**CARCINOGENS, REPRODUCTIVE TOXINS AND ACUTE TOXINS**

**Also Known as OSHA “Particularly Hazardous Substances”**

**STANDARD OPERATING PROCEDURE TEMPLATE**

**Type of SOP:**  ProcessHazardous Chemical Hazard Class

To customize this SOP, add lab-specific information to the sections below marked in RED, as applicable. Completion of the last section (“Lab-Specific Information”) is required. Also, any of the content below may be amended with lab-specific information to enhance worker safety as desired.

**OVERVIEW**

This SOP deals with three classes of related materials:

* reproductive toxins
* acute toxins
* select carcinogens

Although the mechanism/target of their toxicity may vary, they are similar in that they generally don’t present a physical hazard (fire, explosion, high reactivity). Their primary hazard is their long-term or acute toxicity - most commonly via inhalation or skin contact. Therefore, the engineering controls and personal protective equipment used to protect an individual are generally the same for these substances. These materials are denoted by Cal-OSHA as **Particularly Hazardous Chemicals (PHS)** under the Chemical Hygiene Plan safety standard. The individual *Safety Data Sheet* for a particular material should always be consulted before beginning work.

**IDENTIFYING PARTICULARLY HAZARDDOUS SUBSTANCES**

Definitions of PHS and a list of PHS sorted by type is found at:

<http://www.ehs.ucsb.edu/labsafety-chp/sec3/c/particularly-hazardous-substances>

***Labelling***

*Reproductive hazards and carcinogens* are now identified by the United Nations **Globally Harmonized System of Classification and Labeling of Chemicals (GHS).** Newer chemical containers manufactured after the implementation of GHS will have this symbol

 Respiratory sensitization; germ cell mutagenicity; carcinogenicity reproductive toxicity; specific target organ toxicity; aspiration hazard

Newer containers of *acute toxins* are identified under GHS by one of these two symbols:

 Acute toxicity (oral, dermal, inhalation) category 4, skin/eye irritation; skin sensitization; specific target organ toxicity – single exposure

Acute toxicity (oral,dermal, inhalation), categories 1,2,3

**DEFINITIONS AND HAZARDS OF PHS**

**-Select Carcinogens** are a category of chemicals where the available evidence strongly indicates that the substances cause human carcinogenicity. See link above under “Identifying PHS” for lists of materials. A “select carcinogen” meets one of the following criteria.

1. It is regulated by Cal/OSHA as a carcinogen (see below)
2. It meets certain OSHA definitions of carcinogenicity as used by the National Toxicology Program, or the International Agency for Research on Cancer.

**Cal/OSHA Regulated Carcinogens** have extensive additional requirements associated with them that are not covered under this standard operating procedure. The identity of these compounds and their associated regulations can be found at:

<http://www.dir.ca.gov/title8/sb7g16a110.html>

Contact the EH&S department for more information about these materials, and for assistance in developing any further required standard operating procedures.

**-Reproductive Toxins** are chemicals that affect the reproductive capabilities including causing chromosomal damage (mutations), adverse effects on fetal development (teratogenesis), infertility, gestation/pregnancy, lactation, genetic effects, general reproductive performance, and can affect both women and men. But, note that chemicals can have more than one associated hazard. See link above under “Identifying PHS” for list of materials.

**-Acute Toxins** are chemicals that pose a high/acute level of immediate health risk to individuals by skin contact, inhalation or ingestion. See link above under “Identifying PHS” for definitions and list of materials.

**WORKING WITH PHS**

All of the above classes of materials have in common the fact that direct contact must be avoided. Careful handling and stringent controls are essential in order to minimize risk to researchers and the environment. Therefore, the requirements outlined in the following sections must be followed rigorously.

**Note that this standard operating procedure describes the baseline requirements for handling these classes of compounds**. There are many cases where specific chemical entities require additional or modified handling procedures. Some examples of this are chemicals that have:

* unique properties (e.g. cyanide salts, where the risk of exposure varies greatly over a range of pH),
* multiple hazards related to them (e.g. azide salts, which have toxicity profiles similar to cyanide, but have the added hazard of being potentially explosive),
* extreme levels of a particular hazard (e.g. methyl mercury, which can penetrate the skin very quickly and cause death in extremely small doses).

**These chemicals should have their own chemical specific standard operating procedure - see the UCSB SOP library to obtain some of these.**

Additional information about working with hazardous chemicals can be found in [Prudent Practices in the Laboratory, National Research Council, 2011](http://www.nap.edu/catalog.php?record_id=12654) Chapters 4-6.

**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

See the PPE information under Sec. II of the *UCSB Chemical Hygiene Plan* regarding:

* the UC PPE Policy and policy summary (what PPE is needed and when/where to use)
* obtaining your PPE via use of the *Laboratory Hazard Assessment Tool*
* glove selection criteria
* respirator use, etc.

*At minimum, complete protection of the eyes and skin is essential.*

**ENGINEERING/VENTILATION CONTROLS**

Particularly Hazardous Substances should *always* be used in a fume hood, glove box, or in totally-sealed containers. For further information see the following pages in Sec. II of the *UCSB Chemical Hygiene Pl*an:

* Fume Hood Usage Guide
* Criteria for Implementing Engineering Controls

**SPECIAL HANDLING PROCEDURES**

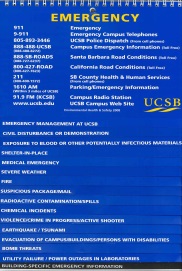
* Never work alone with extremely hazardous materials.
* Eliminate or substitute for a less hazardous material when possible.
* Design your experiment to use the least amount of material possible to achieve the desired result.
* Do not exceed the scale or deviate from the experimental parameters which may be outlined in the **lab-specific information** section below without the approval of the PI.
* Perform adequate hazard analysis and risk assessment before beginning the experiment, as described in in [Prudent Practices in the Laboratory, National Research Council, 2011](http://www.nap.edu/catalog.php?record_id=12654) Chapters 4-6.

**STORAGE REQUIREMENTS**

All hazardous materials must be labeled with their identity as well as all applicable warning statements. Manufacturer labels will contain all the necessary information. However, if material is repackaged or synthesized in the laboratory, please follow the protocols described in the CHEMICAL LABELLING section in Section II of the *UCSB Chemical Hygiene Plan.*

**SPILL AND INCIDENT PROCEDURES**

See directions under the “Chemical Incident” tab of the *UCSB Emergency Information Flipchart* – should already be posted in all labs.



**DECONTAMINATION**

Using proper personal protective equipment as outlined above, decontaminate equipment and bench tops using soap and water and properly dispose of all chemical and contaminated disposables as hazardous waste following the guidelines below.

**WASTE DISPOSAL**

See “Chemical Waste Disposal” in Sec. II of the *UCSB Chemical Hygiene Plan*.

**PRIOR APPROVAL/REVIEW REQUIRED**

As they deem necessary, the PI/supervisor should insert here any prior approval or review needed before an individual can do the operation.

**DESIGNATED AREA**

As they deem necessary, the PI/supervisor should insert here any information about whether a special use-area is designated for this material/process.

**SAFETY DATA SHEETS**

Found online at: <http://ehs.ucsb.edu/labsafety/msds>

**LAB-SPECIFIC INFORMATION (required) *(***[*Examples*](http://www.ehs.ucsb.edu/labsafety-chp/sec1/three-examples-language-used-customize-standard-operating-procedure)***of appropriate content)***

Add appropriate lab-specific information here describing how this material(s) is generally used. E.g., name of protocol, typical frequency done, quantities used, temperature and any additional safety measures, etc.