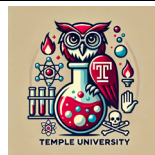


CHEMICAL SAFETY GUIDE

DEVELOPING a CHEMICAL SOP In LABORATORIES



Document # CHE057--Developing a Chemical SOP in Labs	Distribution: External
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1. DESCRIPTION:

This document is intended to provide guidance to Principal Investigators (PIs) and/or designated laboratory personnel in the creation of chemical Standard Operating Procedures (SOPs).

All laboratories should conduct a hazard assessment prior to working with a with any hazardous chemical and the development of any SOP. Hazard assessments are important and are recommended to be performed on chemicals and/or procedures that are new to the laboratory or have not been studied previously. The level of formality and what you need to document will depend on the chemical or process being reviewed or examined.

Contact EHRS via ehrschem@temple.edu for questions on developing a chemical SOP in laboratories.

2. METHODOLOGY:

2.1 Consult with workers, vendors, or other experts.

They may point out hazards you haven't considered or known about. For example, compressed gas vendors can explain appropriate handling. Include warning or trouble signs and what to do to prevent a laboratory accident. Submit the SOP for review by the Principal Investigator, Laboratory Supervisor, Instructor, and other laboratory personnel.

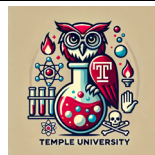
CAUTION: Consult with the Department, Facilities Management (Fire Marshal, Operations, PDG, etc.) and EHRS for information on any department, regulatory or building requirements.

2.2 Review literature and other guidance material.

- Consult the Safety Data Sheet (SDS) for specific chemicals to be used.
- Consult applicable code, standards, and references (Consult EHRS for assistance in obtaining)
- Review the literature for lessons learned.
- Review the experiment for what could go wrong/likely failures.
- What failures, even if unlikely, could lead to a catastrophic event?

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2.3 Ensure that all the required elements are included in the SOP.

The SOP template developed by EHRS serves as a tool to coordinate into succinct procedures and facilitates review with and by laboratory personnel. The laboratory can also develop alternative procedures to the SOP template, if the document includes the elements listed below:

2.3.1 Name of Principal Investigator (PI) and location of laboratory where chemical and/or process will be conducted.

2.3.2 Description: Include a brief description of how the chemical will be used and/or process performed.

2.3.3 Chemical Risk Identification/Information

- Include all potential safety hazards.
- Include the name or class, CAS number, primary hazard classification, physical state, concentration, the amount on hand, the estimated rate of use, and reactivity/incompatibility for the substance.
- Review the SDS, container label or other technical documents for this information. Recommended optional information include the manufacturer name and product number.

2.3.4 Significant Route(s) of Exposure: anticipate and check all potential route(s) of exposure based on the work that is conducted with the chemical

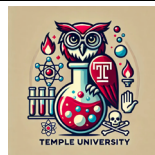
2.3.5 Additional materials to be reviewed prior to working with the chemical: List the documents that laboratory personnel must review prior to working with the chemical to ensure safe handling, include the name and their location.

2.3.6 Exposure Controls: Identify engineering controls and personal protective equipment; giving priority to engineering controls to mitigate or eliminate the hazard.

- Chemical Fume Hood: Should be used for chemicals that generate gases or vapors and for processes that can produce mists, fumes, or aerosols.
- Glove Box/Atoms Bag: Should be used if protection from atmospheric moisture or oxygen is needed; or when a chemical fume hood does not provide adequate protection from exposure to the substance.

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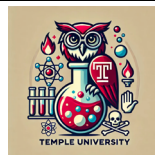
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- **Personal Protective Equipment (PPE):** Identify PPE that must be worn in addition to standard laboratory PPE.
 - **Disposable Lab Coats:** select a disposable lab coat if there is potential for contamination with a substance that should not go to laundry, or that could readily penetrate the lab coat.
 - **Face Shield:** Worn over chemical splash goggles, a face shield provides full face protection when working with large volumes or severely corrosive chemicals.
 - **Chemical splash goggles:** Should be worn when there is a possibility of a significant chemical splash. Many chemical manipulations, particularly where pressure is involved, warrant chemical splash goggles.
 - **Safety glasses:** Protect from flying particles and minor chemical splash, e.g., opening a centrifuge tube or a cryogen vial.
 - **Gloves:** Since no single glove material offers complete protection from all chemicals, it is important to select the glove that offers the best resistance for each application. Refer to the SDS or glove manufacturer compatibility charts for more information.
 - **Respirators:** Offer protection from inhalation when engineering controls are not sufficient. The use of a respirator must be approved by EHRS. Contact EHRS at 215-707-2520 if a respirator is needed.
- 2.3.7 **Use and Storage:** Review the Safety Data Sheet (SDS) to determine if specific handling and storage conditions exist for the chemical.
 - **Authorized personnel:** Select the type of personnel authorized to work with the chemical and/or PHS. Only personnel who are fully trained on the handling procedures and are aware of the hazard(s) associated with a chemical and/or a PHS are allowed to handle it. List the documents that a user must review prior to using this substance to ensure safe handling. Include the name and their location.
 - **Personnel handling or conducting procedures with PHSs should never work alone.**
 - **Laboratory Protocol/Procedure:** Provide a brief description of the part of the experiment that requires handling the substance, including the various concentrations.

