OHS Registration #: _____

Expiration Date: _____

STANDARD OPERATING PROCEDURE/APPROVAL FORM
FOR CARCINOGENS AND HIGHLY TOXIC MATERIALS

Instructions: Please complete this form to request approval to use and possess highly toxic or carcinogenic material from the University Chemical Hygiene Committee as required by Chapter 12 of the University Chemical Hygiene Plan and University Policy 7-37.

Submit a separate form for each chemical. Copies of the current guidelines and Chemical Hygiene Plan are available at the DOHS web site: http://www.udel.edu/OHS/. For questions, please contact the University Chemical Hygiene Officer at 831-2103.

Form Updated: January 2007

Please attach a detailed synopsis of how this material will be used in your research.

Section I – Information

1. Principal Investigator(s): _____
2. E-Mail Address: _____
3. Department: _____
4. Address: _____
5. Phone Number: _____ 6. Fax Number: _____
7. Lab(s) to be Used: _____
8. Chemical: Chloroform

Section II – Use and Storage

A. Purchasing

All purchases of this material must have approval from the Principal Investigator (PI) or authorized personnel before ordering. The user is responsible to ensure that a current Material Safety Data Sheet (MSDS) is obtained unless a current one is already available within the laboratory. Quantities of this material will be limited to _____, and/or the smallest amount necessary to complete the experiment.

B. Authorized personnel

Please select the general categories of personnel who could obtain approval to use this material:

1. ☐ Principal Investigator 2. ☐ Graduate Students 3. ☐ Undergraduates
4. ☐ Technical Staff 5. ☐ Post Doctoral Employees
6. ☐ Other (Describe): _____

Please list the specific personnel and their approval level (Attach an addendum to this form for additional personnel):

NOTE: The Principal Investigator must be aware of all purchases of this material. The Principal Investigator must assure the there is not an exceedance of the quantity limits.

1. _____	☐ Purchase	☐ Use the Material
2. _____	☐ Purchase	☐ Use the Material
3. _____	☐ Purchase	☐ Use the Material
4. _____	☐ Purchase	☐ Use the Material
5. _____	☐ Purchase	☐ Use the Material

The Principal Investigator will update this section when any personnel changes occur. If changes occur, document the changes (include the record of training of additional personnel) in the laboratory's files and submit an addendum to the University Chemical Hygiene Officer with all training documentation.

C. Storage

Materials will be stored according to compatibility and label recommendations in a designated area.

1. Please list compounds that this chemical is incompatible with:

    - Acetone
    - Alkali Materials
    - Inorganic Acids
    - Nitrogen Tetroxide
    - Fluorine
    - Metals (Al, K, Li, Mg, Na, NaK alloy)
    - Potassium tert-butoxide
    - Sodium methoxide
    - Triisopropylphosphine.
    - Oxidizing Materials
    - Attacks, softens and may dissolve rubber, many plastics, paints and coatings.
    - Other: _____

2. Please list special storage requirements (I.E.: Refrigerated, Inert Atmosphere, Desiccated, etc.):

    - Store below 30 deg C.
    - Other: _____

3. Please list specific storage area (This Area Must be Marked and Labeled): _____

Storage areas will be inspected by laboratory personnel on a regular basis. Personnel will check for safety concerns such as improper storage, leaking/damaged container(s), damaged labels, quantities in excess of approved limits, theft/disappearance of material, etc. The inspector will also determine if an inventory reduction is possible. The Principal Investigator will designate one individual to complete this inspection.

4. Please select an inspection frequency:

☐ Weekly ☐ Biweekly

☐ Bimonthly ☐ Monthly

D. Use location:

Materials shall be used only in the following designated areas.

