foam manufacturing facility subject to a different compliance schedule than the foam manufacturing (foam blowing) operation?

- A. No. If a Polyurethane foam manufacturer has 20-99 employees and uses methylene chloride to blow foam, then the compliance schedule for Polyurethane foam manufacturers with 20-99 employees applies for all the operations in the facility involving methylene chloride exposure.

Appendix B

METHYLENE CHLORIDE EXPOSURE TRACKING

- I. Purpose. The information provided in this appendix is intended to aid OR-OSHA compliance officers with determining the method to use to track their methylene chloride exposures during an inspection of a work place.
- II. Methylene Chloride Air Concentration Measurements.
 - A. Methylene chloride air concentrations can be measured with an approved detector tube or with other direct reading instruments. The sensitivity of detector tubes for methylene chloride is limited. At levels at or below 25 ppm methylene chloride and low humidity, preliminary estimates indicate that it will take approximately 12-14 minutes to obtain a visible color change on the detector tube using the maximum number of pump strokes.
 - B. For instantaneous measurement of methylene chloride in air, a photo ionization detector (PID) can be used if it is equipped with a high energy lamp (11.4 eV or higher). Calibration of the PID must be done according to the manufacturer's recommendations using isobutylene as a span gas. Because the photo ionization response is not specific for methylene chloride, other chemicals in the work environment will cause a positive interference, and therefore the ppm readings obtained by this device will overestimate the true exposure to methylene chloride.
 - C. When a PID is used to monitor the methylene chloride air concentration in a work environment, such as furniture stripping, where a multiple of solvent vapors may exist, it is advisable to measure the methylene chloride air concentration with a detector tube for determining the approximate proportion of the PID response that can be attributed to methylene chloride. For example if the PID reading registers 200 ppm in a work area in which a detector tube reads 75 ppm, then the methylene chloride concentration in air can be estimated to be 40% of the PID reading ($75/200 \times 100 \sim 40\%$). Because the response signal for methylene chloride will be affected by changes in the composition of the vapors in the work area, it is advisable to periodically verify the response ratio of the PID detector to the detector tube reading.

Appendix C

EVALUATING THE METHYLENE CHLORIDE HAZARDS AND THE EFFECTIVENESS OF THE PROTECTIVE MEASURES USED

- I. Air Sampling.
 - A. If the air concentrations of methylene chloride measured in the work area with detector tubes or other direct reading instruments are below the 12.5 ppm action level, then professional judgement should be exercised in determining what additional sampling to perform. Because concentrations of methylene chloride in air can vary dramatically, and because direct monitoring and detector tube sensitivities have limited accuracy at low levels, in some cases the compliance officer will find it appropriate to conduct personal sampling of the workers to establish if the action level has been exceeded.
 - B. Two types of sampling tubes are available for personal sampling. For STEL sampling, a Carbosieve S-III synthetic charcoal sampling tube, (OSHA method #80) may be used. For 8-hour TWA sampling, this sample tube must be changed hourly based upon the recommended flow rate of 0.05 L/min, or a two hour sample can be obtained with this sample tube using a 0.025 L/min sampling rate.
 - C. An alternative sampling tube for both STEL and for 8-hour TWA monitoring is the large three-section sample tube containing conventional coconut shell charcoal (OSHA method #59). This sample tube can be used to sample for 3.3 hours at 0.05 L/min, however the sample tube can be used at a lower flow rate (0.025 L/min) to provide a 6.6 hour sampling time. At this reduced sampling rate, a sampling tube can be changed at the lunch break shift, and thus, two sample tubes can be used to monitor each worker over an eight-hour work day.
 - D. Area air sampling may be required to establish whether the boundary of the regulated area complies with OAR 437-002-1910.1052(e). The large OSHA #59 sample tubes calibrated at 0.025 L/min can be used to obtain an area sample in a location suspected of exceeding either the 25 ppm TWA or the 125 ppm STEL. Alternatively, OSHA method #80 tube can be used for sampling an area for STEL monitoring, or for a short term PEL sample. Detector tube or PID direct reading measurements in an area may be useful in determining the location for conducting area monitoring.
 - E. Gas bag samples can also be collected as a means of obtaining air samples. These samples can then be "analyzed" on site using a detector tube or a PID to determine if the air concentration is in excess of the 8-hour TWA PEL or the STEL. This method may be most appropriate in a situation where direct reading PIDs are not available to frequently monitor the methylene chloride concentration in the area over time, and the compliance officer wants to obtain a better picture of the exposure over time than is available from a single detector tube "grab sample" of the air.

