**Laboratory Standard Operating Procedure**

Acutely Toxic Chemicals

|  |  |
| --- | --- |
| **Principal Investigator** | **Lab Space(s)/designated work area** |
| [name] | [lab spaces (i.e. room number(s))] |

This standard operating procedure (SOP) is intended to provide general guidance on how to safely work with chemicals or materials that are acutely toxic. Section 10.0 of this document identifies lab specific acutely toxic material(s) and special considerations. Section 10.0 must be completed and updated as necessary by the Principal Investigators.

**CONTENTS**

**SECTION 1.0 Hazard Summary**

**SECTION 2.0 Best Practices for Safe Handling of Acutely Toxic Chemicals**

**SECTION 3.0 Control of Hazards**

**SECTION 4.0 Disposal and Waste Management**

**SECTION 5.0 Designated Use and Storage Area(s)**

**SECTION 6.0 Decontamination Procedures**

**SECTION 7.0 Emergency Response & Spill Response**

**SECTION 8.0 First Aid Procedures**

**SECTION 9.0 Incident Documentation**

**SECTION 10.0 Lab Specific Acutely Toxic Chemicals and Special Considerations**

**SECTION 1.0 Hazard Summary**

‘Acute toxicity’ refers to adverse effects occurring after oral or dermal administration of a single dose of a chemical or multiple doses within 24 hours, or an inhalation exposure of four hours. These adverse effects, caused by short term exposure, can range from illness to death.

The Occupational Safety and Health Administration (OSHA) indicates that chemicals with a high degree of acute toxicity may be fatal or cause damage to target organs as a result of a single exposure or exposures of short duration, such as hydrogen cyanide, hydrogen sulfide and nitrogen dioxide. In general, a chemical must be considered acutely toxic if it falls within any of the following lethal dose (as determined by studies in rats) categories:

1. LD50 – ingestion: < 50 mg/kg

2. LD50 – contact (24hrs): < 200 mg/kg

3. LD50 – inhalation: < 200 ppm/1hr



The Acute Toxicity GHS Health Hazard Pictogram is used on containers and safety data sheets to identify actuely toxic chemicals.

**SECTION 2.0 Best Practices for Safe Handling of Acutely Toxic Chemicals**

* Review the chemical Safety Data Sheet and emergency procedures before starting any work requiring the use of acutely toxic materials.
* Review lab specific experimental procedures related to the use of acutely toxic material.
* Conduct work involving acutely toxic materials within a fume hood.
* Avoid handling acutely toxic material while working alone. At least one additional person trained in the safe handling of acutely toxic chemicals should be present in the general vicinity of the use area while an acutely toxic chemical is handled.
* Identify and demarcate all acutely toxic chemical use and storage areas by posting a hazard identification sign/posting (see Section 5.0) in the area.
* Remove all PPE and wash hands with soap and water immediately upon leaving the area where acutely toxic material is being used.
* Ensure storage containers are in good condition and compatible with the chemical.
* Use and store only the smallest practical quantities required for the experiments to be performed.
* Wipe down the area and/or equipment after each use to prevent an accumulation of chemical residue.
* Complete the online Acutely Toxic Chemical training module available on EHSS website, and laboratory-specific training prior to beginning experiments.

**SECTION 3.0 Control of Hazards**

**3.1 Engineering Controls**

1. Use acutely toxic materials in an EHSS inspected and functioning chemical fume hood. Sash heights must be maintained as low as possible to minimize escaping fumes and provide a physical barrier.
2. Emergency eyewash stations and safety showers must be readily accessible near chemical use areas.

**3.2 Personal Protective Equipment**

* In addition to the standard laboratory attire (i.e., long pants and closed toe shoes), the following PPE is recommended:
* ANSI certified (Z87.1) chemical splash goggles
* Knee-length lab coat
* Chemically compatible gloves (Consider double gloving)
* Review Section 10.0 (Lab Specific Acutely Toxic Materials and Special Considerations) for additional laboratory and chemical specific PPE requirements.
* Remove PPE immediately upon contamination and prior to leaving the use area.
* Wash hands with soap and water immediately after removing PPE.

