UCI Environmental Health & Safety

Standard Operating Procedure (SOP)

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

Carcinogens

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 carcinogens.

Properties & Hazards

General Hazards:

Chemicals in this band are known to cause or are suspected of causing cancer. All chemicals in this band are considered highly hazardous and this band is generally defined as follows:

- Regulated by Cal/OSHA as a carcinogen
  - Article 110 Listed and Regulated Carcinogens require assessment by EHS prior to use and storage, and a chemical-specific SOP for each Regulated Carcinogen is required.
- National Toxicology Program (NTP) “known to be carcinogens” or “reasonably anticipated to be carcinogens”
- International Agency for Research on Cancer (IARC) Group 1 (definitely carcinogenic), 2A (probably carcinogenic), or 2B (possible carcinogenic).

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	Carcinogenicity (Cat. 1A, 1B, 2)	H350, H351	Carcinogen, Select Carcinogen

All chemicals in this band are considered “particularly hazardous substances” per Cal/OSHA.

A list of chemicals known to the State of California to cause cancer can be found at: https://oehha.ca.gov/media/downloads/proposition-65//p65list010320.pdf.

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

Administrative Controls

- Never work alone with carcinogens.
- 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.
- Carcinogens 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. The designated area sign shall include the phrase "DANGER SELECT CARCINOGENS, REPRODUCTIVE TOXINS OR SUBSTANCES OF HIGH ACUTE TOXICITY MAY BE PRESENT AUTHORIZED PERSONNEL ONLY".

Engineering Controls

- All manipulations of carcinogens 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 stored in a designated area.
- All containers and storage locations must be clearly labeled.
- Store away from other materials that are not particularly hazardous or which may be chemically incompatible.
- Carcinogens must be stored in unbreakable secondary containment in a designated area.

Handling:

- All manipulations (open chemical use) must be conducted in a fume hood, glovebox, or similar device.
- Carcinogens 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.
- Transport materials between locations in sealed containers using a non-breakable bottle carrier.
- 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.
- Additional regulatory requirements apply to "Listed" and Regulated carcinogens. "Listed" and Regulated Carcinogens are not covered by this SOP, these chemicals must have chemical specific SOPs.

Cal/OSHA "Listed" Carcinogens include 13 carcinogens:

- 2-acetylaminofluorene
- 3,3'-dichlorobenzidine and its salts
- 4-aminodiphenyl
- 4-dimethylaminoazobenzene
- 4-nitrobiphenyl
- Alpha-naphthylamine
- Benzidine and its salts
- Beta-naphthylamine
- Beta-propiolactone
- Bis-chloromethyl ether
- Ethyleneimine
- Methyl chloromethyl ether
- N-nitrosodimethylamine

Additional Cal/OSHA Regulated Carcinogens include but are not limited to:

- 1,3-butadiene
- 1,2-dibromo-3-chloropropane (DBCP)
- Acrylonitrile
- Arsenic
- Benzene
- Beryllium
- Butadiene
- Cadmium
- Chromium (VI)
- Carbon tetrachloride
- Formaldehyde
- Ethylene dibromide
- Ethylene oxide
- Lead
- Methylene chloride (Dichloromethane)
- Methylenedianiline
- Vinyl chloride

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

Decontamination:
Decontamination methods will vary based on the materials being handled and the equipment being used. Please review the SDS for guidance on cleaning the materials.

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

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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 carcinogens, 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