Check all that apply:

1. ☐ Demarcated Area in Lab (Describe): _____
2. ☒ Fume Hood 3. ☐ Glove Box
4. ☐ Other (Describe): _____

Section III – Personnel Safety and Protection

A. Training requirements:

All users must demonstrate competency and familiarity regarding the safe handling and use of this material prior to purchase. The Principal Investigator is responsible for maintaining the training records for each user of this material. Training should include the following:

1. Review of current MSDS
2. Chemical Hygiene/Right-To-Know
3. Chemical Waste Management
4. Review of the OSHA Lab Standard
5. Review of the Chemical Hygiene Plan
6. Special training provided by the department/supervisor
7. Review of the departmental safety manual if applicable
8. Safety meetings and seminars
9. One-on-One hands-on training with the Principal Investigator or other knowledgeable laboratory personnel.
10. Other: _____

B. Personal Protective Equipment:

All personnel are required to wear the following personal protective equipment whenever handling this material:

1. Proper Laboratory Attire (Pants or dresses/shorts below the knees, sleeved shirt, close-toe shoes)
2. Safety Glasses – **Researchers must upgrade to chemical safety splash goggles if a splash, spray or mist hazard exists. In general, safety glasses can be worn if the fume hood sash is**

properly positioned to provide the splash, spray and mist protection, otherwise indirect venting chemical safety splash goggles must be worn.

3. Lab Coat

4. Chemical Protective Gloves: PVA, Viton, Silver Shield

Personnel may be required to wear other Personal Protective Equipment when working with this material. The Principal Investigator should contact the University Chemical Hygiene Officer to discuss the selection of chemical protective clothing (aprons, suits and gloves) and respirators. Please check all that apply:

1. ☐ Chemical Safety Splash Goggles	2. ☐ Face Shield
3. ☐ Chemical Protective Clothing (Describe): _____	
4. ☐ Chemical Protective Splash Apron (Describe): _____	
5. ☐ Respirator (Type): _____	
6. ☐ Other (Describe): _____	

C. Safe Work Practices

The following safe work practices should be employed when using this material:

1. Wear all required personal protective equipment

2. Cover open wounds

3. Wash hands thoroughly when work with the material is completed

4. No mouth pipetting

5. Use of sharps, such as glass Pasteur pipettes, needles, razor blades, etc. should be avoided or minimized

6. Must not work alone in the laboratory

7. Please list any other safe work practices: _____

D. Personnel Decontamination and Emergency Response

For most exposures, decontamination should occur as follows:

1. Small Skin Exposures –

    a. Wash contaminated skin in sink with tepid water for 15 minutes
    b. Have buddy locate the MSDS
    c. Wash with soap and water
    d. Contact Occupational Health and Safety at 831-8475 for further direction

2. Eye Exposure –

    a. Locate the emergency eye wash
    b. Turn eye wash on and open eyelids with fingers

c. Rinse eyes for 15 minutes
d. Have buddy contact 911 for the Newark Campus, 9-911 for all others and locate the MSDS
e. Notify OHS

3. Large Body Area Exposure –

a. Locate the emergency safety shower
b. Stand under shower and turn it on
c. Rinse whole body while removing all contaminated clothing
d. Have buddy contact 911 for the Newark Campus, 9-911 for all others and locate the MSDS
e. Rinse body for 15 minutes
f. Notify OHS

4. Ingestion Emergencies –

a. If swallowed do NOT induce vomiting.
b. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
c. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
d. Have buddy contact 911 for the Newark Campus, 9-911 for all others and locate the MSDS
e. Notify OHS

5. Inhalation Emergencies –

a. If fumes or combustion products are inhaled remove from contaminated area.
b. Lay patient down. Keep warm and rested.
c. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
d. Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
e. Have buddy contact 911 for the Newark Campus, 9-911 for all others and locate the MSDS
f. Notify OHS

6. Injection Emergencies –

a. Clean the areas with soap and water
b. Allow the wound to bleed
c. Have buddy contact 911 for the Newark Campus, 9-911 for all others and locate the MSDS
d. Notify OHS

Please list any special decontamination procedures: _____

E. Exposure Symptoms and Treatment

Please list the emergency procedures to be followed in the event of an exposure. These will be found in the MSDS for the compounds:

1. **Skin Exposure Symptoms:** The liquid may produce skin discomfort following prolonged contact. Defatting and/or drying of the skin may lead to dermatitis. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis

(nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

2. **Eye Contact Symptoms:** The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/ or other transient eye damage/ ulceration. The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

3. **Ingestion Symptoms:** The material is highly discomforting to the gastro-intestinal tract and may be harmful if swallowed. Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

4. **Inhalation Symptoms:** Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved. Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin). Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal. Toxic effects are increased by consumption of alcohol.

