Methylene Chloride
Workplace Chemical Protection Program

The WCPP is a program to protect potentially exposed persons in the workplace who are engaged in using methylene chloride. All researchers unable to eliminate methylene chloride from their processes must develop and implement a WCPP to limit employee exposure. EHS will assist in WCPP implementation and provide resources where possible.

Submission Date:			
Department:			
Location:			
Principal Investigator (PI):			
PI Office Phone:		PI Cell Phone:	
Alternate Lab Contact Name:		Alternate Lab Contact Phone:	
Alternate Lab Contact Name:		Alternate Lab Contact Phone:	

WCPP OVERVIEW

- **Initial monitoring** - (PART 1)
- **Periodic Monitoring** - (PART 1)
- **Recordkeeping and Notification** – (PART 1)
- **Hazards Identification** – (PART 2)
- **Exposure Control Plan** - (PART 3 – 10)
- **Establishment of a regulated area** - (PART 3)
- **Training** - (PART 6)
- **Respiratory Protection and Personal Protective Equipment (PPE)** - (PART 7)
- **Emergency Response** – (PART 8)
- **Waste Disposa**l – (PART 9)
- **Lab Specific Procedures** – (PART 10)
- **Documentation and Approval** – (PART 11)

1. EXPOSURE CONTROL, RECORD KEEPING, AND NOTIFICATION

   a. **Initial Monitoring:**
      i. The EHS will monitor all employees or individuals in an area representing the worst-case scenario for methylene chloride exposure.
      ii. PIs or lab supervisors must inform the EHS of methylene chloride use in their labs or work areas by completing the Methylene Chloride Use Survey online.
      iii. Lab supervisors or PIs must report any changes to existing protocols or new uses of methylene chloride to ensure proper exposure monitoring is conducted.
   b. **Periodic Monitoring:**
      i. Restricted areas will be monitored periodically by EHS staff for inhalation exposure depending on risk or if there are procedural changes.
      ii. Exposure levels below the action limit (1 ppm) for the 8-hour TWA and at or below the STEL (16 ppm) will be monitored every 5 years.
      iii. Exposures above these limits will require monitoring every 3 or 6 months, depending on severity.
   c. **Recordkeeping and Notification:**
      i. EHS will maintain exposure monitoring records for methylene chloride storage and use areas.
      ii. EHS will notify potentially exposed persons of the results of workplace exposure monitoring activities, workplace exposure incidents, and steps taken to protect workers from exposure to methylene chloride.
      iii. steps taken to protect workers from exposure to methylene chloride.

2. HAZARD IDENTIFICATION

Chemical Name	**Chemical Name**	**Quantity Stored** [ENTER QUANTITY AND UNITS]
Methylene Chloride, (MC) Dichloromethane (DCM)	75-09-2	

Signal Word: Danger

GHS Hazard Statements:

- Causes skin irritation
- Causes serious eye irritation
- May cause drowsiness or dizziness
- Suspected of causing cancer
- May cause damage to organs through prolonged or repeated exposure

Exposure Limits	
8-Hour Time Weighted Average (TWA) (EPA ECEL)	2 ppm
15-Min Short-Term Exposure Limit (STEL) (EPA)	16 ppm
Action Level (EPA)	1 ppm
Chemical and Physical Properties	
Molecular Formula	CH2Cl2
Hazard Class	Carcinogen, Acute Toxicity
Form/Physical State	Liquid
Boiling Point	39.6C
pH	NA
Odor	Sweet, Chloroform-like, 25-320 ppm - variable
Flash Point	Non-flammable
Vapor Pressure	47.33 kPa at 25 °C

Note: MC is heavier than air, so vapors move to lower unventilated areas.

3. EXPOSURE CONTROL PLAN - The exposure control plan must describe efforts that will be taken to protect potentially exposed persons through the use of the hierarchy of controls. The hierarchy of controls specifies that labs should first attempt to use elimination and substitution, then engineering controls, administrative controls, and work practices to manage methylene chloride exposure to the extent feasible before requiring PPE to control inhalation exposures. The lab must ensure engineering and administrative controls to reduce exposure below the ECEL and EPA STEL.

    a. **REGULATED STORAGE AND USE LOCATIONS**

Regulated Work and Storage Locations	[ENTER BUILDING, ROOM # AND SPECIFIC AREA]
Storage conditions	Store in a cool, well-ventilated area, in tightly sealed containers, away from direct sunlight, acids, and bases. Storage areas should clearly be indicated with methylene chloride signage. Methylene chloride should not be stored in open containers or squirt bottles.

