

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.

**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: Carbon Tetrachloride

**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. _____	<input type="checkbox"/> Purchase	<input type="checkbox"/> Use the Material
2. _____	<input type="checkbox"/> Purchase	<input type="checkbox"/> Use the Material
3. _____	<input type="checkbox"/> Purchase	<input type="checkbox"/> Use the Material
4. _____	<input type="checkbox"/> Purchase	<input type="checkbox"/> Use the Material
5. _____	<input type="checkbox"/> Purchase	<input type="checkbox"/> 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 laboratories 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: Becomes corrosive when in contact with water. Reacts violently with sodium metal , potassium metal , magnesium metal, aluminum metal, alkali metals, allyl alcohol and fluorine gas
2. Please list special storage requirements (I.E.: Refrigerated, Inert Atmosphere, Desiccated, etc.): Observe manufacturer's storing and handling recommendations. Store in a cool area and away from sunlight. Store in a well-ventilated area. No smoking, naked lights, heat or ignition sources. Store away from incompatible materials. Store away from foodstuff containers. Protect containers against physical damage. Keep containers securely sealed. Check regularly for spills and leaks.
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. Review of the OSHA Lab Standard
3. Review of the Chemical Hygiene Plan
4. Special training provided by the department/supervisor (Right to Know)
5. Review of the departmental safety manual if applicable
6. Safety meetings and seminars
7. One-on-One hands-on training with the Principal Investigator or other knowledgeable laboratory personnel.

**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
3. Lab Coat

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. <input type="checkbox"/> Chemical Safety Splash Goggles	2. <input type="checkbox"/> Face Shield
3. <input checked="" type="checkbox"/> Chemical Protective Gloves (Describe): <u>Silver Shield, Polyvinyl Alcohol, Viton</u>	
4. <input type="checkbox"/> Chemical Protective Clothing (Describe): _____	
5. <input type="checkbox"/> Chemical Protective Splash Apron (Describe): _____	
6. <input type="checkbox"/> Respirator (Type): _____	
7. <input type="checkbox"/> 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: Avoid breathing vapours and contact with skin and eyes. Use in a well-ventilated area. Wear personal protective equipment when handling. Avoid smoking, naked lights or ignition sources. Avoid contact with incompatible materials, until atmosphere has been checked. Keep containers securely sealed when not in use. Avoid physical damage to containers. When handling, DO NOT eat, drink or smoke. Wash hands with soap and water after handling. Work clothes should be laundered separately: NOT at home.

#### **D. Personnel Decontamination**

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, 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, 911 for all others and locate the MSDS
  - e. Rinse body for 15 minutes
  - f. 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/eye contact:
  - a. Symptoms: EYE: There is some evidence to suggest that this material can cause eye irritation and damage in some persons. The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. SKIN: Skin contact with the material may produce toxic effects; systemic effects may result following absorption. There is some evidence to suggest that this material can cause inflammation of the skin on contact

in some persons. The liquid may produce skin discomfort following prolonged contact. Defatting and/or drying of the skin may lead to dermatitis. Toxic effects may result from skin absorption. Exposure limits with "skin" notation indicate that vapor and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapor inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

- b. First Aid: Rinse with water in a emergency eye wash or safety shower while removing contaminated clothing for 15 minutes. Seek emergency medical care by dialing 911.

## 2. Ingestion:

- a. Symptoms: Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
- b. First Aid: • If swallowed do NOT induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. Contact 911 immediately.

## 3. Inhalation

- a. Symptoms: Toxic by inhalation. Vapours potentially cause drowsiness and dizziness\*. The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Anaesthetics and narcotic effects (with dulling of senses and odour fatigue) are a consequence of exposure to chlorinated solvents. Individual response varies widely; odour may not be considered objectionable at levels which quickly induce central nervous system effects. High vapour concentrations may give a feeling of euphoria. This may result in reduced responses, followed by rapid onset of unconsciousness, possible respiratory arrest and death.
- b. First Aid: Move to fresh air. Seek emergency medical care by dialing 911. Provide CPR if necessary.

## 4. Injection

- a. Symptoms: May be fatal
- b. First Aid: Seek emergency medical care by dialing 911.

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:

- Acute exposures to carbon tetrachloride present, initially, with CNS depression followed by hepatic and renal dysfunction.
- Respiratory depression and cardiac dysrhythmias are an immediate threat to life.
- Since a major fraction of absorbed carbon tetrachloride is exhaled in first hour, good tidal volumes should be maintained in severely poisoned patients; hyperventilation may be an additional therapeutic modality.

- Ipecac syrup, lavage, activated charcoal or catharsis may all be used in the first 4 hours.
- Since reactive metabolites may cause hepatorenal toxicity, administration of N-acetyl-L-cysteine may reduce complications. Experience with this therapy is limited. [Ellenhorn and Barceloux: Medical Toxicology].

\* Preplacement and annual medical examinations are recommended for workers exposed to carbon tetrachloride. Preplacement examinations should include an evaluation of alcohol intake, a urinalysis that includes a microscopic examination, and kidney function tests. Special attention should be given to the central nervous system, the skin and blood. Individuals with kidney, liver or central nervous system disorders or who are alcoholics should not be exposed to carbon tetrachloride.

(Source: Occupational Diseases)

Note: Consumption of alcohol augments the injurious effects of this substance. (I.L.O.)

## **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 to 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. Wear protective clothing, impervious gloves and safety glasses. Avoid breathing vapours and contact with skin and eyes. Remove all ignition sources. Wipe up and absorb small quantities with vermiculite or other absorbent material. Place spilled material in clean, dry, sealable, labelled container.

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:

##### CHRONIC HEALTH EFFECTS

Cumulative effects may result following exposure\*. There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. This has been demonstrated via both short- and long-term experimentation. Primary routes of exposure include inhalation, accidental ingestion and skin absorption. The material may accumulate in the human body and progressively cause tissue damage. Chronic exposure may cause liver, heart and kidney damage. Enlarged and tender liver, and jaundice may result from toxic hepatitis. Diminished urinary volume, red and white blood cells in urine, coma and death may be consequences of acute renal failure. Chronic exposure may also cause visual disturbances such as haze, blind spots, narrowing of visual field. The hazard of systemic effects is increased when carbon tetrachloride is used in conjunction with ingested alcohol. When administered by gavage, carbon tetrachloride increased the incidence of hepatomas and hepatocellular carcinoma in mice of both sexes. When administered by inhalation carbon tetrachloride induced liver carcinomas in rats. Three case reports describe liver tumors associated with cirrhosis in humans exposed to carbon tetrachloride. A mortality study of laundry and dry cleaning workers exposed to a variety of solvents suggested an excess of respiratory cancers, liver tumors and leukemia.

#### **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:

Collect solid waste material in a 7mil polyethylene bag and label with an orange chemical waste label. Collect liquid waste in a "Justrite" container provided by DOHS. Label with a hazardous waste label. Use proper laboratory ventilation such as a fume hood to manage both liquid and solid wastes. Contact DOHS for removal. Do not put in the normal trash or pour any solutions down the drain.

**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](mailto: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 be 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.