The ChemWatch MSDS, which is available at http://www.udel.edu/OHS/ oftentimes, has treatment information for Emergency Room Personnel and Doctors to follow. Please list any information that can be provided to assist with the treatment:

Treat symptomatically.

DO NOT administer sympathomimetic drugs as they may cause ventricular arrhythmias. Chloroform concentrations may be determined in blood. Inhalation Management: Maintain a clear airway; give humidified oxygen and ventilate if necessary. If respiratory irritation occurs, assess respiratory function and, if necessary, perform chest X-rays to check for chemical pneumonitis. Consider the use of steroids to reduce inflammation response. Treat pulmonary edema with PEEP or CPAP ventilation. Symptomatic and supportive care. Dermal Management: Remove any remaining contaminated clothing, place in double, sealed, clear bags and label; store in a secure area away from patients and staff. Irrigate with copious amounts of water. Treat irritation symptomatically. Eye Management: Irrigate thoroughly with water or saline for 15 minutes. Stain with fluorescein and refer to an opthalmologist if there is any uptake of stain. Oral Management: Chloroform is radiopaque and X-rays confirm ingestion. DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration. Consider gastric lavage within 1 hour of ingestion because of very rapid absorption of chloroform (use cuffed ET tube to protect airway) Contact a poisons information service for further guidance on gut decontamination.

Systematic Management

All patients initially require at least 24 hours observation with ECG monitoring. Patients should be kept at complete bed rest, the use of stimulants (including adrenaline and noradrenaline) should be avoided because of the risk of sensitization of the myocardium. In symptomatic patients the hepatic and renal function should be monitored for at least 3-days post-exposure. Chest X-rays will be necessary to monitor development of respiratory complications. Chloroform depletes glutathione stores; N acetylcysteine (used in the treatment of paracetamol overdose) has been suggested as a possible antidote for hepatotoxic organic solvents (success in carbon tetrachloride intoxications has been reported).

The Chemical Incident Management Handbook; Editors: Catherine Farrow, Henrietta Wheeler, Nicola Bates, Dr. Virginia Murray; Chemical Incident Response Service Medical Toxicology Unit Guy's and St. Thomas' Hospital Trust, Published 2000.

F. Spills

The laboratory should be prepared to clean up minor spills (25 ml/25 g or less) of highly toxic/carcinogenic materials should they occur in a properly operating fume hood. Chemical spill clean up guidance can be found at http://www.udel.edu/OHS/chemspillkit/chemspillkit.html. Laboratory personnel cleaning up a spill will wear all personal protective equipment listed above and manage all cleanup debris according the waste disposal section. Notify OHS of any spills, even if the lab staff handled the clean-up.

Please list the following:

1. Location of Spill Cleanup Materials for a small spill: _____

2. Any special measures/cleanup material required to cleanup a spill: Clean up all spills immediately. Avoid breathing vapours and contact with skin and eyes. Increase ventilation. Wipe up and absorb small quantities with vermiculite or other absorbent material. Place in suitable containers for disposal.

If a spill is large or occurs outside of a fume hood, the laboratory occupants should immediately vacate the laboratory, close all doors and contact Occupational Health & Safety at 831-8475 during working hours or 911 after hours. If the laboratory personnel determine that the spill is not contained to the lab or could cause harm to people outside the laboratory, they should pull the building fire alarm and go to the Emergency Gathering Point to await the University Police and Emergency Responders. The responsible/knowledgeable person should provide the University Police and the Emergency Responders with the following:

1. Common Name of the Material Involved

2. A copy of a MSDS, if possible

3. Any pertinent information related to the emergency, such as location in the lab, other hazards in the lab, etc.

G. Emergency Phone Numbers:

Below are a list of emergency numbers to contact in the event of an emergency:

1. Police, Fire or Medical Emergency, call – 911 on the Newark Campus, 9-911 for all others

2. Occupational Health & Safety – X8475

Please provide a list of other emergency phone numbers, such as after hour contacts for laboratory personnel or any other important phone number, to be used in the event of an emergency: _____

H. Other Special precautions

Please list any other special precautions or procedures not listed in the above sections. Please be as specific as possible: _____

Section VI – Waste Disposal

The authorized person using this material is responsible for the safe collection, preparation and proper disposal of waste unless otherwise stated below. Waste shall be disposed of as soon as possible and in accordance with all laboratory and University procedures. All personal must obtain chemical waste disposal training via DOHS.

