

Lab-specific Chemical SOP Template

The purpose of this template is to be used to describe specific procedures used when working with chemicals.



National Institutes of Health • Office of Research Services • Division of Occupational Health and Safety

STANDARD OPERATING PROCEDURE (SOPs)			
Title:			
Document No.	Document Page(s):	Author's Branch:	Effective Date:
Revision:	Revision Date:	Reviewed/Approved by:	Date:
Overseeing Official's Signature:		Date:	Procedure Location:
1	PURPOSE OF STANDARD OPERATING PROCEDURE		
<input type="checkbox"/> Specific laboratory procedure or experiment [Examples: synthesis of chemiluminescent esters, general organic synthesis, etc.]			
<input type="checkbox"/> Generic laboratory procedure that covers several chemicals [Examples: distillation, chromatography, etc.]			
<input type="checkbox"/> Generic use of specific chemical or class of chemicals with similar hazards [Examples: organic solvents, mineral acids, etc.]			
2	DESCRIPTION OF PROCESS/ EXPERIMENT		
<i>[Provide a brief description of your process or experiment, including its purpose. Do <u>not</u> provide a detailed sequential description as this will be covered by section #6 of this template. Indicate the frequency and duration below.]</i>			
Frequency:	<input type="checkbox"/> one time <input type="checkbox"/> daily <input type="checkbox"/> weekly <input type="checkbox"/> monthly <input type="checkbox"/> other: _____		
Duration per experiment:	_____ minutes; or _____ hours		
3	SAFETY LITERATURE REVIEW & HAZARD SUMMARY		
1. Hazardous Substances <i>[List hazardous substances and their associated health and safety hazards. Examples of potential hazards include toxicity, reactivity, flammability, corrosivity, pressure, etc. Refer to Safety Data Sheets (SDSs) and other resources, as needed.]</i>			

2. *Other Hazards*

[List nonchemical hazards, e.g., biological hazards, electrical hazards, physical hazards (including sharps), mechanical hazards, nonanes radiation, or ionizing radiation.]

3. **References**

[List all references you are using for the safe and effective design of your process or experiment, including safety literature and peer-reviewed journal articles.]

4

STORAGE REQUIREMENTS

[Describe special handling and storage requirements for hazardous chemicals in your laboratory, especially for highly reactive/unstable materials, highly flammable materials, and corrosives.]

5

STEP-BY-STEP OPERATING PROCEDURE

[For each step's description, include any step-specific hazard, personal protective equipment, engineering controls, and designated work areas in the left-hand column.

- a. **Guidance on Engineering and Ventilation Controls – Review safety literature and peer-reviewed journal articles to determine appropriate engineering and ventilation controls for your process or experiment. Guidance is available from health and safety specialists through DS (301) 496-2960.**
- b. **Guidance on Personal Protective Equipment - To assist with your PPE selection, contact your health and safety specialists through DS (301) 496-2960. Respiratory protection is generally not required for lab research, provided the appropriate engineering controls are employed. For additional guidance on respiratory protection see the [NIH respiratory protection program](#).**
- c. **Designated work area(s) - Required whenever *Particularly Hazardous Substances (PHS)* - carcinogens, highly acutely toxic substances, or reproductive toxins are used. Refer to the Chemical Hygiene Plan, Section X: Working with Particularly Hazardous Substances for more information.** The intent of a designated work area is to limit and minimize possible sources of exposure to these materials. The entire laboratory, a portion of the laboratory, or a laboratory fume hood or bench may be considered a designated area.

Describe the possible risks involved with failure to follow a step in the SOP in the right-hand column.]

Step-by-Step Description of Your Process or Experiment

Potential Risks if Step is Not Done or Done Incorrectly (if any)

<p>1. Don personal protective equipment.</p> <p><input type="checkbox"/> appropriate street clothing (long pants, closed-toed shoes)</p> <p><input type="checkbox"/> gloves; indicate type: _____</p> <p><input type="checkbox"/> safety goggles <input type="checkbox"/> safety glasses <input type="checkbox"/> face shield</p> <p><input type="checkbox"/> lab coat <input type="checkbox"/> flame-resistant lab coat</p> <p><input type="checkbox"/> other: _____</p>		
<p>2. Check the location/accessibility/certification of the safety equipment that serves your lab:</p>		
Item	Status	
Laboratory Fume Hood/Glove Box or other Ventilation Control	<p>Location: _____</p> <p><i>Check sticker to ensure that hood was certified within last 12 months.</i></p>	
Eyewash/Safety Shower	<p>Location: _____</p> <p><i>Ensure that it is accessible, not blocked.</i></p> <p><i>Check tag that it has been tested within last month.</i></p>	
First Aid Kit	Location: _____	
Chemical Spill Kit	Location: _____	
Fire Extinguisher	Location: _____	
Telephone	Location: _____	
Fire Alarm Manual Pull Station	Location: _____	
3. [Describe the next step in the procedure.]		
4. [Describe the next step in the procedure. Insert additional rows in table, as needed.]		

