



Laboratory Standard Operating Procedure: Acutely Toxic Substances

I.	CONTACT INFORMATION
Procedure Title	
Procedure Author	
Date of Creation/Revision:	April 12, 2013
Name of Responsible Person	<i>(The PI, Lab Supervisor, or Autonomous Researcher)</i>
Location of Procedure	<i>(Building and room number)</i>
Approval Signature	<i>(If required. See section XI of this template)</i>
II.	THIS STANDARD OPERATING PROCEDURE (SOP) IS FOR A:
<input type="checkbox"/> Specific laboratory procedure or experiment <i>Examples: synthesis of chemiluminescent esters, folate functionalization of polymeric micelles, etc.</i>	
<input type="checkbox"/> Generic laboratory procedure that covers several chemicals <i>Examples: distillation, chromatography, etc.</i>	
<input checked="" type="checkbox"/> Generic use of specific chemical or class of chemicals with similar hazards <i>Examples: organic azides, mineral acids, etc.</i>	
<p>This standard operating procedure (SOP) is intended to provide general guidance on how to safely work with acutely toxic agents. This general use SOP only addresses safety issues specific to acute toxicity of chemicals. In some instances, several general use SOPs may be applicable for a specific chemical. If you have questions concerning the applicability of any item listed in this procedure contact the Principal Investigator/Laboratory, Supervisor of your laboratory or the Chemical Environmental Health and Safety Coordinator [CEHSC] at (813) 842-3528.</p>	
III.	CLASS OF HAZARDOUS CHEMICALS
<p>A highly toxic material may be characterized in any of the following categories:</p>	



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1. A chemical with a median lethal dose (LD50) of 50 mg or less per Kg of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical with a median lethal dose (LD50) of 200 mg or less per Kg of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 Kg each.
3. A chemical that has a median lethal concentration (LC50) in air of 5000 ppm by volume or less of gas or vapor, or 50 mg per liter or less of mist, fume, or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Examples of Acutely Toxic substances used onsite include: *Acrolein, Arsine, Carbon Monoxide and Nitrogen Dioxide.*

IV.

GENERAL HAZARD CONTROL

Laboratory specific SOPs will vary according to the material used and detail of experimentation techniques. The following guidelines are to be applied as a general precaution for projects involving acutely toxic substances:

- 1) Use the smallest amount of chemical that is consistent with the requirements of the work to be performed.
- 2) Use containment devices (such as lab fume hoods or glove boxes) when:
 - a) Volatilizing these substances,
 - b) Manipulating substances that may generate aerosols, and
 - c) Performing laboratory procedures that may result in uncontrolled release of the substance.
- 3) Use high efficiency particulate air (HEPA) filters, carbon filters, or scrubber systems with containment devices to protect effluent and vacuum lines, pumps, and the environment whenever feasible.
- 4) Use ventilated containment to weigh out solid chemicals. Alternatively, the tare method can be used to prevent inhalation of the chemical. While working in a laboratory hood, the chemical is added to a pre-weighed container. The container is then sealed and can be re-weighed outside of the hood. If chemical needs to be added or removed, this manipulation is carried out in the hood. In this manner, all open chemical handling is conducted in the laboratory hood.



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V.	ENGINEERING & VENTILATION CONTROLS
<p>Use a properly functioning lab fume hood when handling acutely toxic agents. If the process does not permit the handling of such materials in a fume hood, contact the CEHSC at (813) 842-3528 for reviewing the adequacy of room ventilation standards.</p>	
<p style="text-align: center;">FOLLOW SAFE FUME HOOD PRACTICES:</p>	
<ol style="list-style-type: none"> 1. Ensure the fume hood's certification date is within a one-year period. Verify sufficient inward airflow before using a hood by checking the hood's airflow indicator. Report any problems to PI/Lab Supervisor and the CEHSC. 2. Maintain hood sash at or below the maximum height indicated by an arrow on the side of the fume hood. 3. Close the hood sash when not working in the hood. 4. Avoid rapid movements at the face of the hood to avoid creating competing air currents that reduce the ability of the hood to contain air contaminants. 5. Equipment used in hoods should be placed securely on blocks to allow air to flow under and around the equipment. 6. Keep chemical sources and equipment at least six inches away from the face or rear of the hood. 7. Minimize equipment and chemical storage placed in the hood to avoid dead air spaces or eddies and to prevent blocking back baffles. 	
VI.	PERSONAL PROTECTIVE EQUIPMENT
<p><input checked="" type="checkbox"/> Lab Coat <input checked="" type="checkbox"/> Long pants <input checked="" type="checkbox"/> Close-toed shoes <input checked="" type="checkbox"/> Safety glasses</p> <p>The above listed personal protective equipment should be worn when handling acutely toxic substances. Additional protection may be required based upon each chemical agent.</p>	



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Check all personal protective equipment [PPE] prior to use to ensure good undamaged condition. At a minimum:

1. When handling hazardous chemicals or contacting potentially contaminated surfaces, protective gloves are to be worn. For proper selection of glove material, review [chemical MSDS](#) and [glove selection guidance](#).
2. Goggles (not safety glasses) are appropriate for processes where a splash or spray potential exists.
3. Additional protective clothing (i.e., face shield, apron, and over sleeves) is appropriate for chemicals that are toxic through skin contact or dermal absorption.

VII.

SPECIAL HANDLING PROCEDURES AND STORAGE REQUIREMENTS

Ensure secondary containment and segregation of incompatible chemicals per guidance within the [UT Chemical Hygiene Plan](#). Also, follow any substance-specific storage guidance provided in SDS documentation.

