Research
Research Laboratory & Safety Services

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Delayed Health Hazard
Hazard Class Standard Operating Procedure

1. Purpose

This standard operating procedure (SOP) is intended to provide guidance on how to safely work with chemicals that present a delayed health hazard in a University of Arizona (UA) laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before using chemicals that present a delayed health hazard. If you have questions concerning the requirements within this SOP, contact the Approval Holder (AH)/Approval Safety Coordinator (ASC), or the Research Laboratory & Safety Services (RLSS).

2. Scope

This hazard class SOP only addresses safety issues specific to the delayed health hazards of a chemical; several hazard class SOPs may be applicable for a specific chemical.

3. Hazard Description

This hazard class includes health hazards that may appear over a prolonged or repeated exposure to a chemical. Some of the chemicals within this hazard class are classified as particularly hazardous chemicals by OSHA (i.e. select carcinogens), but not every chemical under this hazard class is a particularly hazardous chemical. The following hazard types are included in this SOP:

- Skin sensitizer: Chemicals that cause people to develop an allergic reaction in normal tissue after exposure to the substance through skin contact
  - Ex: Latex, Formaldehyde, etc.
- Respiratory sensitizer: Chemicals that induce hypersensitivity of the airways following inhalation
  - Ex: Acrylonitrile, Nickel(II) chloride, Sodium dichromate, etc.
- Carcinogen: Chemicals that can initiate or speed the development of cancer in normal tissue
  - Ex: 2-Mercaptoethanol, Benzene, Ethylene oxide, etc.
- Target organ toxin from prolonged or repeated exposure: Chemicals whose toxicity targets specific organs after repeated or prolonged exposure after inhalation, ingestion or skin/eye contact
  - Ex: Asbestos, Cadmium, Nitrobenzene, etc.

4. General Control of Hazards

The Delayed Health Hazard hazard class includes a wide variety of hazard types. Though basic control measures may be implemented for the class as a whole, the SDS of chemicals presenting a delayed health hazard should be consulted for specific information on hazard controls and safety measures.

The following general control measures should be implemented whenever using or handling chemicals which pose a delayed health hazard:

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- Plan experiments involving delayed health hazards carefully, including consulting the SDS(s). Do not handle chemicals that present delayed health hazards until all safety precautions have been read and understood.
- Minimize the quantity and/or concentration of these chemicals used or synthesized to the smallest amount immediately needed for an experiment.
- Design experimental procedures to minimize the potential for splash, splatter or other likely scenarios of accidental contact.
- Do not breathe dust, fumes, gas, mist, vapors or sprays when handling these chemicals.
- Wash hands thoroughly after handling.
- Do not bring contaminated work clothing out of the laboratory.

5. Engineering Controls

A certified chemical fume hood must be used when handling select carcinogens, respiratory sensitizers and target organ toxins (from prolonged or repeated exposure) through inhalation.

Other containment devices may be used to control exposure to these chemicals, such as glove boxes. This is especially useful when manipulating the carcinogen in such a way that it volatilizes, generates aerosols, or may result in uncontrolled release of the chemical.

6. Personal Protective Equipment

At a minimum, all laboratory workers must wear safety glasses, long pants, closed-toed shoes, a laboratory coat and examination gloves when working with hazardous chemicals in a laboratory.

Laboratory personnel working with carcinogens, skin sensitizers or target organ toxins (from prolonged or repeated exposure) should wear splash goggles instead of safety glasses. Double gloving with examination-type gloves, or the use of chemical resistant gloves, should be used if the compound can be readily absorbed through the skin. Refer to the Personal Protective Equipment Selection Guide on the RLSS website for further information on appropriate chemical-resistant gloves. Other personal protective equipment that should be considered include a face shield (for high splash hazards) and a chemical-resistant apron.

If respiratory sensitizers, carcinogens with an inhalation hazard, or target organ toxins (from prolonged or repeated exposure) cannot be used in a ventilated enclosure (i.e. chemical fume hood) or containment device (i.e. glove box) due to experimental restrictions, laboratory workers should consider the use of a respirator. Contact the RLSS to perform a hazard assessment of your experimental procedures to determine if respiratory protection should be used. An RLSS hazard assessment report is required prior to registration into the Respiratory Protection Program, facilitated by Risk Management Services.

7. Handling and Storage Requirements

Segregate carcinogens from other hazardous chemicals and store within a labeled designated area. Ideally, this segregation would occur via separate cabinets. If space is limited, however, storing select carcinogens in secondary containment (i.e. plastic trays or Tupperware) within the same cabinet as other chemicals is acceptable. Carcinogens should be securely stored, and access to these chemicals should be restricted.

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Some chemicals within this hazard class may require exposure monitoring and routine medical surveillance for any laboratory personnel who may be exposed. The RLSS will inform the AH/ASC if any chemicals used in the laboratory require such monitoring/medical surveillance.

Carefully plan the transportation of select carcinogens and target organ toxins. Handling chemicals outside of the laboratory area should be minimized, but when necessary, wear full personal protective equipment and carry the chemicals in unbreakable secondary containment.

8. Waste Disposal

Waste chemicals that present a delayed health hazard should be collected in compatible waste containers (i.e. plastic 3.5 gallon buckets) and segregated from incompatible chemicals. Some carcinogens may require special decontamination and disposal procedures. Contact Risk Management Services for further information on the disposal of chemicals.

9. Spill and Incident Procedures

Laboratory personnel may clean a small spill of chemicals that present a delayed health hazard themselves, as long as they wear appropriate personal protective equipment and have appropriate training. If the spill is large, requires a respirator for cleanup, or occurs in a public area, do not attempt to clean the spill yourself. Evacuate the area and follow the procedures in the University Chemical Hygiene Plan section on major chemical spills. Inform the RLSS of all major chemical spills.

If a laboratory worker is injured or exposed to chemicals that present a delayed health hazard, immediately notify the AH/ASC; call 911 if the laboratory worker needs immediate medical attention. Remove contaminated clothing and immediately flush the contaminated areas with water for at least 15 minutes. For eye exposures, immediately remove contact lenses, if present, and flush the eyes with water for at least 15 minutes.

If the exposure is less severe, and the laboratory worker is left feeling ill or if there is persistent discomfort, call the Arizona Poison & Drug Information Center at 1-800-222-1222 for information to determine if further medical action is required. Consult the chemical's SDS for more specific information on appropriate first aid. Inform the RLSS and Risk Management Services of the incident as soon as practicable.

10. Designated Area

Carcinogens are considered to be particularly hazardous chemicals. Because of this, some chemicals in this hazard class will require the designation of an area for their use and storage. All laboratory workers must know the location of these designated areas, and must use or store particularly hazardous chemicals only within them. Designated areas also require posting with the "Designated Area Label," which can be found on the RLSS website.