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1. STANDARD OPERATING PROCEDURE

Use this form to document the Health & Safety information associated with the procedure.

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| **Procedure Title:** | Handling of Suspected Carcinogens |
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| **Dept:** |  |  | **Bldg/Rm:** |  |  | **Supervisor:** |  |

**Procedure Overview:** (brief description of the project)

**ALL WORKERS MUST READ AND UNDERSTAND THIS DOCUMENT BEFORE HANDLING SUSPECTED CARCINOGENS**

 1. Instruct group members in the safe use of suspected carcinogens.

 2. Establishes designated areas for use of suspected carcinogens.

 3. Outlines decontamination and emergency spill procedures.

 4. Details proper secondary containment.

 5. Documents emergency plans for spills.

**Health and safety information for materials used:** (briefly describe the hazards associated with the materials and/or equipment **OR** document your hazard assessment in Section II)

OSHA listed carcinogens (See ISU Laboratory Safety Manual, p.4)

 <http://www.ehs.iastate.edu/publications/factsheets/CarcReproTerat.pdf>

**Note:** These procedures apply to mutagens, teratogens and suspected carcinogens.

**Hazard Control Measures:**

(Lab coat, eye and hand protection, and closed toe/heel shoes must be selected as required by Section D of the ISU Laboratory Safety Manual.)

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| **[ ]**  | **Latex gloves** | **[ ]**  | **Insulated gloves** | **[ ]**  | **Face Shield** | **[ ]**  | **Respirator** |
| **[x]**  | **Nitrile gloves** | **[x]**  | **Safety glasses** | **[x]**  | **Lab Coat** | **[ ]**  | **Fume hood** |
| **[ ]**  | **Neoprene gloves** | **[ ]**  | **Vented goggles** | **[ ]**  | **Apron** | **[ ]**  | **Biosafety cabinet** |
| **[ ]**  | **Vinyl gloves** | **[ ]**  | **Splash goggles** | **[ ]**  | **Dust mask** | **[ ]**  | **Glove box** |
| **[x]**  | **Closed Toe/Closed Heel Shoes** | **[ ]**  | **Flame Resistant Lab coat** |

***Other Control Measures:***

**Goggles required when using liquid suspected carcinogens if splashing hazards exist.**

**Special Handling Procedures and Storage Requirements:**

**I. Group Policy**

A. Careful consideration must be used when dealing with suspected carcinogenic material. A listing of these materials can be found on page 4 of the ISU Laboratory Safety Manual (LSM),

 <http://www.ehs.iastate.edu/publications/factsheets/CarcReproTerat.pdf>. Data on specific chemicals can also be located in the SDS or directly on the bottle of the chemical. As outlined in the LSM, if an alternate (non-carcinogenic and non- or less toxic) materials can be used which are not a detriment to the experiment, they **shall** be obtained and used. However, if such reasonable substitutes cannot be found, the experiments will be carried out using the suspected carcinogen.

B. When working with suspected carcinogens, all group members should inform Occupational Medicine of this fact upon reporting for physical examinations.

**II. General Considerations**

A. The first step in planning any experiment involves collecting information on all chemicals and materials to be used. If any of these chemicals or materials is on the Suspected Carcinogenic Materials Lists, the procedures outlined under this section must be followed.

B. If you are unsure of the hazards of any chemical or material, read the appropriate SDS to learn of the hazardous properties and follow the appropriate precautions for its use.

C. Facilities, equipment, and ventilation systems (e.g., hoods) shall be designed, installed, and operating in a manner which reduces human exposure to these materials. If any of these are deficient, all work shall cease until the safety problems are remedied.

D. Prior to beginning any new experiment, project, or task, a safety analysis shall be conducted to determine if proper safeguards are in place for minimizing hazards such as toxicity and flammability. In addition, chemical and physical characteristics and compatibility of materials and processes shall be considered.

E. The minimum Personal Protective Equipment (PPE) for handling suspected carcinogenic materials shall be safety goggles/glasses, lab coat, nitrile gloves, closed toed shoes.

F. All work involving suspected carcinogens shall be performed in an operating fume hood, vacuum system with cold trap, or in a glove bag.

G. In all cases, trays, pails, or other secondary confinement systems shall be used to contain spills and to aid in clean up. Secondary containment systems should be made of a durable material to avoid breakage and further spread of a spill.

H. All experiments using suspected carcinogens shall be clearly labeled as such by means of signs or tags, indicating what suspected carcinogens may be present.

**Specific Procedures for Suspected Carcinogens:**

A. **Volatile organic liquids** [typical example: Chloroform (CHCl3) ].

 Transfer of the liquid from the storage bottle to the receiving vessel should always be conducted in an efficient fume hood. The operator should wear rubber gloves, a laboratory coat and safety glasses or goggles during this operation. Any spills should be cleaned up and disposed of by procedures given on the SDS sheet for the specific compound. Transfer of the liquids should be made with all vessels located in a tray capable of containing any liquid spilled. All subsequent handling of the material transferred should be done in closed vessels. Any vapors emitted during subsequent manipulations must be vented to the fume-hood, or if operations are performed on a vacuum system, vapors be trapped in a liquid-nitrogen cold trap located between the reaction or distillation vessel and the vacuum pumps. In all operations the work should be carefully planned so as to avoid accidental release of liquid or vapor into the environment. Wastes containing these materials must be stored in tightly capped, specially marked containers identifying the contents as Carcinogenic Wastes.

B. **Volatile Solids**

 Volatile solids may be handled briefly in air during weighing. All other operations must be conducted in the fume-hood. The handling must be done on a tray or confined work space so that any spills are easily cleaned up. The operator must wear rubber gloves to prevent contact with the skin. Spilled material must be cleaned up immediately and disposed of in the proper way, as suggested by the SDS sheet. Affected surfaces must be cleaned thoroughly with soap and water.

