Western Carolina University
Standard Operating Procedure for the use of Dichloromethane

This is an SOP template for a specific chemical or class of chemicals and is not complete until: 1) lab specific information is entered in the fields below, 2) lab specific procedures are detailed in Section 6, and 3) the SOP is read and signed by the relevant lab personnel.

Section 1. Contact Information

Procedure Title:

Procedure Author:

Date of SOP Creation/Revision:

Name of Responsible Person:

Location of Procedure:

Location of Safety Data Sheet (SDS):

Approval Signatures:
(If required, refer to Sec. 10)

Section 2. This SOP is for a:

☐ **Specific laboratory procedure or experiment** (Ex. Synthesis of chemiluminescent esters, folate functionalization of polymeric micelles, etc.)

☐ **Generic use of specific chemical or class of chemicals with similar hazards** (Ex. carcinogens, flammables, etc.)

Section 3. Process or Experiment Description

Provide a brief description of your process or experiment, including a purpose. A more detailed description will be covered in Section 6.

List all references you are using for the safe and effective design of your process or experiment, including peer reviewed articles and safety literature:

Frequency of Procedure: ☐ Once ☐ weekly ☐ monthly ☐ other (explain):

Duration of Procedure:
(minutes/hours/days)

Section 4. Safety Literature Review and Hazard Summary

Hazard Summary:
Methylene chloride or dichloromethane (DCM) is commonly used as a solvent for thin-layer chromatography in isolating organic compounds. Dichloromethane is an IARC Group 2B, possible human carcinogen. Acute Effects: Very hazardous in case of eye contact, inhalation, or ingestion. In case of ingestion, DCM may cause irritation of the gastrointestinal tract and vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through gastro-intestinal tract may produce symptoms of central nervous system depression ranging from light headedness to unconsciousness. Chronic Effects: Can cause headache, mental confusion, depression, liver effects, kidney effects, bronchitis, loss of appetite, nausea, lack of balance, and visual disturbances. Can cause dermatitis upon prolonged skin contact.

Personal Protective Equipment (PPE):

Respiratory Protection. Where risk assessment shows air-purifying respirators are appropriate, use a full-face respirator with multi-purpose combination (US) respirator cartridges as a backup to engineering controls. Respirators should be used only under any of the following circumstances:

- As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
- When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
- Regulations require the use of a respirator.
- An employer requires the use of a respirator.
- There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL).
- As PPE in the event of a chemical spill clean-up process.

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested. Contact the Safety Office.

Hand Protection. When handling this chemical, wear laminate film or polyvinyl alcohol (PVA) gloves. Recommended combination of nitrile gloves with outer polyvinyl alcohol (PVA). Replace gloves when splash occurs.
Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with the chemical you are using. A glove selection chart from Ansell is provided as a reference below:
http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf

Eye Protection. Wear NIOSH approved safety glasses or goggles.

Skin & Body Protection. Wear flame resistant or retardant lab coats – lab coats must be buttoned to their full length and coat sleeves must be of a sufficient length to prevent skin exposure while wearing gloves. Wear full-length pants and close-toed shoes. The area of skin between the shoe and ankle should not be exposed.

Hygiene Measures. Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes, and clothing. Wash hands before breaks and immediately after handling the product.

Engineering Controls:
All operations involving Methylene chloride and dilutions should be carried out in a certified chemical fume hood to keep airborne level below recommended exposure limits. Chemical fume hoods designated as containment areas for particularly hazardous substances, like Methylene chloride, must have an average face velocity between 80 – 100 cfm. The fume hood must be certified annually – verify certification and working condition prior to use.

First Aid Procedures:

If inhaled… Move to fresh air. If the person is not breathing, give artificial respiration using a respiratory medical device if victim inhaled or ingested the chemical. Call 828-227-8911 (on campus) or 911 (off campus).

In case of skin contact… Minor skin contact requires washing with soap and water. Soaking or flushing contaminated areas of the skin with water for periods up to 15 minutes is required if a large area comes into contact with the chemical, or if prolonged contact occurs. Contaminated clothing may hold the chemicals in contact with the skin without being immediately noticed. Many chemicals are absorbed through the skin, and dermatitis may later appear on skin which appears to be clean.

In case of eye contact… In the event of eye contact, the eye should be immediately flushed with water. If the chemical is very irritating, it is likely that the affected individual will require assistance to hold the eye open during the flushing. Use the nearest emergency eyewash immediately. Call 828-227-8911 (on campus police) or 911 (off campus).

If swallowed… DO NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately, call 828-227-8911 (on campus) or 911 (off campus).

Section 5. Special Storage & Handling Requirements

Storage

- Keep in tightly closed container.
- Store in a cool, dry, well-ventilated area.
- Protect against physical damage.
- Isolate from any source of heat or ignition.
- Store in a secondary containment, isolate from other chemical compounds with proper labeling. Label secondary containment / cabinet with "REGULATED CARCINOGEN".
- DCM can be stored in the same cabinet as other regulated carcinogens.

