Title: **Methylene Chloride Exposure Control Plan Policy**	**Policy Category:** **Environmental Health & Safety**
Issuing Authority: **Enterprise Risk Management**	**Responsibility:** **Environmental Health & Safety**
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Policy Statement/Background:

Methylene chloride (CAS # 75-09-2), also known as Dichloromethane, is a volatile solvent used in laboratories, workshops, and facilities that is commonly found as a stock chemical or as a component in degreasing products, paint strippers, metal cleaners and aerosols. Methylene chloride is a colorless liquid with a mild, sweet odor.

Workplace exposure to methylene chloride is regulated for products with concentrations of 0.1% or greater by Occupational Safety and Health Administration's Methylene Chloride Standard (29 CFR 1910.1052) and the Environmental Protection Agency (EPA) ruling for Methylene Chloride under the Toxic Substances Control Act (40 CFR 751 Subpart B). This also includes controlling methylene chloride exposure to a concentration that is below the EPA Existing Chemical Exposure Limit (ECEL) of 2 parts per million (ppm) as an eight-hour time-weighted average (8-hr TWA) and below the EPA Short Term Exposure Limit (EPA STEL) of 16 ppm averaged over 15-minutes.

This Exposure Control Plan (ECP) covers all work areas where methylene chloride is handled, including storage and disposal, and is applicable to all potentially exposed persons (e.g. students, faculty and staff, visitors, contractors etc.) to methylene chloride.

Policy:

A. Responsibilities

1. Principal Investigators/Supervisors/Lab Directors/Facility Managers ("Supervisors")

a) Consider the feasibility of eliminating the use of methylene chloride or substituting methylene chloride with safer alternatives, wherever possible.
b) Ensure that all personnel potentially exposed to methylene chloride have completed ELS 032 – Methylene Chloride Safety course annually and can demonstrate an awareness of the signs and symptoms of exposure.
c) Provide training to personnel on the storage, handling, use and disposal of methylene chloride within the workspace.
d) Require the use of engineering controls and PPE to minimize methylene chloride exposure where appropriate.
e) Develop and implement administrative controls.
f) Obtain a permit to possess and use methylene chloride with EH&S.
g) Identify those who work with methylene chloride and coordinate with Environmental Health and Safety (EH&S) to perform initial monitoring.
h) Coordinate with EH&S to facilitate ongoing exposure monitoring when indicated.
i) Establish Regulated Areas and signage, if required.
j) Report all incidents and accidents to EH&S.
k) Make medical surveillance available for employees, if required.
l) Responsible for the costs associated with continuing use of methylene chloride.
    i. Costs anticipated include, but not limited to, the following:
        1. Initial and periodic monitoring
        2. Medical surveillance, if required
        3. Respiratory protection, if required

2. Staff / Students / Other Employees

a) Complete ELS 032 – Methylene Chloride Safety course.
    i. This training is required prior to first use and annually thereafter.
b) Demonstrate an awareness of the signs and symptoms of methylene chloride exposure.
c) Complete worksite specific training on the storage, handling, and use of methylene chloride.

3. Environmental Health and Safety

a) Implementation of this exposure control plan.
b) Review and update this exposure control plan at least once every 5 years or as needed, whichever comes first.
c) Develop and maintain ELS 032 - Methylene Chloride Safety Training.

d) Provide guidance and support to areas which use, store, and dispose of methylene chloride.
e) Develop and implement methods for monitoring methylene chloride exposure.
f) Coordinate with Supervisors and Department Leadership to review monitoring results and ensure employees are notified within the required timeframe.

B. Methods of Control

1. Elimination and Substitution

a) Workplaces will eliminate or substitute methylene chloride with a safer alternative whenever it is feasible to do so.
   i. Carefully review the available hazard and exposure information on the potential substitutes to avoid substitute chemical that might later be found to present unreasonable risks or be subject to regulation (sometimes referred to as a "regrettable substitution").
b) Most uses of methylene chloride have been prohibited by the EPA's TSCA regulation for methylene chloride.
   i. Consult with EH&S if the use conditions are allowable.
c) Refer to Section C. of this plan: Discontinued Use of Methylene Chloride.

2. Engineering Controls

a) Work areas will use engineering controls such as a chemical fume hood to reduce and maintain employee exposures below the methylene chloride action level.
b) Methylene chloride handling activities within a laboratory must be performed within a functional chemical fume hood. (See EH&S Policy: *Chemical Fume Hood Safety*)
   i. Typical exhaust snorkels do not provide effective capture to control methylene chloride exposures below the ECEL Action Level and the EPA STEL.
      1. Use of laboratory snorkels will require further review by EH&S.
   ii. Bio-safety cabinets, ductless fume hoods or laminar flow hoods are not appropriate for the use of methylene chloride.
c) Any work outside of a functional chemical fume hood will require EH&S review and approval.