Areas where methylene chloride is used will be marked as designated areas with restricted access. All storage areas will be marked with the Methylene Chloride label. [Provide a description of regulated areas, how they are marked, and persons authorized to enter the regulated areas, attach additional pages as needed]

4. LIMINATION/SUBSTITUTION

    a. Use a safer alternative to methylene chloride. When considering a substitute, compare the potential risks of the substitute to those of methylene chloride. This review should consider how the substitute will combine with other agents in the workplace. Effective substitutes reduce potential harmful effects and do not create new risks. The EPA recommends carefully reviewing the available information on potential substitutes to avoid a substitute chemical that might later be found to present unreasonable risks or be subject to regulation. **[Laboratories must make efforts to eliminate or substitute methylene chloride in their lab processes. If your lab cannot dispose or discontinue use of methylene chloride, describe why these control measures were not feasible, ineffective, or otherwise not implemented.]**

5. ENGINEERING CONTROLS

    a. Use fume hoods or glove boxes **at all times** when working with methylene chloride to ensure proper ventilation.
    b. Closed Systems: Use closed systems (e.g., sealed reaction vessels or containers) to handle methylene chloride whenever feasible to reduce vapor release.
    c. Ensure that local exhaust is active when using the chemical in open systems or non-enclosed equipment.
    d. Laboratory fume hoods must be operational and tested annually by the CWRU Safety Office. Contact EHS for additional testing (216-368-6077).
    e. Emergency overrides and interlocks must be accessible to shut down processes if there is a risk of overexposure.

6. WORK PRACTICE CONTROLS AND TRAINING

a. Work Practice Controls

i. Ensure all personnel are familiar with the specific handling of methylene chloride and disposal of methylene chloride waste.
ii. Ensure all regulated storage and use locations are clearly identified using signage.
iii. Restrict the use of methylene chloride to specific, clearly marked areas (e.g., within fume hoods or specially regulated lab areas).
iv. Restrict access to regulated areas by anyone who lacks training in PPE or is unauthorized to enter for any reason.
v. Avoid inhalation of vapors and prevent contact with skin and eyes.
vi. Use the minimum amount of methylene chloride necessary for the task at hand.
vii. Minimize open container time: keep methylene chloride containers closed when not in use. Open containers only as long as needed to prevent vapor release.
viii. Routine Inspection and Maintenance: Regularly inspect ventilation systems, fume hoods, and PPE to verify they work effectively. Any equipment malfunction can result in increased exposure.
ix. Prohibit Eating/Drinking in the Lab: Ensure no food, drinks, or personal items are stored or consumed in the lab where methylene chloride is used.
x. Handwashing Practices: Encourage frequent handwashing, especially before eating or touching the face and after handling methylene chloride to avoid contamination.

b. Training Requirements: Staff will undergo training before working in methylene chloride-restricted areas **prior** to submission.

i. ☒ Laboratory Safety Training
ii. ☒ Laboratory Specific Safety Training (Provided by PI or Lab Supervisor)
iii. ☒ Hazardous Waste Handling Training included in Lab Safety Training
iv. ☐ Biosafety Training
v. ☐ Bloodborne Pathogen Training
vi. ☐ Radiation Safety Training
vii. ☐ Nanomaterial Safety Training
viii. ☒ Methylene Chloride Safety Training (see training link to CDC video)

A video on the "Fundamentals of Methylene Chloride Safety" can be found at https://reach.cdc.gov/course/fundamentals-methylene-chloride-safety.

7. PERSONAL PROTECTIVE EQUIPMENT – Long pants, closed-toe shoes, and safety glasses are required upon entry into an area where hazardous materials are used or stored. Additional PPE requirements are listed below. Principle investigators or lab supervisors supply PPE and train lab users on PPE use, limitations, and storage.

   a. **Respiratory protection**
      i. **Supplied air respirators are** required when exposure exceeds acceptable levels determined by the EPA (must be fit-tested, trained, and cleared by EHS). Air-purifying respirators CAN NOT be used due to the short service life of chemical cartridges when used for methylene chloride.
      ii. Respiratory protection is not an option for controlling inhalation exposures to methylene chloride in the lab. Filter cartridge respirators cannot be used because methylene chloride can pass through the cartridge, leaving respirator wearers unprotected.
   b. **Eye Protection**
      i. ANSI Z87.1 Safety Glasses are required at all times.
      ii. Splash Goggles are required for all processes with potential chemical splash hazards or aerosols.
      iii. Splash Goggles & Face Shield provide the greatest protection from chemical splash hazards.
   c. **Hand Protection**
      i. Gloves must be worn when handling chemicals.
      ii. Many common glove materials, including nitrile, latex, neoprene, and butyl rubber, do not protect from methylene chloride. Methylene chloride permeates disposable nitrile gloves within one minute.
      iii. Use **chemical-resistant gloves** such as polyvinyl alcohol (PVA) or Silver Shield.
      iv. Good protection and dexterity are provided by double gloving with Silver Shield® gloves as the inner gloves and disposable nitrile gloves as the outer gloves.
   d. **Skin and Body Protection**
      i. Long pants and closed-toe shoes must be worn at all times.
      ii. Laboratory coats are required when working with hazardous materials.
      iii. Flame-resistant laboratory coats should be worn for increased risk of fire.
      iv. If splashes or skin contact is possible, a face shield, chemically resistant apron, disposable sleeves, etc. are required.

