**General Use Standard Operating Procedure (SOP)**

**Carcinogens**

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*Globally Harmonized System Hazard Class and Category(s): Carcinogenicity*

*Examples: Benzene, Beryllium/Beryllium compounds, Cisplatin, Bis(chloromethyl) Ether, Ethylene Oxide, Formaldehyde, Streptozotocin, Tamoxifen*

**Note**: This SOP is intended to provide general guidance on how to safely work with carcinogens and only addresses safety issues specific to carcinogens. Other hazard classes may also apply. Review Safety Data Sheets (SDS) and refer to other general use SOPs relevant to the chemical you are working with. Contact the Principal Investigator/ Laboratory Supervisor or the WSU Chemical Hygiene Officer for questions concerning the applicability of any item listed in this SOP (OEHS: 313-577-1200).

**If the chemical of interest is a particularly hazardous substance or a high risk chemical a lab specific SOP is required.**

# **Hazard Description**

A carcinogen is a substance, mixture or agent that can cause cancer or it increases the risk of developing cancer.

The OSHA Lab Standard defines a “Select Carcinogen” as any substance, which meets one of the following criteria:

* It is regulated by OSHA as a carcinogen; or
* It is listed under the category, "known to be carcinogens," in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or
* It is listed under Group 1 ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (latest editions); or
* It is listed in either Group 2A or 2B by IARC or under the category, "reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:
  + After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m3;
  + After repeated skin application of less than 300 (mg/kg of body weight) per week; or
  + After oral dosages of less than 50 mg/kg of body weight per day.
* With regard to mixtures, OSHA requires that a mixture, “shall be assumed to present a carcinogenic hazard if it contains a component in concentrations of 0.1% or greater, which is considered to be carcinogenic.”

# **Control of Hazards – General**

* Eliminate or substitute with a less hazardous material when possible.
* Purchase and use the smallest amount of chemical that is consistent with the requirements of the work to be performed.
* Laboratory work surfaces on which a carcinogen is handled must be protected from contamination. Cover work surface with disposable absorbent material (e.g. bench paper). Provide secondary containment for chemicals.
* After each use (or at end of day), dispose of absorbent material in hazardous chemical waste container, wipe down the immediate work area and equipment to prevent accumulation of chemical residue.
* Conduct a hazard assessment to identify proper use and handling techniques, fire safety, storage, and waste disposal issues specific to the chemical being used.

# **Engineering/Ventilation Controls**

* Use containment devices (such as lab fume hoods or glove boxes) when: (i) volatilizing these substances, (ii) manipulating substances that may generate aerosols, and (iii) performing laboratory procedures that may result in uncontrolled release of the substance.
* Use high efficiency particulate air (HEPA) filters, carbon filters, or scrubber systems with containment devices to protect effluent and vacuum lines, pumps, and the environment whenever feasible.
* To weigh out solid chemicals, use the tare method to prevent inhalation of the chemical. While working in a chemical fume hood, the chemical is added to a pre-weighed container. The container is then sealed and can be re-weighed outside of the hood. If chemical needs to be added or removed, this manipulation is carried out in the chemical fume hood. In this manner, all open chemical handling is conducted in the chemical fume hood.

# **Personal Protective Equipment**

In addition to proper street clothing (long pants (or equivalent) that covers legs and ankles, and close-toed non-perforated shoes that completely cover the feet), wear the following Personal Protective Equipment (PPE) when performing lab operations/tasks involving carcinogens:

* Safety glasses (if splash potential exists, use goggles + face shield instead)
* Lab coat
* Appropriate chemical‐resistant gloves.
  + Refer to Section 8 “Exposure controls/personal protection” of SDS or a glove selection guide (e.g. [Ansell Chemical Protection Guide](https://www.ansellguardianpartner.com/chemical/home#hp)) to identify appropriate glove type.
* NIOSH certified filtering facepiece respirators (e.g. N95): For laboratory procedures resulting in volatilizing, aerosol generation and/or uncontrolled release of carcinogens if work cannot be carried out in a chemical fume hood. This would require training and fit-testing conducted through OEHS.

