



Environmental Analysis Program

Pomona College
Biogeochemistry Laboratory

SOP-L005

Chemical Inventory Management

Standard Operating Procedure

SOP Number	SOP-L005
Revision	1.1
Author(s)	Marc Los Huertos
Date	2026-06-26
Organization	EA Program, Pomona College

FOR INTERNAL USE ONLY

This document is the property of the Environmental Analysis Program at Pomona College.
Unauthorized distribution is not permitted.

Table of contents

1 Purpose	1
2 Scope	2
3 Definitions	2
4 Responsibilities	3
5 Safety Considerations	3
6 The Inventory System	3
6.1 Electronic Inventory	3
6.2 Physical Labels	4
7 Procedures	4
7.1 Receiving New Chemicals	4
7.2 Ordering Chemicals	4
7.3 Storage Assignment	5
7.4 Using and Depleting Chemicals	5
7.5 Disposing of Chemicals	5
7.6 Periodic Audits	6
8 Waste Minimization	6
9 References	6
10 Related SOPs	6
11 Training Record	7

1. Purpose

This SOP establishes the procedures for managing the chemical inventory in EA Program laboratories. A current, accurate inventory is essential for safety (knowing what is on hand in an emergency), regulatory compliance (fire code limits on flammable storage, Pomona College Chemical Hygiene Plan), waste minimization (avoiding duplicate purchases and expired stockpiles), and research efficiency (knowing what is available before ordering) (Occupational Safety and Health Administration, 2012; Standard on Fire Protection for Laboratories Using Chemicals, 2019).

2. Scope

- **Applies to:** All chemicals stored in EA Program laboratories (SGM 133, 134, 135), including reagents, standards, solvents, acids, bases, compressed gases, and prepared solutions
- **Does not apply to:** Common consumables that are not hazardous (Kimwipes, gloves, filter paper, etc.), or chemicals stored exclusively in other departments' spaces
- **Location:** All EA Program laboratory spaces

3. Definitions

- **CAS number (Chemical Abstracts Service Registry Number):** A unique numerical identifier assigned to every chemical substance by CAS; the most reliable identifier for chemicals because, unlike common names, it is unambiguous; required on every inventory spreadsheet row.
- **Chemical Hygiene Plan (CHP):** A written program required by OSHA's Laboratory Standard (29 CFR 1910.1450) describing the safety procedures, equipment, and work practices in place to protect laboratory workers from hazardous chemicals; Pomona College's CHP is maintained by EH&S (Occupational Safety and Health Administration, 2012).
- **Expiration date:** The manufacturer-recommended date after which a chemical's stated purity, concentration, or safety characteristics may no longer be guaranteed; after this date, the chemical must be tested or disposed of.
- **GHS (Globally Harmonized System of Classification and Labelling of Chemicals):** The United Nations system for standardizing chemical hazard communication; governs the content and format of Safety Data Sheets and container labels in the United States under the OSHA Hazard Communication Standard (Occupational Safety and Health Administration, 2012).
- **Hazard class:** A classification of a chemical's primary physical or health hazard (flammable, corrosive, oxidizer, toxic, carcinogen, etc.) per OSHA/GHS criteria; used to assign compatible storage locations and set fire code quantity limits (Standard on Fire Protection for Laboratories Using Chemicals, 2019).
- **NFPA 45:** The National Fire Protection Association standard governing fire protection for laboratories using chemicals; sets maximum allowable quantities (MAQs) of flammable and combustible liquids that may be stored in different lab occupancy types (Standard on Fire Protection for Laboratories Using Chemicals, 2019).
- **Peroxide-forming solvent:** A solvent that can spontaneously form explosive organic peroxides during storage (e.g., diethyl ether, THF, isopropanol); must be tested periodically with peroxide test strips and disposed of before the safe shelf life is exceeded; open-date label required on every container (National Research Council, 2011).
- **Safety Data Sheet (SDS):** A standardized 16-section document (GHS format) describing a chemical's identity, hazards, safe handling, storage, disposal, and emergency response; legally required to be accessible in the workplace for all hazardous chemicals; Section 7 (Handling and Storage) and Section 13 (Disposal) are most relevant to inventory management (Occupational Safety and Health Administration, 2012).
- **Small Quantity Generator (SQG):** A US EPA RCRA designation for facilities generating 100–1,000 kg of hazardous waste per month; Pomona College's classification, which sets specific accumulation time and storage requirements.

- **Surrogate chemical:** A non-hazardous chemical used for training and demonstration purposes in place of a hazardous substance.

4. Responsibilities

Role	Responsibility
Lab PI	Approve purchases; ensure compliance with fire code limits
Lab Manager	Maintain the inventory database; conduct audits
All Lab Personnel	Log new chemicals upon receipt; update inventory when chemicals are consumed or disposed
Chemical Safety Officer	Review inventory for incompatibilities and compliance

5. Safety Considerations

Accurate inventory management is a safety measure (Occupational Safety and Health Administration, 2012; Standard on Fire Protection for Laboratories Using Chemicals, 2019):

- First responders and the fire department use the chemical inventory to assess hazards during emergencies.
- NFPA 45 fire code limits the total quantity of flammable liquids that may be stored outside of approved flammable-storage cabinets (Standard on Fire Protection for Laboratories Using Chemicals, 2019).
- Knowing what is stored and where prevents accidental mixing of incompatible chemicals.
- Expired chemicals (especially peroxide-forming solvents) can become hazardous over time (National Research Council, 2011).

See [SOP-L003](#) for chemical storage, compatibility, and labeling requirements.