Specific instructions: Liquid waste will be placed inside a Nalgene waste container. The nalgene container will have a safety waste funnel attached to it. The safety funnel has a hinged cover to keep emissions contained and spills to a minimum. This container also has a built in vent to minimize overflow. A "JustRight" container can also be used. This material should be appropriately labeled with the name and the quantity. Solid waste that is unable to go into a nalgene container should be placed into a 6 mil poly bag or triple bagged into the normal trash bags. The bagged material should then be appropriately labeled with a hazardous waste label and set aside for pick up by the Department of Occupational Health & Safety. Dispose of waste through Occupational Health & Safety.

Section V – Signature and Verification

Your signature below indicates that you have completed this form accurately to the best of your knowledge, you acknowledge all requirements and restrictions of this form and that you accept responsibility for the safe use of the material.

1. Prepared By: _____ Date: _____

   Signature: _____

2. Principal Investigator: _____ Date: _____

   Signature: _____

Section VI – Approval Process

A. University Chemical Hygiene Officer Approval

The Principal Investigator should have this form completed as accurately as possible. Please e-mail or fax this form to the University Chemical Hygiene Officer at eich@udel.edu or 831-1528. The Chemical Hygiene Officer will review and verify the form and make any necessary changes or updates.

1. University CHO: _____ Date: _____

Signature: _____

B. Conditional Approval to Purchase and Use

This form will then be e-mailed or faxed to a member of the University Chemical Hygiene Committee (CHC), usually from the same department as the requesting PI. The Committee Member will meet with the Principal Investigator or designee and discuss the form and the use of the material. If the Committee Member finds the procedure acceptable, they can offer a conditional approval for purchase and use of this material.

2. CHC Member: _____ Date: _____

Signature: _____

C. Full Approval

A signed copy of the form will be sent, via campus mail, to the University Chemical Hygiene Officer, who will bring it up at the next Chemical Hygiene Committee Meeting for full approval. All approvals will be good for two years. The complete, signed approval form will kept on file with Occupational Health & Safety and a copy will be sent to the Principal Investigator to keep on file.

3. Acceptance: _____ Date: _____

CHC Chair: _____

Signature: _____

D. Approval Expiration

The approval for use and purchase of this material will expire should any of the approved information change, with the exception of Section II, B and C, Authorized Personnel and Storage Location, or two years after CHC approval. If, at the end of two years, the procedure is substantially the same, the Principal Investigator can complete a renewal form and send it to the University CHO, who can approve the renewal for an additional two years.

CHECKLIST FOR POSSESSION AND USE OF CARCINOGENS AND HIGHLY TOXIC MATERIALS

The checklist is provided to assist a researcher with the approval process for possession and use of carcinogens and highly toxic materials. This form may be kept on file in the laboratory with the SOP to serve as documentation. The complete procedure can be found in the University Chemical Hygiene Plan in Chapter 12.

Date and Initial	
_____	1. Complete a Standard Operating Procedure/Approval Form For Carcinogens and Highly Toxic Materials and submit this form to OHS for review
_____	2. Review and make OHS's changes and recommendations
_____	3. Meet with a member of the University Chemical Hygiene Committee to review the approval form and the use of the material.
_____	4. Submit (via campus mail) the completed and signed form back to the University Chemical Hygiene Officer for conditional approval to purchase and use the material. The University Chemical Hygiene Committee will review this form at the next scheduled meeting for full approval.
_____	5. Complete a Job Hazard Analysis (JHA) for each experiment in which this compound is used. These JHAs must be kept on file in the laboratory and updated every 5 years or when a process changes.
_____	6. Provide and document training for every worker who will use the material. Training shall include hands-on instruction as well as review of the JHA, SOP and the University Chemical Hygiene Plan; specifically Chapter 12.
_____	7. Conduct a trial run with OHS present.
_____	8. Have OHS present the first time a process using this material occurs.