



Environmental Analysis Program

Pomona College
Biogeochemistry Laboratory

SOP-L003

Hazardous Materials Handling

Standard Operating Procedure

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1. Purpose

This SOP covers the safe use, storage, disposal, and spill treatment of hazardous materials. It applies to staff, students, and researchers who use acid, base, explosive, caustic, and poisonous materials in EA Program laboratories.

This document does not explicitly cover radioactive materials.

2. Scope

- **Applies to:** All staff, students, and researchers handling hazardous chemicals in EA Program laboratories
- **Does not apply to:** Radioactive materials (see separate procedures)
- **Location:** SGM 133 and associated EA Program laboratory spaces

3. Responsibilities

Role	Responsibility
Lab PI	Approve SOP, ensure training compliance
Trained Personnel	Follow this SOP, report deviations
New Students	Complete training before independent use

4. Definitions

- **Caustic chemicals:** Chemicals such as ammonium hydroxide, potassium hydroxide, and sodium hydroxide that are able to burn or corrode organic tissue by chemical action.
- **Combustible liquid:** A liquid with a flashpoint at or above 60 °C (140 °F); can burn at temperatures usually above normal working temperatures.
- **Corrosive chemicals:** Strong acids and bases, dehydrating agents, nonmetal chlorides, and halogens that are health hazards and can damage skin, eyes, and respiratory tissue on contact. Store corrosives under the fume hood on low shelving or in approved storage cabinets. Gas cylinders should not be stored in the same cabinet with corrosive liquids. Segregate acids from bases and oxidizing acids from organic acids; separate nitric acid from all other acids.
- **Flammable liquid:** A liquid with a flashpoint below 60 °C (140 °F) that can ignite easily at normal working temperatures.
- **Hazardous material:** Any substance posing a physical or health hazard as defined by OSHA 29 CFR 1910.1200, including flammables, corrosives, oxidizers, toxins, and carcinogens (Occupational Safety and Health Administration, 1990).
- **Safety Data Sheet (SDS):** A standardized document describing a chemical's hazards, safe handling, storage, disposal, and emergency response procedures; located on the counter near the east entrance and at the PPE shelves in SGM 133.

5. Safety and Hazards

Hazards

- **Chemical:** Acids, bases, flammables, oxidizers, and toxic reagents are used routinely in EA Program labs.
- **Physical:** Glassware breakage, heat from hot plates and ovens, compressed gas cylinders.
- **Biological:** Soil and water samples may contain pathogens.

5.1. Required PPE

- ☐ Safety glasses / goggles
- ☐ Lab coat
- ☐ Nitrile gloves
- ☐ Face shield (concentrated acids and bases)

5.2. Required Training

- [SOP-L002 Laboratory Safety](#) before handling any hazardous chemical

6. General Safe Handling Procedures

6.1. Working with Hazardous Materials

- Read the SDS for every chemical before first use.
- Never work alone when handling concentrated acids, bases, or flammables.
- Use the fume hood when working with volatile, toxic, or corrosive chemicals.
- Cap unused containers immediately; return chemicals to designated storage after use.
- Purchase the smallest quantity needed; order corrosives in plastic-coated containers where available.

6.2. Physical Hazards

Glassware: Inspect glassware for cracks before use. Use extreme care when inserting glass tubing into stoppers. Use heat-resistant gloves near hot glassware.

Burns: Use hot plates or water baths instead of open flames. Tie up loose hair and wear snug-fitting, non-synthetic clothing when possible. Always use a fume hood with volatile organic compounds.

Chemical spills: Read the SDS before working with any hazardous chemical. Always wear PPE, cap unused chemical containers, and use fume hoods. Never work alone.

Mercury spills: Follow the college's emergency instructions for mercury spill response.

Explosions: Develop written protocols for explosive chemicals. Use fume hoods; avoid experiments in closed containers; always wear PPE.

Chemical inhalation: Never breathe deeply from a chemical mixture. Use a fume hood; consider gas monitoring equipment for experiments that generate toxic gases.

7. Chemical Storage

7.1. General Rules

- Store chemicals by hazard class, not alphabetically.
- Never store chemicals on the floor; use low shelves or cabinets with front lips.
- Secure shelves to the wall. Ensure shelves have lips to prevent containers from falling.

7.2. Storage by Hazard Class

Hazard Class	Storage Location
Flammable liquids	Flammable-storage cabinet (yellow, self-closing)
Corrosive acids	Acid cabinet under fume hood (separate from bases)
Corrosive bases	Base cabinet under fume hood (separate from acids)
Oxidizers	Separate from flammables and organics
Toxics / reagents	General chemical shelves, secured
Compressed gases	Chained to wall; away from corrosives
Refrigerated	Lab refrigerator (no food); door labeled

8. Waste Disposal

See [SOP-L006 Waste Disposal](#) for the complete waste classification and disposal procedures. Key rules:

- Segregate waste by chemical compatibility (acids, bases, halogenated solvents, non-halogenated solvents, heavy metals).
- Label every waste container with the chemical name, hazard class, and accumulation start date.
- Never pour hazardous chemicals down the drain without verifying local discharge limits.
- Schedule EH&S pickup when a container reaches 75% capacity or after 270 days of accumulation, whichever comes first.

9. References

Occupational Safety and Health Administration. (1990). *Occupational exposure to hazardous chemicals in laboratories, 29 CFR 1910.1450*. US Department of Labor. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1450>

10. Training Record

Training is documented in EA Program files. Before working independently, personnel must:

1. Read this SOP in full
2. Complete [SOP-L002 Laboratory Safety](#) training
3. Review SDS forms for all chemicals to be handled
4. Demonstrate understanding of spill response procedures
5. Be signed off by the PI or Chemical Safety Officer