6. The Inventory System

6.1. Electronic Inventory

The EA Program maintains a shared Google Sheet (or equivalent spreadsheet) as the master chemical inventory. The spreadsheet is stored on the lab shared drive and accessible to all lab personnel.

Required columns:

Column	Description
Chemical name	Full name (no abbreviations or formulas only)
CAS number	Chemical Abstracts Service registry number
Manufacturer	Supplier name
Catalog number	Supplier catalog/part number

Column	Description
Lot number	Manufacturer lot number
Date received	YYYY-MM-DD
Quantity received	Amount and units (e.g., 500 mL, 100 g)
Current quantity	Updated when significantly depleted
Concentration/purity	If applicable (e.g., “ACS reagent grade, 37%”)
Expiration date	From manufacturer label, or calculated shelf life
Hazard class	Flammable, corrosive, oxidizer, toxic, etc.
Storage location	Room, cabinet/shelf code (e.g., SGM 133, Flam-1)
SDS on file	Yes/No
Owner/project	Who ordered it and for what project
Status	In use / Sealed / Expired / Disposed

6.2. Physical Labels

Every chemical container in the lab must have a label that includes:

- Chemical name (spelled out)
- Concentration (if a prepared solution)
- Hazard warning(s) per GHS
- Date received or date prepared
- Researcher name
- Expiration date (if applicable)

See [SOP-L003, Section 6.4](#) for detailed labeling requirements.

7. Procedures

7.1. Receiving New Chemicals

1. Inspect the container for damage, leaks, or missing labels when the shipment arrives.
2. If the container is damaged or leaking, do not accept it into the lab. Notify the lab manager. Follow spill procedures in [SOP-L004](#) if needed.
3. Add the chemical to the inventory spreadsheet immediately, completing all required columns.
4. Verify that the SDS is on file. If not, download it from the manufacturer’s website and add it to the SDS binder and the electronic SDS folder.
5. Label the container with the date received and the researcher’s name if not already present.
6. Store the chemical in the correct location based on its hazard class (see §5.3).

7.2. Ordering Chemicals

Before ordering a new chemical:

1. Check the inventory spreadsheet to see if the chemical is already in stock.

2. Check with other lab users to see if someone has an open container that can be shared.
3. Order only the quantity needed for the project. Purchasing excess chemicals generates waste and occupies storage space.
4. For highly hazardous chemicals, consult the PI and review the SDS before ordering (National Research Council, 2011).

7.3. Storage Assignment

Assign storage based on hazard class. Chemicals must be segregated by compatibility (Standard on Fire Protection for Laboratories Using Chemicals, 2019):

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 or bench; away from corrosives
Refrigerated/frozen	Lab refrigerator or freezer (no food)

! Important

Never store chemicals on the floor. Use low shelves or cabinets with front lips. Ensure shelves are fastened to the wall. See [SOP-L003](#), Section 6.3 for detailed storage rules.

7.4. Using and Depleting Chemicals

- When you open a sealed container for the first time, write the date opened on the label.
- When a container is nearly empty or fully consumed, update the “Current quantity” and “Status” columns in the inventory spreadsheet.
- Return every chemical to its designated storage location after use.

7.5. Disposing of Chemicals

When a chemical is expired, no longer needed, or in poor condition:

1. Update the inventory spreadsheet: change Status to “Disposed” and record the disposal date.
2. Follow the waste disposal procedures in [SOP-L003, Section 8](#): fill out a waste tag, complete the packing manifest, and schedule pickup.
3. Do not pour chemicals down the drain unless explicitly permitted by the SDS and local regulations for that specific chemical.

7.6. Periodic Audits

Conduct a full physical audit of the chemical inventory at least once per year (typically at the start of the fall semester) (National Research Council, 2011):

1. Print the current inventory spreadsheet.
2. Walk through every storage location and physically verify each item.
3. Note discrepancies between the spreadsheet and actual stock.
4. Remove expired chemicals for disposal.
5. Update the spreadsheet to reflect the audit results.
6. File the annotated printout as the audit record.

8. Waste Minimization

- Order the smallest quantity that will meet your needs.
- Share chemicals across projects when possible.
- Prepare only the volume of working solutions needed for an analytical session.
- Substitute less hazardous chemicals when feasible (e.g., replace a halogenated solvent with a non-halogenated alternative).
- Dispose of expired chemicals promptly rather than letting them accumulate.

See [SOP-L003, Section 8.3](#) for additional waste minimization guidance.

9. References

- Occupational Safety and Health Administration (2012)
- National Research Council (2011)
- (Standard on Fire Protection for Laboratories Using Chemicals, 2019)

National Research Council. (2011). *Prudent practices in the laboratory: Handling and management of chemical hazards* (Updated). National Academies Press. <https://doi.org/10.17226/12654>

Occupational Safety and Health Administration. (2012). *Laboratory safety guidance* (OSHA 3404-11R). US Department of Labor.

Standard on Fire Protection for Laboratories Using Chemicals, Pub. L. Nos. NFPA 45 (2019). <https://www.nfpa.org/codes-and-standards/nfpa-45-standard-development/45>

10. Related SOPs

SOP	Title	Relationship
L002	Laboratory Safety	General safety framework
L003	Hazardous Materials Handling	Storage, labeling, waste disposal

SOP	Title	Relationship
L004	Chemical Spill Response	Spill procedures for inventoried chemicals

11. Training Record

Before ordering, receiving, or storing chemicals independently, personnel must:

1. Read this SOP and [SOP-L003](#) in full
2. Demonstrate how to add a new chemical to the inventory spreadsheet
3. Locate SDS binders and the electronic SDS folder
4. Identify the correct storage location for a given hazard class
5. Be signed off by the lab manager or PI