UCI Environmental Health & Safety

Standard Operating Procedure (SOP)

This Standard Operating Procedure (SOP) describes basic chemical safety information for toxic chemicals. Prior to conducting work with toxic chemicals personnel must obtain approval from their Principal Investigator (PI) and/or Supervisor and attend the appropriate laboratory safety training. The PI must complete the Lab-Specific Use Procedures section and provide their personnel with a copy of this SOP and a copy of the SDS from the manufacturer.

Toxic Chemicals

Date SOP was written:	
Date SOP was approved by PI/lab supervisor:	
Principal Investigator:	
Principal Investigator Signature:	

Type of SOP: ☐ Process ☐ Hazardous Chemical [X] Hazardous Class

Purpose

The purpose of this standard operating procedure is to acquaint you with the proper and safe handling, use, storage, and disposal of toxic chemicals.

Properties & Hazards

General Hazards:

Chemicals in this band can be fatal or extremely harmful through ingestion, contact, inhalation, or aspiration. This band includes chemicals that can be harmful to target organs through single or repeated exposures. This band generally consists of two hazard levels as follows:

Highly Hazardous
• oral LD_{50} *≤50 mg/kg (rat)*
• skin contact LD_{50} *≤200 mg/kg* (rabbit, 24hr)
• inhalation LC_{50} *≤200 ppm or ≤2,000 mg/m^3 (rat, 1hr)*

Generally Hazardous
• oral LD_{50} *≤5,000 mg/kg (rat)*
• skin contact LD_{50} *≤5,000 mg/kg* (rabbit, 24hr)
• inhalation LC_{50} *≤20,000 ppm or ≤200,000 mg/m^3 (rat, 1hr)*

The GHS and Cal/OSHA definition of the band is described in the table below:

GHS Pictogram	UCI Hazard Level	GHS Category	GHS H-Code	Cal/OSHA Definitions
	Highly Hazardous	Acute Toxicity (Cat. 1, 2)	H300, H310, H330	Highly Toxic
		Aspiration Hazard (Cat. 1)	H304	
		Specific Target Organ Toxicity (Cat. 1)	H370, H372	Target Organ Effects
	Generally Hazardous	Acute Toxicity (Cat.3,4,5)	H301, H302, H303, H311, H312, H313, H331, H332, H333	Toxic (not highly)
		Aspiration Hazard (Cat.2)	H305	
		Specific Target Organ Toxicity (Cat.2,3)	H335, H336, H371, H373	Target Organ Effects

Highly hazardous chemicals in this band are considered “particularly hazardous substances” (PHS) per Cal/OSHA.

Personal Protective Equipment (PPE)

Skin and Body Protection:
Long pants (or equivalent) completely covering legs, closed toed shoes, and a traditional lab coat or flame resistant Nomex® lab coat when working with flammables.

Hand Protection:
Nitrile or neoprene gloves are typically adequate for minor splashes. Thicker gloves should be used for longer operations, larger quantities, or direct contact. Consult the SDS, and/or the lab specific use section to determine whether the material or process requires alternative hand protection.

Eye Protection:
ANSI Z87.1-compliant safety glasses or safety goggles if a splash hazard is present.

Additional Hygiene Measures: If toxic chemicals come into contact with gloves, **immediately** dispose of the affected gloves. If toxic chemicals come into contact with reusable PPE (lab coat, etc.) immediately remove the affected PPE, then dispose of it or submit it for laundering.

Administrative Controls

- Never work alone with toxic chemicals. Inform all other personnel in the laboratory before working with these chemicals.
- Review the Safety Data Sheets (SDSs) for all chemicals used in the experiment. Online SDSs can be accessed at https://www.ehs.uci.edu/sds/index.php.
- Toxic chemicals must be used in a "designated area" within the laboratory. A designated area may be the entire laboratory, an area of a laboratory, or a device such as a laboratory hood.

Engineering Controls

- All manipulations of toxic chemicals must be carried out in containment devices (e.g. fume hoods, gloveboxes, or similar devices) within the designated area.
    - If a fume hood or other containment device is not feasible contact EHS to review the adequacy of the ventilation and alternative ventilation measures.
- Use high efficiency particulate air (HEPA) filters, carbon filters, or scrubber systems with containment devices to protect vacuum lines, pumps, and the environment when possible.

Special Storage and Handling Requirements

Storage:
- All containers must be clearly labeled and stored in a designated area that is also clearly labeled.
    - These labels must include a skull-and-crossbones pictogram and identified as toxic.
- Toxic chemicals must be stored in unbreakable secondary containment.
- Store away from other materials that are not particularly hazardous or which may be chemically incompatible.

Handling:
- All manipulations (open chemical use) must be conducted in a fume hood, glovebox, or similar device.

- Transport toxic chemicals between locations using a non-breakable bottle carrier.
- Toxic chemicals must be weighted in ventilated containment. If the scale cannot be located in a fume hood use the tare method.
    - Tare method: the chemical is added to a pre-weighted container in ventilated containment, the container is then sealed and weighted outside of the hood. If material needs to be added or removed it is done in ventilated containment.
- The exhaust from vacuum pumps must be vented into an exhaust hood. Mechanical vacuum pumps must be protected using cold traps, and if applicable filtered to prevent particulate release.

Spill, Accident, and First Aid Procedures

Spills:
Refer to the spill response flowchart. Notify others in the area of the spill. Evacuate and prevent access to the location where the spill occurred. Notify your supervisor and EHS at x4-6200 immediately.

Skin or Eye Contact:
Remove contaminated clothing or contact lenses and flush the affected area with water for at least 15 minutes. Obtain medical attention immediately.

Inhalation:
Move to fresh air. Obtain medical attention immediately.

Ingestion:
Obtain medical attention immediately. (The poison control center, (800) 222-1222, is available 24 hours every day).

Waste Disposal Procedure

Disposal:
- Hazardous waste must be transferred to EHS for disposal within 6 months of being generated.
- Hazardous Waste Disposal
    - Text a pick up to hwp@uci.edu, EHS will pick up your waste within 1-3 days
    - Or visit https://ehs.uci.edu/enviro/haz-waste/

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APPENDIX A:
Lab-Specific Use Procedures

The following procedures describe how the subject chemicals are used in this laboratory beyond the practices described above.

Please see the General Information for ***Hazardous Materials Standard Operating Procedure*** for specific instructions on writing lab-specific use produces.

Add a generic process/procedure on the safe use of the chemicals within this band.

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Documentation of Training

Prior to conducting any work with toxic chemicals, designated personnel must provide training to their laboratory personnel specific to the hazards and procedures involved in working with these substances.

I have read and understand the content of this SOP:

Name	Signature	Date