C. **Non-volatile Solids**

 These materials may all be handled in air for weighing and transfer. However the handling must be done on a tray or confined work space so that any spills are easily cleaned up. Solutions prepared from the solids must be contained in glassware which can be sealed if storage is necessary. Handling of the solutions must be conducted on spill-containment trays and in the fume-hood if vapors or mists are likely to be emitted (as in the evaporation of an aqueous solution at elevated temperature). Rubber gloves must always be worn during handling of either the solids or solutions.

**Waste Disposal Procedures:**

A. Generated waste should be disposed of as outlined in the Waste and Recycling Guidelines. Suspected carcinogenic wastes shall not be flushed down the sink or put in with the general garbage. Contaminated clothing should not be washed but should be disposed of as carcinogenic waste.

B. All wastes containing suspected carcinogens shall be clearly labeled to that effect and kept separate from non-carcinogenic waste.

C. When in doubt, consult either the Safety Representative, Supervisor, or EH&S at 4‑5359.

**First Aid Procedures:**

**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

**In case of eye contact**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**All accidents and injuries occurring at work or in the course of employment must be reported to the employee's supervisor as soon as possible (even if no medical attention is required).**

<http://www.ehs.iastate.edu/occupational/accidents-injuries>

**Spill/Release Containment, Decontamination, and Clean Up Procedures:**

**IMPORTANT NOTE**

 An immediate assessment of the situation should be made. The nature of the material involved, the amount, and the location will dictate the most appropriate action. For example, spilling 5 grams of a non-volatile solid in the spill tray can be handled relatively easily, whereas a large amount of spilled volatile carcinogen outside a fume hood is a very serious matter. **IF THE SPILL IS SERIOUS OR IF YOU ARE UNSURE, CALL EH&S (4-5359) AND ASK FOR ASSISTANCE.**

General Procedures to be used in the event of any spill:

A. Notify workers and occupants in the vicinity to avoid the spill area.

B. Leave the area of the spill/leak at once. If any chemical has contacted your eyes or skin, wash thoroughly using the eyewash and/or shower as necessary. Any protective clothing that may have been contaminated should be disposed of as carcinogenic wastes as outlined in the Waste and Recycling Guidelines.

C. Notify the Supervisor, Safety Representative, or Safety Coordinator for posting warning signs (Tag Out) in the area, until the area has been cleaned.

D. Before returning to the spill, the employee should be made aware of the neutralization process for the specific compound spilled.

E. Persons not wearing the appropriate PPE and clothing should be restricted from the spill/leak area until cleanup has been completed.

F. If the spill is not a serious threat to the lab environment and can be cleaned up by the worker, the following procedures shall be followed:

 1. Solid Chemical Spills

 a. Cover the solid material with wet paper towels (using water or other appropriate solvent).

 Avoid spreading the compound as much as possible. **DO NOT DRY SWEEP**.

 b. If the material is flammable, remove all sources of ignition.

 c. Ventilate the spill area.

 d. Carefully pick up the bulk of the material with a scoop. If a broom and dustpan are used,

 they must then be completely decontaminated or disposed of as carcinogenic waste.

 e. With wet paper towels, wipe up remaining small traces of material.

 f. Follow the appropriate neutralization process to decontaminate the area.

 g. Dispose of the residues according to the Waste Disposal procedure.

 2. Liquid chemical spills

 a. Ventilate the spill area.

 b. If the material is flammable, remove all ignition sources.

 c. Surround the area with an absorbent material (spill pillows, paper towels,

 sodium bicarbonate, sand, kitty litter, or vermiculite).

 d. Carefully spread more absorbent onto the spill and try to avoid creating

 aerosols. Allow enough time to soak up the liquid.

 e. Carefully scoop up the material and follow steps 1d-g above.

If the spill is determined to be SERIOUS in nature, the following additional cleanup precautions shall be taken if cleanup is to be done by group members:

A. The minimum PPE and clothing that should be worn during the cleanup consists of:

 1. Respirator, with the appropriate cartridge or a self-contained breathing apparatus,

 2. Disposable jump suit, shoe protectors and head cover,

 3. Safety glasses,

 4. Two pairs of disposable gloves, with the inner pair taped to the sleeve cuff of the jump suit.

B. No one is to enter the spill area alone. Only when accompanied by another appropriately dressed individual may a person enter the spill area.

**Using Substances Requiring Special Procedures?** No [ ]  Yes [x]

(If Yes; identify authorized personnel, designate a use area and specify specialized safety precautions here. Refer to Section B in the ISU Laboratory Safety Manual for details.)

Use of suspected carcinogens requires site specific training and the approval from the professor in charge.

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| **Written By:** |  |  | **Date:** |  |
|  |  |  |  |  |
| **Approved By:** |  |  | **Date:** |  |

 (PI or Lab Supervisor)

1. **HAZARD ASSESSMENT**

Use the hierarchy of controls to document the hazards and the

corresponding control measure(s) involved in each step of the procedure.

Consider *elimination or substitution* of hazards, if possible.

*Engineering Control(s):* items used to isolate the hazard from the user (i.e. fume hood, biosafety cabinet).

*Administrative Control(s):* policies/programs to limit the exposure to the hazard (i.e. authorizations, designated areas, time restrictions, training).

*Required PPE*: indicate PPE including specific material requirements if applicable (i.e. flame resistant lab coat, type of respirator or cartridge).

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| **Hazard** | **Engineering Control(s)** | **Administrative Control(s)** | **Required PPE**  |
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1. **Training Record**

Use the following table to record the training associated with this Standard Operating Procedure.

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| **Print Name** | **Signature** | **Date** |
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**Note: Attach to or file with written materials and methods**