# **Special Handling Procedures and Storage Requirements**

* Ensure secondary containment and segregation of incompatible chemicals.
* Demarcate an area where work may be conducted with carcinogens and clearly mark with signs identifying the chemical hazard (e.g. WARNING! BENZENE WORK AREA – CARCINOGEN)
* Follow any substance-specific handling and storage guidance provided in SDS.

# **Decontamination Procedures**

* Decontaminate all surfaces (e.g. benchtops, chemical fume hoods, weighing equipment’s, glassware, instruments) that have come in contact with carcinogens. Refer to the chemical Safety Data Sheet to determine an appropriate decontamination method.
* Wash hands thoroughly with soap and water immediately after handling carcinogens.
* For solid carcinogens, dry sweeping and dry mopping are prohibited to prevent dust generation.

# **Waste Disposal**

Carcinogens intended for disposal are considered hazardous chemical waste to be collected and disposed of by OEHS.

Do not dispose of waste by dumping down a drain or discarding in regular trash containers, unless authorized by OEHS. [Submit requests to OEHS](https://research.wayne.edu/oehs/forms/chem-waste) for waste containers, labels, and waste collection. Also, refer to the [OEHS Hazardous Waste Management web page](http://research.wayne.edu/oehs/hazardous/index.php) and [WSU Chemical Hygiene Plan](http://research.wayne.edu/oehs/pdf/chemical-hygiene-plan.pdf) for more information.

# **Spill procedures**

1. **Spills**

For hazardous material spills or releases which have impacted the environment (via the storm drain, soil, or air outside the building) or for a spill or release that cannot be cleaned up (larger spills) by local personnel:

* 1. Call WSU Police (313) 577-2222. Available 24 hours a day, 7 days a week.
  2. Evacuate the spill area
  3. Post someone or mark-off the hazardous area with tape and warning signs to keep other people from entering.
  4. Remain in the vicinity until emergency personnel arrive and provide them with information on the chemicals involved.

For additional information regarding spill response procedures, refer to the [OEHS chemical spill response guidelines](http://research.wayne.edu/oehs/chemical/spills), [WSU Chemical Hygiene Plan](http://research.wayne.edu/oehs/pdf/chemical-hygiene-plan.pdf) and [American Chemical Society (ACS) guide for chemical spill response](https://www.acs.org/content/acs/en/about/governance/committees/chemicalsafety/publications/guide-for-chemical-spill-response.html).

1. **Small Spills**

In the event of a minor spill or release that can be safely cleaned up by local personnel using readily available equipment (e.g. absorbent materials) and appropriate PPE:

* 1. Alert personnel in the immediate area of spill and restrict access.
  2. Eliminate all sources of ignition.
  3. Increase ventilation in area of spill (turn on fume hood and open sash, open windows). Vent vapors to outside of building only.
  4. Review the SDS for the spilled material, or use your knowledge, to assess the hazards and to determine the appropriate level of protection.
     1. **DO NOT** clean up spills requiring respiratory protection. Contact OEHS for help (313-577-1200).
  5. Choose appropriate personal protective equipment (e.g. goggles, face shield, chemical resistant gloves, lab coat or apron).
  6. Protect floor drains, sinks or other potential avenues of environmental release as much as possible. Make a dike around the outside edges of the spill using absorbent materials.
  7. For solid spills: Use wet paper towels to wipe up solid material. Minimize dust generation.
  8. For liquid spills: Cover the liquid with appropriate absorbent material, working from the spill's outer edges toward the center.
  9. Collect spill cleanup materials using a scoop or other suitable items and place in a tightly closed hazardous chemical waste container.
  10. After spilled material is removed, decontaminate surfaces with water or other appropriate solvent.
  11. Place all contaminated materials, including contaminated items such as gloves, in the hazardous waste container.
  12. Label chemical waste container with completed hazardous waste tag (available from OEHS).
  13. Submit online [waste pickup request](https://research.wayne.edu/oehs/hazardous/chemical-waste.php) to OEHS.

