Carcinogens, Reproductive Toxins and Acutely Toxic Chemicals- Generic Procedures for Safe Handling and Storage[1]

The OSHA Laboratory Standard requires that special handling procedures be employed for certain chemicals identified as "particularly hazardous substances." Particularly hazardous substances include chemicals that are "select" carcinogens, reproductive toxins, and chemicals that have a high degree of acute toxicity. (A partial list is located here.) In addition, many chemicals used (including synthesized) in research laboratories have not been tested explicitly for carcinogenic or toxic properties and should therefore be handled as "particularly hazardous substances" since the hazards are unknown.

Carcinogens - are substances that are either known to cause cancer in humans or animals, or are suspected of being capable of causing cancer in humans. These materials include substances that:

- OSHA regulates as a carcinogen.
- The National Toxicology Program (NTP) lists as "known to be a carcinogen" or "reasonably anticipated to be a carcinogen" in their Annual Report on Carcinogens.
- The International Agency for Research on Cancer (IARC) lists under Group 1 "carcinogenic to humans", Group 2A "probably carcinogenic to humans", or Group 2B "possibly carcinogenic to humans".

Reproductive/Developmental Toxins - are substances that cause chromosomal damage or genetic alterations (mutagens) or substances with lethal or teratogenic effects (malformations or physical defects) in a developing fetus or embryo. Reproductive toxins also include chemicals that affect the fertility of males and/or females.

Acutely Toxic Chemicals – acute toxicity is the ability of a chemical to cause a harmful effect after a single exposure. Acutely toxic chemicals can cause local toxic effects, systemic effects, or both. In general, acutely toxic chemicals have an oral LD50 of <50 mg (rats, per kg), skin contact LD50 <200 mg (rabbits, per kg), inhalation LC50 of <200 (rats, ppm for 1 hr) or, <2000 (rats, mg/m³ for 1 hr).

Prior Approval

As a matter of good practice, and to satisfy regulatory requirements, particularly hazardous substances require additional planning and considerations. Because of the high risk associated with these substances, laboratory workers planning to use a particularly hazardous substance must first receive explicit written approval from their Division Director, Principal Investigator and the DRI Chemical Hygiene Officer. All OSHA and National Toxicology Program listed carcinogens must formally be registered with EH&S by using the form found in Appendix B of the Chemical Hygiene Plan. A specific SOP shall be developed for the substance in question.

Information to be included on the request includes:

- Identity, physical characteristics, and health hazards of the substance involved
- Consideration for exposure control methods
- Plans for storage and secondary containment
- Plans for safe removal of contaminated waste

[1]Additional topics, such as appropriate PPE, spill procedures, disposal, etc., must be added in order to use this document as a stand alone training tool to satisfy lab specific training requirements.

- Decontamination and spill procedures
- Designated area

The designated area shall be marked with the following sign:

CAUTION
Designated Use Area.
Select Carcinogens, Reproductive Hazards, or
Substances of High Acute Toxicity may be present.
Authorized Personnel Only.

The signage can be posted at the actual use area or if the entire lab will be designated, on each entry door.

Handling

- Designated areas (e.g., chemical hoods, glove boxes, lab benches, outside rooms, etc.) for material use must be established and the areas identified by signs or postings.
- Containment devices such as laboratory (chemical) hoods (if necessary) and personal protective equipment (gloves, lab coat, and eye protection) must be used when handling these hazardous substances.
- Procedures for the safe use of the material and waste removal must be established prior to use.
- Decontamination procedures must be developed in advance and strictly followed.
- Only laboratory personnel trained to work with these substances shall perform the work, and always within the designated area. Prior approval is required by the principal investigator or supervisor (see above).
- Only the minimum quantity of the particularly hazardous substance necessary to conduct the research should be ordered and to the extent possible, the experimental design should be done on a micro-scale.

Storage

- These materials must be stored in areas designated for “particularly hazardous substances.”
- Storage areas must be clearly marked with the appropriate hazard warning signs.
- All containers of these materials (even if the material is in very small quantities such as 0.1%) must be clearly labeled with the chemical name or mixture components and the appropriate hazard warning information.
- Chemical storage areas must be secure to avoid spills or broken containers (e.g., cabinets closed, adequate earthquake bracing).
- Storage areas or laboratory rooms must be locked when laboratory personnel are absent.

[1]Additional topics, such as appropriate PPE, spill procedures, disposal, etc., must be added in order to use this document as a stand alone training tool to satisfy lab specific training requirements.