

EH&S FACT SHEET

Environment, Health and Safety Information for the Berkeley Campus

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Laboratory-Specific Standard Operating Procedures (SOPs)

A Standard Operating Procedure (SOP) is a written set of instructions that document how to safely perform work involving hazardous materials or hazardous operations. SOPs are required by Cal/OSHA. There are no specific legal requirements regarding their content.

The Office of Environment, Health & Safety (EH&S) provides several Fact Sheets that serve as SOPs for some common hazardous chemicals such as "Hydrofluoric Acid". These Fact Sheets are available on the EH&S web site or by contacting EH&S at 642-3073.

Many labs work with specific hazards that are not covered by the EH&S Fact Sheets and will need to write their own laboratory-specific SOPs. In that case, start by writing SOPs for the most hazardous chemicals and processes. Anything capable of causing death, explosions, blindness, severe burns, etc., is a candidate for an SOP. Has there been a close call in the lab recently? This is another candidate for an SOP. Sharing SOPs between research groups and/or forming small groups to write them together can save time and effort. For common laboratory equipment (e.g., ultracentrifuges), the manufacturer's operations and maintenance manual may serve as, or supplement, the SOP.

SOPs may focus on any of the following:

- Process (e.g., peptide synthesis, distillation)
- Hazardous chemical (e.g., carbon monoxide, perchloric acid)
- Class of hazardous chemical (e.g., organic solvents)

The EH&S SOP Template provides a physical format for writing an SOP. The following 12 sections have corresponding sections in the SOP Template. When writing an SOP, include the following sections.

Section 1 — Process

List the process or type of process involving hazardous chemicals - for example, "atomic absorption spectroscopy for heavy metals." Include any unique equipment used. If the term "process" does not apply, proceed to Section 2.

Section 2 — Hazardous Chemicals Involved

List the hazardous chemicals (or class of chemicals) involved, including any hazardous products or by-products. Material Safety Data Sheets (MSDSs) for highly reactive or unstable chemicals should be on hand; MSDSs for all chemicals should be readily accessible. MSDSs for most chemicals are available through the EH&S web site or through the chemical manufacturer.



Section 3—Potential Hazards

Describe the potential dangers for each hazardous chemical or each element of the hazardous process or procedure. Include physical, health, and environmental hazards. To find hazard information, look up the MSDSs (available from the EH&S web site or from chemical manufacturers) or look online for other sources such as Cameo Chemicals, a National Oceanic and Atmospheric Administration (NOAA) database that provides hazard information in a user-friendly format. In addition, the Sigma-Aldrich web site, has technical bulletins that provide detailed information about various processes, equipment and classes of chemicals.

Section 4—Approvals Required

List the circumstances under which a particular laboratory operation, procedure, or activity requires prior approval from the Principal Investigator (PI), laboratory supervisor, or other personnel.

Section 5—Designated Area

Consider establishing a designated area for this operation within the laboratory. A fume hood, portion of the laboratory, or the entire laboratory may be the designated area.

Section 6—Special Handling Procedures and Storage Requirements

Describe special handling procedures and storage requirements including, (but not limited to): specific laboratory techniques; ventilation requirements; temperature controls; chemical incompatibilities; special containment devices; and access restrictions. If applicable, describe safe methods to transport the chemicals.

Section 7—Personal Protective Equipment (PPE)

List the PPE required for each activity or chemical. PPE includes gloves, laboratory coats, safety glasses, goggles, face shields, and respirators. If applicable, indicate the type of PPE (e.g., gloves, splash protection) needed for each phase of a process. For help with PPE selection or to determine if respirator use may be necessary, contact EH&S at 642-3073.

Section 8—Engineering/Ventilation Controls

List any engineering controls used. An engineering hazard control is generally defined as equipment or physical infrastructure that reduces or removes hazards from the laboratory. It can include specifically selected and arranged experimental equipment. Common engineering controls include the fume hood, glove box, biosafety cabinet and laser interlock.

Section 9—Spill and Accident Procedures

Describe procedures for handling potential emergencies related to this chemical or process such as accidental releases to the sanitary sewer, spills, fires, chemical burns to skin or eyes, shattered glassware, etc. Note the location of emergency equipment such as spill kits, emergency eyewash/showers, fire extinguishers, etc. Take care to describe any special procedures for dealing with personal exposures (e.g., calcium gluconate should be used for HF exposures). Identify the location of emergency response phone numbers and emergency contact phone numbers. **Emergency situations** can affect your ability to think clearly. It is important that everyone feel confident in their understanding of proper emergency procedures, including nearby lab members whose work may not be related to this SOP but who may need to respond in an emergency.



Section 10 —Waste Disposal

Describe any unique waste disposal procedures for the chemicals.

Section 11—Decontamination

Discuss any appropriate decontamination procedures for equipment, glassware, and clothing. Where applicable, include controlled areas (e.g., fume hoods, glove boxes) in the text.

Section 12 — Process Steps (Optional)

This section is useful for particularly complex or multi-step processes. List each step of the process or procedure chronologically on the left side of the SOP Template page. On the right side of the page and directly across from the corresponding process steps, list precautionary safety measures to be taken, including the use of specific laboratory techniques and PPE. If possible, describe indicators (visual or otherwise) which show whether the reaction, equipment, etc. is working safely as intended or that a hazardous situation may be developing.

SOPs should be reviewed by the PI or at least one peer who is doing similar research. Once an SOP is written, everyone performing work described by that SOP should read it carefully and sign the SOP Training Documentation page at the end of the SOP Template. The location of SOPs should be noted in the "Standard Operating Procedures (SOPs)" section of each laboratory's Chemical Hygiene Plan.