# **Emergency Procedures**

**\*\*If medical attention required, call WSU police (313-577-2222) immediately\*\***

* **Fire Extinguishers** – Refer to section 5 of the SDS for chemical specific firefighting measures. Both ABC dry powder and carbon dioxide extinguishers are appropriate for most fires.
* **Eyewash/Safety Showers** – Depending on the chemical hazard type, an ANSI approved eyewash station and safety shower may be required, easily accessed, and available within 10 seconds travel time for emergency use. Instruct personnel on the locations of eyewashes and safety showers, and how to activate them, prior to an emergency. Refer to [MIOSHA Fact Sheet: Eyewashes and Safety Showers](https://www.michigan.gov/documents/lara/lara_miosha_cet0199_628109_7.doc) to determine if an eyewash/safety shower is required for your specific chemical.

Please note: Additional hazards present in the laboratory may require that an eyewash or safety shower be present. This emergency equipment is required for treating exposures to workplace hazards such as chemical splashes, biological agents, welding sparks, metal shavings, or fine particulates like dust, dirt and sand.

1. **Health Threatening Emergencies**
   1. **Fire, explosion, health threatening hazardous material spill or release, compressed gas leak, or valve failure.**
      1. Call WSU Police (313) 577-2222.
      2. Alert people in the vicinity and activate the local alarm systems.
      3. Evacuate the area and go to your Emergency Assembly Point.
      4. Remain nearby to advise emergency responders.
      5. Once personal safety is established, call OEHS at (313) 577-1200.

Note: For compressed gas leaks, shut off gas supply only if this can be done safely, without risk to personnel.

* 1. **Injuries and Exposures:** 
     1. Remove the injured/exposed individual from the area, unless it is unsafe to do so because of the medical condition of the victim or the potential hazard to rescuers.
     2. Call WSU Police (313) 577-2222.
     3. Administer first aid as appropriate.
        1. Eye contact: Promptly flush eyes with copious amounts of water for a prolonged period (at least 15 minutes). Seek medical attention.
        2. Ingestion: Seek medical attention IMMEDIATELY. See first aid section of chemical Safety Data Sheet.
        3. Skin contact: Remove any contaminated clothing. IMMEDIATELY flush contamination from skin using the nearest emergency shower for a minimum of 15 minutes. Seek medical attention.
        4. Inhalation: Get to a source of fresh air. Seek medical attention.
     4. Call OEHS (313) 577-1200, to report the exposure and complete [Report of Injury](https://risk.wayne.edu/files/rofi.pdf) form.
     5. Bring to the hospital copies of the Safety Data Sheets for all chemicals to which the victim was exposed.

1. **Non-Health Threatening Emergencies**
   1. **Injuries and Exposures**

For injuries and exposures that are not considered serious or a medical emergency, visit:

Henry Ford Occupational Health – Harbortown

3300 East Jefferson, Suite 100

Detroit MI 48207

(313) 656-1618

Monday – Friday 8:00 AM to 6:30 PM

If Henry Ford Occupational Health Center is closed or for serious injuries, visit:

Henry Ford Hospital – Emergency Room

2799 W. Grand Blvd.

Detroit MI 48202

(313) 916-8742

OR

Detroit Receiving Hospital - Emergency Room

4201 St. Antoine St, Detroit, MI 48201

Phone: (313) 745-3000

# **Minimum Training Requirements**

1. **General Training:**

* Online through the [Collaborative Institutional Training Initiative (CITI)](https://about.citiprogram.org/en/homepage/).
  + Laboratory Safety Training (general lab & chemical safety issues) and Hazard Communication
* [Fire Safety](https://risk.wayne.edu/fire-safety).

1. **Laboratory Specific Safety Training:**

* [Laboratory-Specific Safety Training](https://research.wayne.edu/oehs/docs/lab-safety-training-checklist.doc) checklist
* Review of SDS for chemicals involved in process/experiment.
* Review of this SOP.
* Review [WSU Hazardous Waste Management](https://research.wayne.edu/oehs/hazardous/chemical-waste) guidelines.
* Other: \_\_\_\_\_\_\_\_\_

# **Laboratory Personnel Review**

Prior to initiating work, lab personnel using these types of chemicals must complete the table below confirming that they have read and understood the above SOP and the associated hazards.

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| **Name** | **Signature** | **Date** |
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