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- Vacuum Systems (if used): Describe what will be done to ensure that the substance is not accidentally drawn into the vacuum system (e.g., cold traps, filters, etc.).
- Use Location: Designate and post the location(s) where the substance will be used. The clear posting of designated use areas will increase control, facilitate decontamination, and minimize contamination.

NOTE: A designated area may be the entire laboratory, a smaller section of a laboratory (e.g., section of benchtop), or a piece of equipment (e.g., chemical fume hood).

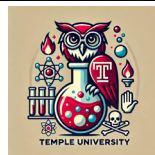
- Storage Location: Designate and post the location(s) where the substance will be stored. The clear posting of designated storage areas will increase control, facilitate decontamination, and minimize contamination.
- Hazard Communication and Signage: Signage should be posted, and information should be communicated to lab personnel.
 - Containers: A container label must be applied to all chemicals and/or PHSs. Ensure that the contents name and hazard warning are on the label.
 - Storage Areas: Post a PHS Storage Area sign in each area where the PHS is used. The sign must include a hazard warning (e.g., acutely toxic, water reactive, etc.) and all laboratory personnel must understand and be trained on the meaning of the designated storage sign.
 - Designated Areas: Post a PHS Designated Use sign in each area where the HHS is used. The sign must include a hazard warning (e.g., acutely toxic, water reactive, etc.) and all laboratory personnel must understand and be trained on the meaning of the designated storage sign.

CAUTION: Consult with the ULAR and EHRS if a hazardous chemical will be administered to animals.

- 2.3.8 Medical Attention & First Aid:** Some chemicals, “High-Risk” chemicals and/or PHS may require specific first-aid or emergency procedures, such as the administration of an antitoxin in the event of an exposure. The SOP must include information on first-aid procedures, supplies and emergency contacts beyond basic first aid, as well as requirements for follow-up medical consultations or examinations. Consult with the PI, Laboratory Supervisor, or Instructor if you are unsure what emergency/first-aid procedures are required for the material used.

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2.3.9 Decontamination:

- Include special decontamination procedures beyond basic laboratory housekeeping and cleaning. Good housekeeping is essential to the health and well-being of laboratory personnel. All equipment and work surfaces used with a “High-Risk” and/or a PHS must be decontaminated after each use. The decontamination method used must effectively remove/deactivate any residual of the substance.
- When leaving a designated area, remove any PPE to avoid cross contamination.
- Ensure a hand washing facility is available when working with PHSs.

2.3.10 Waste Management & Disposal: Identify and select applicable waste disposal procedures.

- Chemical/Hazardous waste collected by EHRS.
- Neutralization or deactivation prior to disposal which requires EHRS pre-approval.
- Other disposal method(s) which require EHRS pre-approval.

2.3.11 Training: Identify and select all applicable training prior to working with a chemical.

- University and EHRS required Trainings.
- Reading the Safety Data Sheet (SDS), the SOP, and other identified materials to be reviewed prior to working with a chemical and/or PHS.
- Hands-on training with the PI, Laboratory Supervisor, Instructor, or other experienced senior staff familiar with the safe handling of the PHS and/or working under the close supervision of an experienced senior staff until deemed competent to work unsupervised.
- List other training requirements specific to work.

2.4 Prepare for the Experiment: Perform a dry run

- Remove any combustible or unnecessary materials from the area around the experiment.
- Make sure there is a clear emergency egress and have appropriate attire and PPE.
- Have a plan to monitor the experiment.
- Review the hazards and make sure measures have been taken to reduce risk.
- Address other laboratory or facility operations that might affect the experiment or be affected by it.
- Practice using nonhazardous materials or using a scaled down process.

2.5 Identify unsafe conditions

- Do not perform an experiment in low humidity, with inadequate space or lighting, or

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in a cluttered or cramped area.

- Do not perform while working alone or without emergency response personnel, if needed.
- Do not perform the experiment if rushed, fatigued or ill.
- Do not proceed if there is evidence of a gas or a tubing or equipment failure.
- Report any near misses, incidents, or concerns to a supervisor.

2.6 Train all laboratory personnel on the SOP and document the training.

3. REFERENCES

3.1. Temple University Chemical Hygiene Plan