8. EMERGENCY RESPONSE

a. Emergency Safety Equipment - [List all required safety equipment and locations. All personnel must know emergency equipment locations and emergency response procedures.]

Emergency Equipment:	Location:
Emergency Eyewash Station(s)	
Safety Shower	
First Aid Kit	
Fire extinguisher	
Fire Alarm Pull Station	
Telephone	

b. CHEMICAL EXPOSURE

1. If Inhaled: Symptoms may include Dizziness, headaches, confusion, nausea, shortness of breath, unconsciousness in extreme cases.
    a. Immediately move the affected person to fresh air.
    b. If breathing is difficult or has stopped, administer artificial respiration or oxygen if trained.
    c. Call University Emergency Number 216 368 3333.
    d. Seek medical attention immediately, even if symptoms appear mild.
2. In Case of Skin Contact: Symptoms may include Irritation, redness, or burning sensation.
    a. Immediately flush all affected areas with water for 15 minutes using the nearest sink or safety shower.
    b. Remove any contaminated clothing.
    c. Seek medical attention.
3. In Case of Eye Contact: - Symptoms may include Severe irritation, redness, watering, and possible chemical burns.
    a. Flush eyes with copious amounts of water for at least 15 minutes in the emergency eyewash station. Ensure eyelids are held open during flushing.
    b. If applicable, wash hands and remove contact lenses while flushing with water.
    c. Seek medical attention!
4. If Ingested: Symptoms may include Nausea, vomiting, abdominal pain, central nervous system depression.
    a. Seek medical attention immediately.
    b. Do not induce vomiting.
    c. Rinse mouth with water.
    d. Do not give anything by mouth to an unconscious person.

REPORT ALL THE INCIDENTS TO EHS WITHIN 24 HOURS

c. **CHEMICAL SPILLS: Notify others and evacuate the lab.**
    i. Is there an immediate threat of fire or explosion?
        1. **YES:** Pull the fire alarm and call 216-368-3333.
        2. **NO:** Call the EHS at 216-368-2907
    ii. **REPORT ALL INCIDENTS TO EHS WITHIN 24 HOURS.**

d. **LIFE-THREATENING EMERGENCIES:** Fire, explosion, life-threatening hazardous material spill/leak, compressed gas leak, etc.:
    i. Call Case Emergency 216-368-3333.
    ii. Alert others in the area and activate local alarm systems (e.g., fire alarm pull stations)
    iii. Evacuate the building to the designated assembly point:
    _____
    iv. Remain at the designated assembly point to meet emergency responders.
    v. Call the EHS at 216-368-2907 when it is safe to do so.
    vi. **REPORT ALL INCIDENTS TO EHS WITHIN 24 HOURS**

e. **INJURIES:**
    i. Call University Emergency 216-368-3333.
    ii. Administer first aid as appropriate.
    iii. Call the EHS 216-368-2907 when it is safe to do so.
    iv. **REPORT ALL INCIDENTS TO EHS WITHIN 24 HOURS**

9. <u>WASTE DISPOSAL</u>
    a. Hazardous waste must be stored and labeled correctly and disposed of by EHS.
    b. Methylene chloride waste should be minimized and segregated from other waste streams whenever possible.
    c. Methylene chloride waste should be stored in regulated methylene chloride use areas.

10. **<u>LABORATORY SPECIFIC PROCEDURES -</u> [List your detailed laboratory-specific procedures in this section. Remember, any changes to these procedures require advance PI approval, attach additional pages as needed]**

11. DOCUMENTATION AND APPROVAL
    a. **DOCUMENTATION OF TRAINING -** ALL LABORATORY PERSONNEL MUST READ & UNDERSTAND THIS WCPP AND SIGN AND DATE BELOW.

NAME	DATE

    b. **WCPP APPROVAL –** P.I. must sign and date this document prior to submission.

Date of last revision	WCPP approval date	P.I. Signature

References:
https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/guidance-regulations-issued-under-toxic-substances