

# STANDARD OPERATING PROCEDURES (SOP) FOR ACUTELY TOXIC CHEMICALS

## INTRODUCTION:

Standard operating procedures (SOP) are intended to provide you with general guidance on how to safely work with a specific class of chemical or hazard. This SOP is generic in nature. It addresses the use and handling of substances by hazard class only. In some instances multiple SOPs may be applicable for a specific chemical (i.e., both the SOPs for flammable liquids and carcinogens would apply to benzene). If you have questions concerning the applicability of any items listed in this procedure contact the Office of Environmental Health and Radiation Safety (EHRS) at 215-707-2520 or the Principal Investigator of your laboratory. Specific written procedures are the responsibility of the principal investigator.

If compliance with all the requirements of this standard operating procedure is not possible, the principal investigator must develop a written procedure that will be used in its place. This alternate procedure must provide the same level of protection as the SOP it replaces. The Office of Environmental Health and Radiation Safety is available to provide guidance during the development of alternate procedures.

## SECURING OF GAS CYLINDERS:

Not applicable

## DECONTAMINATION PROCEDURES:

Personnel: Wash hands and arms with soap and water immediately after handling acutely toxic chemicals.

Area: Decontamination procedures vary depending on the material being handled. The toxicity of some materials can be neutralized with other reagents. All surfaces should be wiped with the appropriate cleaning agent following dispensing or handling. Waste materials generated should be treated as a hazardous waste.

Equipment: Decontaminate vacuum pumps or other contaminated equipment (glassware) before removing them from the designated area.

## DESIGNATED AREA:

The room sign for the laboratory must contain a *Designated Areas Within* identifier.

All locations within the laboratory where acutely toxic chemicals are handled must be demarcated with designated area caution tape and/or posted with designated area caution signs.

This includes all fume hoods and bench tops where the acutely toxic chemicals are handled.

Where feasible acutely toxic chemicals should be manipulated over plastic-backed disposable paper work surfaces. These disposable work surfaces minimize work area contamination and simplify clean up.

## **EMERGENCY PROCEDURE:**

Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptom of overexposure must be developed. The procedures should address as a minimum the following:

- Who to contact: (University police, and Office of Environmental Health and Radiation Safety, Principal investigator of the laboratory including evening phone number)
- The location of all safety equipment (showers, eye wash, fire extinguishers, etc.)
- The method used to alert personnel in nearby areas of potential hazards
- Special first aid treatment required by the type of acutely toxic material(s) handled in the laboratory

## **EYE PROTECTION:**

Eye protection in the form of safety glasses must be worn at all times when handling acutely toxic chemicals. Ordinary (street) prescription glasses do not provide adequate protection. (Contrary to popular opinion these glasses cannot pass the rigorous test for industrial safety glasses.) Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields. Safety glasses with side shields do not provide adequate protection from splashes, therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn.

## **EYEWASH:**

Where the eyes or body of any person may be exposed to acutely toxic chemicals, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use. Bottle type eyewash stations are not acceptable.

## **FUME HOOD:**

Manipulation of acutely toxic chemicals must be carried out in a fume hood. If the use of a fume hood proves impractical refer to the section on special ventilation.

All areas where acutely toxic chemicals are stored or manipulated must be labeled as a designated area.

## **GLOVE (DRY) BOX:**

Certain acutely toxic chemicals must be handled in a glove box rather than a fume hood. The Office of Environmental Health and Radiation Safety (215-707-2520) or the Principal Investigator will determine if this is required.

## **GLOVES:**

Gloves must be worn when handling acutely toxic chemicals. Disposable latex or nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. Lab workers should contact EHRS for advice on chemical resistant glove selection when direct or prolonged contact with hazardous chemicals is anticipated.

## **HAZARD ASSESSMENT:**

Hazard assessment must focus on proper use and handling procedures, the education of employees concerning the health risk posed by acutely toxic materials, and on the demarcation of designated areas.

## **EHRS NOTIFICATION:**

You should notify the Office of Environmental Health and Radiation Safety prior to the initial use of acutely toxic substances. Submit an Assurance on Hazardous Procedures form (EHS 1.3F-001) to EHRS. Notification is also required following significant changes in procedures or the quantity of materials used.

## **PROTECTIVE APPAREL:**

Lab coats, closed toed shoes and long sleeved clothing must be worn when handling acutely toxic chemicals. Additional protective clothing should be worn if the possibility of skin contact is likely.

## **SAFETY SHIELDING:**

Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of acutely toxic chemicals which pose this risk must occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all laboratory occupants, are acceptable.

## **SAFETY SHOWER:**

A safety or drench shower must be available in a nearby location where the acutely toxic chemicals are used.

## **SIGNS AND LABELS:**

Doorways: The room sign must contain a *Designated Area Within Caution* where carcinogens, reproductive hazards, and/or acutely toxic chemicals are stored or used.

Containers: All acutely toxic chemicals must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.

## **SPECIAL STORAGE:**

Acutely toxic chemicals must be stored in a secure designated area.

## **SPECIAL VENTILATION:**

Manipulation of acutely toxic chemicals outside of a fume hood may require special ventilation controls in order to minimize exposure to the material. Fume hoods provide the best protection against exposure to acutely toxic chemicals in the laboratory and are the preferred ventilation control device. Where possible handle acutely toxic chemicals in a fume hood. If the use of a fume hood proves impractical attempt to work in a glove box or in an isolated area on the laboratory bench top.

If available, consider using a Biological Safety Cabinet. The biological safety cabinet is designed to remove the acutely toxic chemicals before the air is discharged into the environment. Acutely toxic chemicals that are volatile must not be used in a biological safety cabinet unless the cabinet is vented to the outdoors.

If your research does not permit the handling of acutely toxic chemicals in a fume hood, biological safety cabinet, or glove box, you must contact the Office of Environmental Health and Radiation Safety.

All areas where acutely toxic chemicals are stored or manipulated must be labeled as a designated area.

## **SPILL RESPONSE:**

Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any acutely toxic chemical.

In the event of a spill, alert personnel in the area that a spill has occurred. Do not attempt to handle a major spill of acutely toxic chemicals. Vacate the laboratory immediately and call for assistance.

- Office of Environmental Health & Radiation Safety 215-707-2520
- After hours-Contact the Page Operator at 215-707-4545
- Campus Police at 215-204-1234-This is a 24 hour service

Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

## **VACUUM PROTECTION:**

Evacuated glassware can implode and eject flying glass, and splattered chemicals. Vacuum work involving acutely toxic chemicals must be conducted in a fume hood, glove box or isolated in an acceptable manner.

Mechanical vacuum pumps must be protected using cold traps and, where appropriate, filtered to prevent particulate release. The exhaust for the pumps must be vented into an exhaust hood.

## **WASTE DISPOSAL:**

All materials contaminated with acutely toxic chemicals must be disposed of as a hazardous waste. Wherever possible, attempt to design research in a manner that reduces the quantity of waste generated. Questions regarding waste pick up should be directed to the Office of Environmental Health and Radiation Safety. This office can also assist you in minimizing waste generation.