

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: Ethidium Bromide

**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: Avoid reaction with oxidizing agents.
2. Please list special storage requirements (I.E.: Refrigerated, Inert Atmosphere, Desiccated, etc.): Amber Glass (UV Sensitive)
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): \_\_\_\_\_

### E. Procedural Steps

1.

**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: Butyl, Nitrile, Viton or PVC Rubber

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 type="checkbox"/> Chemical Protective Clothing (Describe): _____	

4. <input type="checkbox"/> Chemical Protective Splash Apron (Describe): _____
5. <input type="checkbox"/> Respirator (Type): _____
6. <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. Undergraduate students are not permitted to work with the dry reagent powder. Graduate Students, Post-Docs, Faculty Members or Research Staff must prepare the stock solutions. Undergraduates are only permitted to work with dilute solutions.
8. Please list any other safe work practices: Avoid generating and breathing dust.

### 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 Contact Symptoms:** Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. The material is not thought to be a skin irritant (as classified using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Toxic effects may result from skin absorption.
2. **Eye Contact Symptoms:** Although the material is not thought to be an irritant, direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn). The dust may produce eye discomfort causing smarting, pain and redness.
3. **Ingestion Symptoms:** Accidental ingestion of the material may be damaging to the health of the individual; animal experiments indicate that ingestion of less than 150 gram may be fatal. Considered an unlikely route of entry in commercial/industrial environments. Bromide poisoning causes intense vomiting so the dose is often removed. Effects include drowsiness, irritability, inco-ordination, vertigo, confusion, mania, hallucinations and coma. Other effects include skin rash, nervous system symptoms, sensory disturbances and increased spinal fluid pressure. They have been used as sedatives and depress the central nervous system. Toxicity is increased if dietary chloride is reduced. Repeated ingestion can cause a syndrome with acne, confusion, irritability, tremor, memory loss, weight loss, headache, slurred speech, delusions, stupor, psychosis and coma. Concentrated solutions of many cationics may cause corrosive damage to mucous membranes and the esophagus. Nausea and vomiting (sometimes bloody) may follow ingestion. Serious exposures may produce an immediate burning sensation of the mouth, throat and abdomen with profuse salivation, ulceration of mucous membranes, signs of circulatory shock (hypotension, labored breathing, and cyanosis) and a feeling of apprehension, restlessness, confusion and weakness. Weak convulsive movements may precede central nervous system depression. Erosion, ulceration, and petechial hemorrhage may occur through the small intestine with glottic, brain and pulmonary edema. Death may result from asphyxiation due to paralysis of the muscles of respiration or cardiovascular collapse. Fatal poisoning may arise even when the only pathological signs are visceral congestion, swallowing, mild pulmonary edema or varying signs of gastrointestinal irritation. Individuals who survive a period of severe hypertension may develop kidney failure. Cloudy swelling, patchy necrosis and fatty infiltration in such visceral organs as the heart, liver and kidneys shows at death.
4. **Inhalation Symptoms:** Inhalation may produce health damage\*. 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. Not normally a hazard due to non-volatile nature of product. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

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:

For exposures to quaternary ammonium compounds;

- For ingestion of concentrated solutions (10% or higher): Swallow promptly a large quantity of milk, egg whites / gelatin solution. If not readily available, a slurry of activated charcoal may be useful. Avoid alcohol. Because of probable mucosal damage omit gastric lavage and emetic drugs.
- For dilute solutions (2% or less): If little or no emesis appears spontaneously, administer syrup of Ipecac or perform gastric lavage.
- If hypotension becomes severe, institute measures against circulatory shock.
- If respiration laboured, administer oxygen and support breathing mechanically. Oropharyngeal airway may be inserted in absence of gag reflex. Epiglottic or laryngeal edema may necessitate a tracheotomy.
- Persistent convulsions may be controlled by cautious intravenous injection of diazepam or short-acting barbiturate drugs. [Gosselin et al, Clinical Toxicology of Commercial Products]

## 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. Avoid contact with skin and eyes. Wear protective clothing, gloves, safety glasses and dust respirator. Use dry clean up procedures and avoid generating dust. Sweep up or vacuum up (consider explosion-proof machines designed to be grounded during storage and use). Place in clean drum then flush area with water.

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: \_\_\_\_\_

#### **I. Chronic Health Effects**

Cumulative effects may result following exposure\*. There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Principal routes of exposure are usually by skin contact and inhalation of generated dust. There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. The substance produces frame-shift mutations in genetic material and must be considered as a potential mutagen in higher organisms. Chronic intoxication with ionic bromides, historically, has resulted from medical use of bromides but not from environmental or occupational exposure; depression, hallucinosis, and schizophreniform psychosis can be seen in the absence of other signs of intoxication. Bromides may also induce sedation, irritability, agitation, delirium, memory loss, confusion, disorientation, forgetfulness (aphasias), dysarthria, weakness, fatigue, vertigo, stupor, coma, decreased appetite, nausea and vomiting, diarrhoea, hallucinations, an acne like rash on the face, legs and trunk (seen in 25-30% of case involving bromide ion), and a profuse discharge from the nostrils (coryza). Ataxia and generalized hyperreflexia have also been observed. Correlation of neurologic symptoms with blood levels of bromide is inexact. The use of substances such as brompheniramine, as antihistamines, largely reflect current day usage of bromides; ionic bromides have been largely withdrawn from therapeutic use due to their toxicity. Several cases of fetal abnormalities have been described in mothers who took large doses of bromides during pregnancy.

#### **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 or a LDPE nalgene container. Label with a hazardous waste label. Solidified gels may be disposed of through the biological waste program. 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. Departmental Chemical Hygiene Officer Approval**

The Principal Investigator should have this form completed as accurately as possible. Meet with the local Department Chemical Hygiene Officer and review the SOP.

1. Departmental CHO: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**B. 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.

2. University CHO: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**C. 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

The checklist is provided to assist a researcher with the approval process for possession and use of carcinogens. 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 submit this form to OHS for review
_____	2. Review and make OHS's changes and recommendations
_____	3. Meet the Departmental Chemical Hygiene Officer 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 final approval to purchase and use the material.
_____	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.