3. Administrative Controls

a) Conduct a hazard assessment for methylene chloride use.
b) Develop standard operating procedures to prevent or minimize employee exposure by establishing safe work practices.
c) Any dispensing and/or decanting of methylene chloride must be inside of a chemical fume hood.
d) Ensure Safety Data Sheets are readily accessible.
e) Exposure monitoring, initial and periodic, to determine exposure

of methylene chloride.

f) Training
   i. ELS 032 Methylene Chloride Safety Training will be provided prior to first use, and annually thereafter, to employees potentially exposed to methylene chloride.
      1. Methylene Chloride Safety Training is available through the Safety Management System.
   ii. Those requiring respiratory protection will require additional respiratory protection training provided by EH&S.
g) Housekeeping and proper chemical storage
   i. Keep containers closed, except when in use.
   ii. Store in chemically compatible containers which are labeled with the chemical name (no abbreviations) and appropriate hazard warnings.
   iii. Store away from heat sources.
h) **Personnel rotation is not a permissible practice for maintaining exposures below the ECEL and EPA STEL. This practice is prohibited by regulation.**

4. Personal Protective Equipment (PPE)

The following PPE is required when handling methylene chloride to provide protection from dermal contact:

a) Proper selection of gloves specific to methylene chloride:
   i. Use Polyvinyl alcohol (PVA), Silver Shield, Laminate, or Viton gloves.
      1. Nitrile may be used as a second layer to provide protection to the inner glove.
      2. Consider all other chemicals used with methylene chloride when selecting gloves.
   ii. If nitrile gloves are necessary for dexterity and splashing is unlikely, wear two layers (double glove) with heavier weight (8 mil). In the event of a splash or a spill on nitrile gloves, stop work immediately and remove both layers of gloves.
   iii. Gloves not permitted include standard nitrile, latex, neoprene, or polyethylene gloves.
b) Lab coats for laboratory personnel or work uniforms for non-laboratory personnel and closed toe shoes shall be worn when handling methylene chloride; a rubber apron may be required, depending on the nature of the work.
c) Chemical splash resistant goggles shall be used as eye protection.
d) Supplied air respiratory protection will be used in regulated areas where individuals may be exposed to methylene chloride that exceeds the ECEL and EPA STEL.
   i. **Negative air respiratory protection (e.g. half face, full face, or PAPR) is not permitted by regulation.**

e) Supplied air respiratory protection will be used in accordance with the University's Respiratory Protection Plan.

C. Discontinued Use of Methylene Chloride

1. Users of methylene chloride who plan to eliminate or substitute methylene chloride with a safer alternative shall complete the *Methylene Chloride Discontinuation Form (Appendix A)* and email the completed form to ehsafety@stonybrook.edu. Completed forms shall be kept by the sending department and Environmental Health and Safety.
2. If methylene chloride use is continued at a later date, Environmental Health and Safety shall be contacted to coordinate initial monitoring within **30** days of reintroduction of use.

D. Measures to Ensure Effectiveness of Controls

To ensure that engineering controls and workplace practices adequately control methylene chloride exposure, the following will occur:

1. **Installation**
   a) Consult with Campus Planning, Design, and Construction (CPDC) for chemical fume hood selection and installation.
2. **Regular Fume Hood Inspections**
   a) Verify the date on the inspection sticker on the chemical fume hood. Ensure chemical fume hoods are inspected annually.
      i. Contact EH&S for an inspection.
   b) The chemical fume hood average face velocity is between 80 to 150 feet per minute.
3. **Operation**
   a) Personnel will be trained to properly utilize laboratory fume hoods and/or local exhaust ventilation at the time they are assigned to use this equipment.
4. **Maintenance**
   a) Contact Campus Operations and Maintenance (COM) for fume hood repairs or to address operation issues.
   b) Contact Environmental Health and Safety to verify proper operation of the laboratory fume hood.
5. **Proper Use of Laboratory Fume Hoods**
   a) Maintaining the fume hood sash below the indicated height of operation and as low as practical.
   b) Working at least 6 inches from the front of the hood.
   c) Positioning equipment within the hood in a manner that will not prevent the hood from adequately capturing contaminants.
   d) Upon hearing a fume hood alarm, immediately secure materials. Close and stop working within the hood until the issue has been corrected.
   e) Refer to EH&S Policy: Chemical Fume Hood Safety for more information.

E. Hygiene Facilities

1. Areas where methylene chloride is handled will be equipped with washing facilities.
2. Eyewash facilities must be made available within the immediate work area for emergency use.

