1. Introduction

4.

OSHA mandates the development of the SOP for the lab scale use of hazardous chemicals. The SOP is a simple document that identifies a process or the use of a chemical, the associated hazards and hazard controls, special handling and storage requirements, and proper contingency response. There are two types of SOPs: a task or activity specific SOP (Appendix C) and an SOP that relates to a specific chemical. Either type of SOP can be selected and written. If a particular chemical is used in the same manner for multiple tasks, then one SOP is sufficient for all work involving that chemical. If a more complicated activity involves multiple chemicals or other types of hazards the task specific SOP would be appropriate. The SOP must include the following elements:

General identification, including name of PI and location
Job or process identification or name of specific chemical
Hazard information, as identified on the Hazards Assessment
Required engineering controls and/or special precautions
Required PPE to be worn during the process
Transportation / storage requirements
Accident / spill response

These laboratory-specific SOPs must be included in the Chemical Hygiene Plan, as a separate section. The CHO will review these SOPs. The PI must ensure that laboratory personnel are trained on the use of the SOPs applicable to their activities.

9. Personal protective equipment

will be used as acceptance criteria. A sticker will be affixed to the side of the hood indicating the hood has adequate airflow. Any hood that does not meet the acceptable airflow criteria shall be removed from service until repairs can be completed. Signs shall be posted indicating the hood is "Out of Service".

11. Use of Laboratory Fume Hoods

1. Laboratory equipment that may discharge hazardous chemicals shall be vented to local exhaust devices.

2. Laboratory fume hoods shall be used when working with any material that might release hazardous chemical vapors or dust. Work activities that would require the use of a fume hood would include (but not limited to):

   handling chemicals with significant inhalation hazard, i.e. a chemical with an OSHA permissible exposure limit (PEL) of 100 parts per million (ppm) or less which has appreciable volatility
   performing procedures with chances of splatter or splash of hazardous chemicals
   operating processes where component failure may release hazardous chemicals with velocity
   handling of heated chemicals
   handling of corrosive materials
   carrying out reactions with strong exothermic reaction
   handling chemicals with significant vapor pressure, (highly flammable)
   where monitoring shows significant exposure

3. Personnel using a fume hood shall confirm that it is operating properly prior to use. For hoods without static pressure or airflow gauges, an airflow indicator (telltale) such as an eight-inch strip of light material dangling from the sash, (like a kimwipe), can be used to verify air is flowing into the hood.

4. Equipment in fume hoods shall be kept to a minimum to avoid blockage of airflow or hood face turbulence effects.

5. Laboratory hood sashes shall be kept in the down or closed position when not in use. Hood sashes should be kept as low as practicable during actual use to utilize the barrier capabilities of the sash.

12. Chemical Storage

1. Both the storage amounts and working amounts of toxic, flammable or hazardous chemicals in a laboratory shall be kept to a minimum.
2. Chemicals shall only be stored in a cool, dry, well-ventilated location and in containers with which they are chemically compatible. All chemicals shall be segregated by hazard class.
3. No chemicals shall be brought into or stored in laboratory offices, equipment storage rooms or other locations not specifically intended for chemical storage.
4. Each lab shall maintain adequate control of known or suspected carcinogens and highly toxic materials. The lab shall post a warning sign, which is highly visible, that depict the carcinogens and highly toxic materials that are used within the lab.

5. Larger capacity storage containers shall be stored on lower shelves.
6. Use of laboratory hoods as permanent storage devices is not permitted.
7. Where under-hood cabinets are used for chemical storage, venting of the cabinet to the fume hood is desirable.
8. Metal containers involved in the transfer of a flammable or combustible liquid shall be grounded and bonded together to minimize potential for ignition by a static electricity discharge.
9. Flammable materials shall not be stored with water reactive, explosive or self-igniting materials or next to strong oxidizing agents.
10. Flammable liquids shall be stored in approved flammable liquid storage cabinets, in accordance with NFPA 45, Standard on Fire Protection for Laboratories Using Chemicals. Flammable storage cabinets shall **not** be vented to the laboratory. The cabinet shall have the port hole closed or be vented directly into an exhaust system.
11. Concentrated reagents and other chemicals which could be harmful on skin contact shall be stored below eye-level, well back on properly constructed shelves where they are not likely to be knocked off.
12. Chemical reagents shall be kept in closed containers when not in use.

Below is a concise guide to the storage of most lab scale chemicals.

perchloric acid is separated from all other materials, and used in a fume designed for such use
hydrofluoric acid is separated from all other materials
concentrated nitric acid is separated from all other materials
inorganic acids (except bulleted items above) are stored separately
highly toxic materials (LD_{50} of 50 mg/kg or less) are stored separately
carcinogenic chemicals are stored separately.
bases are stored separately
strong oxidizing agents are stored separately
strong reducing agents are stored separately

The units should be located in areas that will be immediately accessible (reachable within 10 seconds).
The units should be free of obstructions at all times.
The eyewash units shall be

Appendix A
Hazard Assessment

The purpose of the Hazard Assessment is to identify hazards and determine appropriate controls to eliminate or mitigate those hazards to reduce the risk of injury or illness. Hazards can be classified as chemical, physical, biological, or ergonomic. Examples of hazards include heating chemicals, handling any toxic, corrosive, flammable, reactive, or cryogenic material, pressurizing a system, handling liquids in

Appendix B
Hazard Assessment Examples

Appendix D
Standard Operating Procedure for Chemicals

Principal Investigator: _____ Dept.: _____

Building: _____ Room(s): _____

Date: _____

Hazardous Chemical name: _____

Description of Chemical Hazard: _____

_____

Engineering controls to be implemented: _____

_____

_____

_____

PPE to be worn: _____

_____

Hazardous Material Transport/Storage Requirements:

_____

_____

Exposure / Accident Contact: _____

_____

Spill Response: _____

_____