**SECTION 4.0 Disposal and Waste Management**

* Collect all items contaminated with acutely toxic materials as hazardous waste. This includes empty chemical containers, pipette tips, wipes, and any other item that has come into contact with the chemical.
* Containerize and adhere a completed EHSS waste label to all acutely toxic waste. Place waste container(s) in the satellite accumulation area.

**SECTION 5.0 Designated Use and Storage Area(s)**

* Identify and demarcate designated use areas where acutely toxic chemicals will be used and stored with an appropriate in-lab posting (an example is provided below in Figure 1). A designated area may be an entire laboratory, a defined area within the laboratory, or a device such as a laboratory fume hood.

Figure 1. Acutely Toxic In-Lab Posting



* Segregate all acutely toxic chemicals from incompatible chemicals.
* Store acutely toxic chemicals in secondary containment.
* Store chemicals that are acutely toxic by inhalation in vented and exhausted chemical cabinets.

**SECTION 6.0 Decontamination Procedures**

* After use, wipe down the work area and/or equipment to prevent an accumulation of chemical residue. Decontamination procedures may vary depending on the chemical in use. Consult the chemical specific manufacture’s SDS for additional information.
* All materials generated during decontamination of the work area must be treated as a hazardous waste (see section 4.0).
* Decontaminate vacuum pumps or other contaminated equipment (glassware) before removing them from the designated use area.
* Consider lining all designated use areas with disposable absorbent pads in order to contain spills and potential contamination.
* Remove absorbent pad(s) once contaminated and dispose of as hazardous waste (see section 4.0).
* Remove PPE and wash hands with soap and water immediately after handling acutely toxic chemicals.

**SECTION 7.0 Emergency Response & Spill Response**

In the event of a Hazardous Material Spill or Emergency, the following procedure should be followed:

1. **Evacuate:** Immediately notify personnel in the affected area and evacuate the area.

2. **Notify:** Call DPS at 315.443.2224 from a safe location outside of the affected area.

3. **Stay:** in the safe location to meet emergency responders.

4. **Decontaminate:** Individuals exposed to a hazardous material should remove contaminated clothing and wash contaminated body area(s) with water.

5. **Do not re-enter the affected area until cleared to do so by EHSS, or emergency response personnel.**

**SECTION 8.0 First Aid Procedures**

All laboratory exposures and injuries must receive immediate first aid and medical evaluation even if the injury appears minor. Contact DPS immediately (315-443-2224) in the event of a laboratory emergency. The manufacturer’s Safety Data Sheet (SDS) should be referenced for determining appropriate first aid measures. In general, the following first aid measures are advised.

1. **Skin Contact:** Immediately remove all contaminated clothing and rinse affected area with water for at least 15 minutes. Seek medical attention immediately.
2. **Eye Contact:** Flush with water at an emergency eyewash station for at least 15 minutes. Hold eyelids open while flushing. Seek medical attention immediately.
3. **Inhalation:** Move to fresh air. Seek medical attention immediately.
4. **Ingestion:** Seek medical attention immediately.

**SECTION 9.0 Incident Documentation**

All laboratory incidents (e.g., injuries & near misses, spills, property damage, equipment failures) must be documented. Complete the online [Incident Report Form](http://ehss.syr.edu/laboratory-safety/laboratory-incident-reporting/) as soon it is safe to do so.

**SECTION 10.0 Lab Specific Acutely Toxic Chemicals and Special Considerations**

Identify all acutely toxic chemicals that are located in the laboratory and provide the chemical name, CAS# and a description of the process/procedure for which the chemical will be used in the table below. If a chemical requires additional or chemical specific PPE, special considerations, and/or must be handled a specific way, provide additional information in the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chemical Name** | **CAS #** | **Description of Process/Procedure**  (such as a general description of how the chemical will be used.) | **Additional PPE Required**  (such as face shields, chemical resistant aprons, rubber gloves, etc.) | **Special Considerations**  (list any unique hazards, incompatible chemicals, first aid, spill response, decontamination procedures, etc.) |
| [click to enter text] | [click to enter text] | [click to enter text] | [click to enter text] | [click to enter text] |
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