VIII.

DESIGNATED AREA

A designated area shall be established when using acutely toxic substances, where limited access, special procedures, knowledge, and work skills are required. A designated area can be the entire laboratory, a specific laboratory workbench, or a laboratory hood. Designated areas must be clearly marked with signs that identify the chemical hazard and include an appropriate warning; for example: **WARNING! ACROLEIN WORK AREA – HIGHLY TOXIC MATERIAL.**

1. Upon leaving the designated area, remove any personal protective equipment worn and wash hands, forearms, face, and neck.
2. After each use (or day), wipe down the immediate work area and equipment to prevent accumulation of chemical residue.

At the end of each project, thoroughly decontaminate the designated area before resuming normal laboratory work in the area.



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IX.	EMERGENCY SPILL AND ACCIDENT PROCEDURES
<p>Health-Threatening Emergencies</p> <p>Examples: Fire, explosion, health-threatening hazardous material spill or other Immediate Danger.</p>	<ol style="list-style-type: none"> 1. Call 911 2. Alert people in the vicinity to evacuate 3. Activate the local alarm systems 4. Call Campus Security at 813-257-7777 or xtn. 7777 5. Remain nearby to provide arriving emergency responders information about chemicals 6. Once personal safety is established, call the CEHSC at (813) 842-3528
<p>Personnel Injury or Exposure</p>	<ol style="list-style-type: none"> 1. Remove the injured/exposed individual from the area if it is safe to do so because of the medical condition of the victim or the potential hazard to rescuers. 2. Call 911 3. Administer first aid as appropriate. 4. Flush contamination from eyes/skin using the nearest emergency eyewash/shower for a minimum of 15 minutes. 5. Remove any contaminated clothing to prevent contaminants from continuing to absorb onto skin. 6. Give medical responders copies of SDSs for all chemicals the victim was exposed to. 7. Report the exposure to the CESHC
<p>Non-Health Threatening Emergencies</p>	<p>Call Security at 813-257-7777 or xtn. 7777 to report incident</p>
<p>Small Spill Clean-Up</p>	<p>Note: Only minor spills or releases can be cleaned up by knowledgeable personnel using readily available equipment:</p> <ol style="list-style-type: none"> 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. Wear gloves and protective eyewear. Clean up using absorbent. Put the contaminated absorbent in a labeled hazardous waste container. 4. If greater than 30 ml, or if it will take longer than 15 minutes for you to clean-up, immediately call Security (813) 257-7777 or xtn. 7777 to report the spill, and notify your supervisor. 5. Submit waste pickup request to the CEHSC.
<p>Incident Reporting</p>	<ol style="list-style-type: none"> 1. Report all occupational injuries or illness to laboratory supervisor as soon as practical. 2. Laboratory personnel are encouraged to report "near misses" as they are considered a precursor to actual



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	<p>incidents.</p> <ol style="list-style-type: none"> Laboratory supervisor is to conduct (or coordinate) an investigation of all incidents and "near misses." The goal of the investigation is to identify and address any deficiencies that may have contributed to the incident.
<p>Medical Consultation</p>	<p>Laboratory personnel who work with hazardous chemicals are to be provided the opportunity to receive medical attention/consultation when:</p> <ol style="list-style-type: none"> A spill, leak, explosion or other occurrence results in a hazardous exposure (potential overexposure). Symptoms or signs of exposure to a hazardous chemical develop.
<p>X.</p>	<p>WASTE DISPOSAL</p>
<p>Acutely toxic substances intended for disposal are considered hazardous wastes. Please call the CEHSC at (813) 842-3528 to describe the quantities of waste you anticipate generating and appropriate waste disposal procedures. Include any special handling or storage requirements for your waste.</p>	
<p>XI.</p>	<p>DECONTAMINATION PROCEDURES</p>
<p>PERSONNEL</p>	<p>Immediately after working with acutely toxic substances, remove gloves, wash hands and arms with soap and water.</p> <p>If immediate medical attention is required, call 911. Remove any contaminated clothing, and IMMEDIATELY flush contaminated skin with water for at least 15 minutes following any skin contact. For eye exposures, IMMEDIATELY flush eyes with water for at least 15 minutes.</p> <p>Consult SDS for guidance on appropriate first aid. Where medical attention is required, ensure to bring along SDS(s) of chemical(s) to aid medical staff in proper diagnosis and treatment.</p>
<p>AREA</p>	<ol style="list-style-type: none"> Decontamination procedures vary depending on the material being handled; consult the SDS. Some materials can be neutralized with other reagents. All surfaces should be wiped with the appropriate cleaning agent following dispensing or handling.



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	<p><i>Note: Waste materials generated should be treated as a hazardous waste.</i></p>
EQUIPMENT	Decontaminate laboratory apparatus or other contaminated equipment (glassware) before removing them from the designated area.
XII.	TRAINING REQUIREMENTS
<p>General Training (<i>check all that apply</i>):</p> <ul style="list-style-type: none"><input checked="" type="checkbox"/> General Safety & Emergency Preparedness – Annual Orientation Training<input checked="" type="checkbox"/> Review of MSDS for other chemicals involved in process/experiment<input checked="" type="checkbox"/> Compressed gas safety<input checked="" type="checkbox"/> Review of this SOP<input type="checkbox"/> Other: _____ <p>The University may require additional safety training depending on the hazardous materials and laboratory-specific processes – consult the PI for more information.</p>	