5. Dispose of hazardous solvents, solutions, mixtures, reaction residues, etc. as hazardous waste.	
6. Clean up work area and lab equipment. <i>[Describe specific cleanup procedures for work areas and lab equipment that must be performed after completion of your process or experiment. For carcinogens, acutely toxic substances, and reproductive toxins, designated areas must be immediately wiped down following each use.]</i>	
7. Remove PPE and wash hands.	
6 EMERGENCY PROCEDURES	
<p>1) Fire and/or Explosion Procedure</p> <ul style="list-style-type: none"> a) Have everyone evacuate to a safe area. If possible, close doors behind you as you leave. b) Call the NIH Division of Fire and Rescue Services (fill out information for your site as appropriate below). <ul style="list-style-type: none"> Bethesda (main campus): 911 on-campus; 9-911 off-campus, 301-496-9911 from a cell phone Baltimore, MD 911 (cell phone) Frederick, MD 911 Hamilton, MT 911 Research Triangle Park, NC 911 (landline) 919-541-2800 (cell phone) c) Do not reenter the room until the Division of Fire and Rescue Services or appropriate authorities determine that there is no immediate detriment to life or health. <p>2) High-Level Hazard Spill Procedure</p> <ul style="list-style-type: none"> a) Spills >100 mL of any material or spills of Particularly Hazardous Substances of any volume may generate vapors above exposure limits; therefore, these spills may require the use of respiratory protection. b) Cover spill, if possible, to minimize vapors. If the spill is in a chemical fume hood or biosafety cabinet, close the sash before leaving. 	

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- c) Evacuate area and restrict access. Close the windows and doors upon exit. Attend to injured or exposed persons using emergency shower or eyewash. Follow procedures for chemical exposure below.
- d) **MANDATORY: As soon as possible, you must report the spill in a safe area by notifying NIH Division of Fire and Rescue Services (see above).**
- e) Stay near the site (in a safe area) until directed otherwise by first responders. Notify supervisor.
- f) Be prepared to provide the following information:
 - i) Name and phone number of knowledgeable persons that can be contacted.
 - ii) Name of chemical spilled, concentration and amount spilled, liquid or solid type spill.
 - iii) Number of injured, if any (refer to procedures for chemical exposure below).
 - iv) Location of spill
- g) Do not reenter the room until the fire department or appropriate authorities determine that there is no immediate detriment to life or health.

3) Chemical exposure

- a) For any suspected or verified chemical exposures or injuries, Call the NIH Division of Fire and Rescue Services (see above). Upon arrival, first responders will provide medical attention/transportation to any exposed/injured employees and assist with spill clean-up.
- b) **Sharps injury** (needlestick or subcutaneous exposure): scrub the exposed area thoroughly for 15 minutes using warm water and soap.
- c) **Skin exposure:** If possible, scrub the expose area thoroughly for 15 minutes using warm water and soap per SDS guidance, if applicable. If an exposure occurs in an area that cannot be washed using a sink, remove contaminated clothing per SDS guidance if applicable. Use the nearest safety shower for 15 minutes, or as stipulated by the chemical's SDS. Use a clean lab coat or spare clothing for cover-up.
- d) **Eye exposure:** Begin using the eyewash immediately. Remove contact lenses as soon as practical, but do not delay irrigation while waiting for contact lens removal. Irrigate the eyes for 15 minutes (or as stipulated by the chemical's SDS), holding the eyelids open with thumb and index fingers, rolling the eyelids to permit thorough cleaning.
- e) **Inhalation exposure:** Evacuate the contaminated area. Close the door to the area and post a sign. Prevent others from entering. Do not re- enter the space but stay in proximity.

4) Local Cleanup of Low-Level Hazard Spills

Do not attempt to clean up spills requiring respiratory protection. Call the Fire Department for assistance.