F. Monitoring

Monitoring will be coordinated between the Supervisor and Environmental Health and Safety where indicated.

1. Initial Monitoring

a) Shall be conducted for those who work with methylene chloride, including storage, handling and disposal.
b) Shall be conducted for new uses of methylene chloride within **30** days of introduction of use.
c) Shall be repeated each time there is a change in production, equipment, process, personnel or control measures which may result in new or additional exposure to methylene chloride.

2. Periodic Monitoring

a) Periodic monitoring will be determined by Environmental Health and Safety and must be repeated based on the following initial monitoring results outlined in Table 1.

Table 1 - Monitoring Requirements

Exposure Scenario	**Required Monitoring Activity**
Less than the ECEL Action Level and EPA STEL	Repeated monitoring must occur at least: Once every five years
Less than the ECEL Action Level; and Greater than the EPA STEL	Repeated monitoring must occur at least: Once every five years for the ECEL Action Level; and Once every 3 months for the EPA STEL
At or above the ECEL Action Level; and At or below the ECEL and EPA STEL	Repeated monitoring must occur at least: Once every 6 months

At or above the ECEL Action Level; At or below the ECEL; and Above the EPA STEL	Repeated monitoring must occur at least: Once every 6 months for the ECEL; and Once every 3 months for the EPA STEL
Above the ECEL and EPA STEL	Repeated monitoring must occur at least: Once every 3 months for both ECEL and EPA STEL

G. Notification of Monitoring Results

1. Within 15 working days of receipt of monitoring results, users will be notified of the results in writing either individually or by posting results in an appropriate location, such as public or common spaces outside of the regulated area (e.g. laboratory), that is accessible to all potentially exposed persons.
2. Monitoring results must include the following elements:
    a) Exposure monitoring laboratory results
    b) Identification and explanation of the ECEL Action Level, ECEL, and EPA STEL
    c) Where limits are exceeded
    d) Actions taken to reduce exposure, if necessary
    e) Respiratory protection explanation, if necessary
    f) Quantity in use during monitoring
    g) Location of methylene chloride use at the time of monitoring
    h) Manner of use, including specific operations
    i) Identified releases of methylene chloride
    j) Storage of methylene chloride

H. Regulated Areas

1. Regulated areas will be established where exposure to airborne concentration of methylene chloride exceeds or can reasonably be expected to exceed the EPA ECEL or EPA STEL.
2. Regulated areas will be demarcated with signage that states, "Danger: Regulated Area. Methylene chloride, authorized personnel only. Respiratory protection and protective clothing required." (Appendix B)
3. Eating, drinking, and the application of cosmetics is prohibited in regulated areas.
4. Access to regulated areas will be restricted only to individuals that have been trained and authorized to enter.
    a) Regulated areas will be limited to only those who have taken ELS 032 - Methylene Chloride Safety Training.
    b) Visitors, such as contractors, must apply for a permit prior to handling methylene chloride.

i. Contact EH&S to submit a permit for methylene chloride use.

5. Individuals entering regulated areas will participate in a medical surveillance program by completing the methylene chloride medical surveillance questionnaire at least annually and submitting it for review to the health care provider identified by the institution.

I. Disposal

1. Methylene chloride containing solutions must be disposed of as hazardous waste in compliance with the Hazardous Waste Management Policy.
2. Contact Hazwaste@stonybrook.edu for disposal instructions.

J. Medical Surveillance

1. The employer (PI/Department) must make medical surveillance available for employees:
    a) Exposed to methylene chloride at or above the Action Level or exceeding the STEL;
    b) Who develops signs and symptoms of overexposure;
    c) Exposed in emergencies.
2. Employees in the medical surveillance program to the health care provider identified by the institution.
3. If an employee requires medical surveillance, they must complete the methylene chloride questionnaire (Appendix C) at least annually and submit for review to the Center for Occupational and Environmental Medicine, 181 N.Belle Mead Rd, Suite 2, Telephone: (631) 444-6250.
4. If the employee has developed signs and symptoms related to methylene chloride exposure in emergencies, then they should go to the SBU Hospital – Emergency Department.