Handling (Designated Areas)

- Designated area(s) for use and storage of Methylene chloride must be established.
- Work inside an active, annually certified fume hood posted as a "Designated Use Area for Methylene Chloride" and "Danger, Cancer Hazard".
- Ensure you are wearing the following minimum PPE: safety goggles or face shield, lab coat & gloves, full length pants, closed-toed impervious shoes.
- Wash thoroughly after handling.

Section 6. Step-by-step Operating Procedure

Describe the possible risks involved with failure to follow a step in the SOP in the right hand column.

Step-by-Step Description of Your Process or Experiment	Potential risks if step is not done or is done incorrectly
Don personal protective equipment: ☐ appropriate street clothing (long pants, closed-toe shoes) ☐ gloves; indicate type:_____ ☐ safety goggles ☐ safety glasses ☐ face shield ☐ lab coats ☐ other:_____	

Check the location/accessibility/certification of the safety equipment that serves your lab:

Laboratory Fume Hood/Glove Box or other Ventilation Control.	Location:	
Eyewash/Safety Shower	Location:	
First Aid Kit	Location:	
Chemical Spill Kit	Location:	
Fire Extinguisher	Location:	
Fire Alarm Manual Pull Station	Location:	
Nearest Available Telephone	Location:	

List the procedure steps and note in the column to the right any potential hazards for omitting or doing them incorrectly.	

List the clean-up procedures for the work area and equipment:
Remove PPE and wash hands before leaving the lab.

Section 7. Waste Disposal

Decontamination/Waste Disposal Procedure:
No waste streams containing Methylene chloride shall be disposed of in sinks. Decontaminate work space with 70-75% ethanol. Wash hands and arms with soap and water after finished. Contaminated pipette tips, tubes and gloves should be collected as hazardous waste.

Label waste. Attach a completed Hazardous Waste label to all waste containers as soon as the waste is added to the container.
Store waste. Store hazardous waste in closed containers, in secondary containment and in a designated storage location. Double-bag dry waste using sealable transparent bags. Waste must be under the control of the person generating and disposing of it.

Describe the quantities of waste you anticipate generating and appropriate waste disposal procedures. Include any special handling or storage requirements. Explain final neutralization procedures, hazard waste labeling, etc.

Section 8. Training Requirements

List all required safety training, such as chemical safety, lab specific CHP, SOPs, & general lab safety, etc.

The PI must ensure that his/her lab personnel have completed the required lab safety training (initial and refresher training). Location where training documents & records are maintained:

Section 9. Emergency Procedures

A. Health-Threatening Emergencies (ex: fire, explosion, health-threatening hazardous material spill or release, compressed gas leak, or valve failure)

1. **On Campus Call 828-227-8911 or Off Campus 911**
2. Alert people in the vicinity and activate the local alarm systems.
3. Evacuate the area.
4. Elect someone familiar with the process to stay nearby to advise emergency responders.
5. Once personal safety is established, call the Safety Office at 828-227-7443.

For personnel exposure or injury:

1. Remove the injured/exposed individual from the area, unless it is unsafe to do so because of the medical condition of the victim or the potential hazard to rescuers.
2. **Call 828-227-8911** (if immediate medical attention is required.)
3. Administer first aid as appropriate. Consult the SDS(s) to determine appropriate first aid.
4. Remove any contaminated clothing and flush contamination from eyes/skin using the nearest emergency eyewash/shower for a minimum of 15 minutes.
5. Bring copies of SDSs for all chemicals the victim was exposed to for the emergency responders/medical providers.
6. Call 828-227-7443 to report the incident to the Safety Office.

B. Non-Health Threatening Emergencies

For non-health threatening injuries and exposures

Call University Health Services for more information and to schedule an appointment (828-227-7640)

For hazardous material spills or releases which have impacted the environment (via the storm drain, soil, or air outside the building) or for a spill or release that cannot be cleaned up by local personnel:

Notify your PI/lab supervisor and the Safety Office at 828-227-7443 immediately.

C. Small Spills/Local Cleanup:

In the event of a minor spill or release that can be cleaned up by local personnel using readily available equipment

1. Notify personnel in the area and restrict access. Eliminate all sources of ignition.
2. Review the SDS for the spilled material, or use your knowledge of the hazards of the material to determine the appropriate level of protection.
3. Wearing appropriate personal protective equipment, clean up the spill. Collect spill cleanup materials in a tightly closed container. Manage spill cleanup debris as hazardous waste.

D. Building Maintenance Emergencies (e.g., power outages, plumbing leaks):

Call Facilities Operations at 828-227-7224

Describe any additional safety/emergency response information for this lab procedure (hazardous chemical antidotes for particular first aid treatment, chemical neutralizers to use, etc.).

Section 10. Prior Approvals

You must seek prior approval from the Safety and Risk Management Office if you intend to use **high risk** chemicals and operations, as special safety precautions may be required. For guidance on **high risk procedures**, consult the University Chemical Hygiene Plan (Section 6). Approval can be indicated with a signature in Section 1 above.

Enter additional comments:

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Procedure Title:____

“I have read and understand this SOP and I agree to fully adhere to its requirements.”

Last Name (print)	First Name (print)	92#	Signature