In the event of a low-level hazard spill (<100 mL of materials that are not PHS) that can be safely cleaned up by local personnel using readily available equipment (absorbent available in the Small Chemical Spill Kit) and laboratory PPE:

1. Notify personnel in the area and restrict access. Eliminate all sources of ignition.
2. Review the SDS for the spilled material or use your knowledge of the hazards of the material to determine the appropriate level of protection.
3. Personnel must wear a lab coat or smock, safety goggles, chemical appropriate type gloves and shoe covers as needed when cleaning up spills.
4. **Liquids:** Wipe up spilled liquids with absorbent pads. If using a neutralizing absorbent, cover the spill with the absorbent and allow to set for the prescribed contact time (usually 15 min.), and then scoop up and dispose of properly.
5. **Solids:** Gently cover with wetted paper towels or absorbent pads (unless chemical is water sensitive or reactive) to avoid raising dust and then wipe up.
6. Clean the spill area thoroughly with approved cleaning solution followed by clean water.
7. If spill is extensive within the containment, clean all interior surfaces after completion of the spill cleanup.
8. Double bag all waste in clear plastic bags (NSN-8105-01-195-8730) and attach a filled out chemical waste tag. For waste collection instructions consult the [NIH Waste Disposal Guide](#); for chemical waste pick-up contact (301) 496-4710; for chemical waste assistance call (301) 496-7990.
9. **MANDATORY: You must report the spill to your [IC Safety and Health Specialist](#).**

5) Injuries and Exposures:

- a) 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.
- b) Administer first aid as appropriate (see 3, above).
- c) As soon as possible (from a safe location), call the NIH Division of Fire and Rescue. Fill out information for your site as appropriate below. **Bethesda** (main campus):
911 on-campus;
9-911 off-campus,
301-496-9911 from a cell phone
Baltimore, MD
911 (cell phone)

Frederick, MD

911

Hamilton, MT

911

Research Triangle Park, NC

911 (landline)

919-541-2800 (cell phone)

- d) Report the injury as soon as possible to your local OMS clinic. Fill out information for your site as appropriate below.

Bethesda (main campus): Building 10, Room 6C306; (301) 496-4411

Baltimore, MD: 251 Bayview Blvd., BRC 01B210, (667) 312-5843

Frederick, MD: 8200 Research Plaza, Room 1B116; (301) 631-7233

Hamilton, MT: 903 South 4th Street, Room 5202; (406) 375-9755

Research Triangle Park, NC: 111 T W Alexander Drive, Building 101, Room E111; (984) 287-4178

- e) Bring copies of the SDSs for all chemicals the victim was exposed to, to the OMS clinic.

6) Lab-Specific Procedures

[This section is for any emergency procedures different from standard responses, or for additional emergency information due to the nature of materials or task. Include information on gas leaks, chemical spills, and personal exposure/medical emergency as appropriate.]

7) Building Maintenance Emergencies

- a) **Emergencies** should be called into the [Maintenance Operations 24 Hour Center](#) at (301) 435-8000.

8) Biosafety Lab Level 3 or 4 (BSL-3/BSL-4) facility issues, should be called into the **Maintenance Operations 24 Hour Center** immediately, at **(301) 435-8000.**

(Requester should identify specific Building, Location, Biosafety Level, on- site contact and Facility Issue when speaking to an agent.)

9) Unusual Odors should be considered a life safety **emergency.** **Enter specifics for your site below.**

Bethesda (main campus): 911 on- campus;

9-911 off-campus;

301-496-9911 from a cell phone

Baltimore, MD

911 (cell phone)

Frederick, MD

911

Hamilton, MT

911

Research Triangle Park, NC

911 (landline)

919-541-2800 (cell phone)

10) Local Notifications

[Identify the area management staff that must be contacted and include their work and after-hours numbers. This must include the principal investigator and may include the lab safety manager, facilities manager, etc.]

7

WASTE DISPOSAL

[Describe the quantities of waste you anticipate generating and appropriate waste disposal procedures. Include any special handling or storage requirements for your waste. Please see the NIH Chemical Waste Guidance Procedure for questions and guidance.]

8

TRAINING REQUIREMENTS

General Training (*check all that apply*):

- Introduction to Lab Safety – On-Line Training
- NIH Laboratory Safety Training 101
- Working Safely with HIV and Other Bloodborne Pathogens (for Non- Hospital Personnel)
- Other: _____

[Depending on the hazardous materials and processes you will be working with in this SOP, additional safety training may be required by NIH]

Location Where General Records Maintained:

Laboratory-specific training (*check all that apply*):

- Review of SDS for chemicals involved in process/experiment
- Review of this SOP
- Hands-on training
- Other: _____

Location Where Specific Records Maintained:

9

PRIOR APPROVALS

You **must** seek prior approval from your principal investigator (PI) or lab supervisor if you plan to use **Particularly Hazardous Substances (PHS)**.

You should also consult your PI or lab supervisor if your experiments involve **high-risk chemicals** (e.g., chemicals with a high level of acute toxicity,

carcinogens, reproductive toxins, and highly reactive materials) **and operations**, as special safety precautions may need to be taken. For additional guidance, see the [Chemical Hygiene Plan](#).

Your PI or lab supervisor's prior approval may be documented by his/her signature in the Approval Signature section of this document.

Prior Approval (*check if applicable*):

Prior approval from the PI or lab supervisor is required for this procedure.

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