K. Accident Reporting

1. Individuals exposed to methylene chloride and are experiencing health symptoms must call University Police at 333 (work phone) or 632-3333 (cell) and complete an Injury Illness Form.
    a) **Short-term/Acute exposure**
        i. Liquid methylene chloride may cause irritation to the eyes.
        ii. Skin exposure may cause irritation or skin burns. Methylene chloride is also absorbed through the skin and may contribute to the exposure by inhalation.
        iii. At high concentrations in air, methylene chloride vapors may cause nausea, vomiting, light-headedness, numbness of the extremities, changes in blood enzyme levels, and breathing problems, leading to bronchitis and pulmonary edema, unconsciousness and even death.
        iv. At lower concentrations in air, methylene chloride vapors may cause irritation to the skin, eyes, and respiratory tract

and occasionally headache and nausea.

v. Exposure at low concentrations may also have central nervous system effects on coordination and alertness that may cause unsafe operations of machinery and equipment.

b) **Long-term/Chronic exposure**

i. Low levels and short duration exposures do not seem to produce permanent disability, but chronic exposures to MC have been demonstrated to produce liver toxicity in animals, and therefore, the evidence is suggestive for liver toxicity in humans after chronic exposure.

ii. Chronic exposure to methylene chloride may also cause cancer.

L. Emergencies

1. For **all** methylene chloride spills or leaks, individuals shall secure work materials, evacuate the room, and close the door to prevent the spread of vapors. Contact University Police at 911 from a campus phone or 631-632-3333 and report the incident to their supervisor.
2. Individuals able to detect the odor of methylene chloride may be exposed above the ECEL or EPA STEL as the odor detection level exceeds the EPA ECEL.
3. Individuals exposed to methylene chloride through dermal contact shall remove the source of the exposure (e.g. lab coat, work uniform) and flush exposed skin with water for 3 to 5 minutes (preferably under a shower), then wash with a mild soap.
4. Individuals exposed to methylene chloride through a splash to the eyes shall use an emergency eyewash station and flush their eyes for 15 minutes.
5. In the event of ingestion, do not induce vomiting. For both incidental ingestion and injection, immediately contact University Police.

M. Recordkeeping

1. Records related to this policy will be made available upon request to potentially exposed persons or regulatory authorities. These records include, but are not limited to:
    a) Exposure assessments
    b) Exposure monitoring results and reporting
    c) Training documentation
    d) Respiratory protection program records (medical approval, fit testing, etc.)
    e) Engineering control evaluation (fume hood certification, manufacturer information, etc.)
    f) Discontinued use of methylene chloride forms

Definitions:

Administrative Controls: Changes in work procedures such as written safety policies, rules, supervision, schedules, and training with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations.

Engineering Controls: A physical modification to a process, or process equipment, or the installation of further equipment with the goal of preventing the release of contaminants into the workplace.

EPA Existing Chemical Exposure Limit - Action Level (ECEL Action Level): Concentration of airborne methylene chloride of 1 part per million (1 ppm) calculated as an 8-hour time-weighted average.

EPA Existing Chemical Exposure Limit (ECEL): Concentration of airborne methylene chloride of 2 parts per million (2 ppm) calculated as an 8-hour time-weighted average.

EPA Short Term Exposure Limit (EPA STEL): Concentration of airborne methylene chloride of 15 parts per million (15 ppm) for a 15-minute duration.

Methylene Chloride: Organic compound with chemical formula CH2Cl2, Chemical Abstracts Service (CAS) Registry Number 75-09-2.

Synonyms include: Dichloromethane, DCM, MeCl, MeCl2, Methane dichloride, Methylene bichloride, Methylene dichloride, MC

OSHA Action Level (AL): Concentration of airborne methylene chloride of 12.5 parts per million (12.5 ppm) as an 8-hour time-weighted average (TWA).

OSHA Permissible Exposure Limit (PEL): Concentration of airborne methylene chloride of 25 parts per million (25 ppm) as an 8-hour time-weighted average (TWA).

OSHA Short Term Exposure Limit (STEL): Concentration of airborne methylene chloride of 125 parts per million (125 ppm) for a 15-minute duration.

Personal Protective Equipment (PPE): Articles of protective equipment worn to minimize exposure to a variety of hazards. PPE reduces employee exposure when engineering and administrative controls are not feasible or effective for reducing employee exposure.

Contact:

Additional information about this policy is available here:

Environmental Health and Safety
110 Suffolk Hall
Stony Brook, NY 11794-6200
(631) 632-6410
ehsafety@stonybrook.edu
http://www.ehs.stonybrook.edu

Relevant Standards, Codes, Rules, Regulations, Statutes and Policies:

- EPA Toxic Substances Control Act - Methylene Chloride (40 CFR Part 751 Subpart B)
- OSHA Hazard Communication Standard (HAZCOM) (29 CFR 1910.1200)
- OSHA Methylene Chloride Standard (29 CFR 1910.1052)
- OSHA Hand Protection (29 CFR 1910.138)
- OSHA Respiratory Protection (29 CFR 1910.134)

Forms:

- **Appendix A** – Methylene Chloride Discontinuation Form
- **Appendix B** – Methylene Chloride – Regulated Area Signage
- **Appendix C** – Questionnaire for Methylene Chloride