II. Evaluation of Airflow.

- A. Smoke tubes can be used to examine the performance of local exhaust ventilation controls by observing the ability of the local exhaust system to capture discharged smoke.
- B. Smoke tubes can be used to determine whether air flows from methylene chloride work areas or regulated areas to nonregulated areas.

III. Evaluation of Spills.

- A. Whereas (f)(3)(ii) requires that incidental spills be promptly cleaned by employees who use the appropriate personal protective equipment and are trained in proper methods of cleanup, caution should be exercised in determining the size of a spill which can be classified as incidental. Methylene chloride is a very volatile solvent and has a high vapor pressure (440 mm Hg at 25 C). Thus a large pool of methylene chloride spilled on the floor in an enclosed room with no ventilation could produce an air concentration in excess of 500,000 ppm. At this extremely high concentration, an oxygen deficient environment would exist, which in addition to producing a narcotic effect, would cause a rapid loss of consciousness and death.
- B. Another useful example to illustrate the potential hazards created by methylene chloride spills could involve a scenario in which a worker spills a quart of methylene chloride in an enclosed room with dimensions of 15' length by 15' width by 10' ceiling. Because methylene chloride evaporates rapidly (70% as fast as ethyl ether), it can be expected that the entire volume will be rapidly dispersed into the air in the room resulting in an air concentration over 5700 ppm, which exceeds the 2,300 ppm IDLH level reported in the NIOSH 1994 pocket guide. (1990 NIOSH Pocket Guides lists IDLH of 5,000 ppm). Under this scenario, the spill would not be classified as an incidental spill under OSHA's interpretation of 1910.120, Hazardous Waste Operations and Emergency Response, and consequently evacuation would be the only appropriate response. Efforts to mitigate the consequences of this spill would require that the employer implement an emergency response as described in 1910.120.
- C. Direct reading PID air monitors can be useful in determining sources of leaks and spills.

- IV. Evaluation of Protective Clothing and Equipment. NIOSH studies indicate that skin absorption can be a significant route of exposure. It appears that dermal exposure to methylene chloride can occur without producing irritation. Color-indicating patches are available from the Oregon OSHA Occupational Health Lab for evaluating the effectiveness of PPE against methylene chloride. Contact the Oregon OSHA Occupational Health Lab for recommendations on how to use these patches.

V. Evaluation of Supplied Air Systems.

- A. The breathing air for supplied air systems must meet the air quality requirements of Grade D or better as specified in CGA specification G-7.1-1997.
- B. Compressed air supplied by oil lubricated compressors must be monitored frequently for carbon monoxide if the compressors are not equipped with continuous carbon monoxide monitors.
- C. Entry of contaminants into the supplied air system must be prevented by locating the compressor air intake in an uncontaminated area or by in-line purification. Proper location will probably be the only practical means of preventing contamination of the breathing air with methylene chloride because of the inability to effectively filter it from air.
- D. Air line couplings must be incompatible with outlets of other gas services.
- E. NIOSH approved respirators must be used. This approval process also applies to the air line hose and the length of hose. See 42 CFR Part 84.
- F. NIOSH approved respirators must only be repaired with approved replacement parts.

INDEX

OAR 437-002-1910.1052
OAR 437-003-1926.1152
airborne
airflow
clothing
compliance dates
construction
controls
employee exposure
equipment
exemption
Field Inspection Reference Manual
liquid
longshoring
medical surveillance
monitoring
MSDS (Material Safety Data Sheet)
occupational exposure
PEL (Permissible Exposure Limit)
records
sample
spill
STEL (Short Term Exposure Limit)
toxic