NATIONAL ACCELERATOR LABORATORY

ENVIRONMENT, SAFETY & HEALTH DIVISION

Chapter 40: Chemical Lifecycle Management

Planning Requirements

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1 Purpose

The purpose of these requirements is to ensure adequate planning for the use of *chemicals* and other *hazardous materials*. They cover approving planned uses, identifying hazards and establishing controls, and final disposition. They apply to workers (as *chemical users*, *requesters,* and *receivers*), supervisors, ESH coordinators, the chemical lifecycle management program manager, and subcontractors.

2 Requirements

Before using a new chemical, workers and supervisors must plan for that use, considering the following:

1. The chemicals or types of chemicals to be used, their hazards and exposure limits, and their proposed storage and use locations
2. The building or area occupancy classification and the maximum chemical quantities allowed to ensure exempt or maximum amounts are not exceeded. The following occupancies are present at SLAC:
    1. A: assembly areas such as cafeteria and auditorium
    2. B: business areas, laboratories under exempt amounts, vocational shops
    3. F: factories and industrial areas
    4. S-1: moderate hazard storage and service garage
    5. S-2: low hazard storage

    Contact the SLAC fire marshal for details on occupancy and storage.[1]
3. Potential incompatibilities with other processes in the proposed work location
4. Potential hazard controls, including the need to acquire any specialized equipment, such as new spill kits, early warning devices, air monitoring equipment, emergency respiratory equipment, and chemical-specific antidotes (see Section 2.2, “Hazard Controls”)
5. The possibility of substituting a less hazardous substance
6. The possibility of acquiring the chemical from a fellow researcher/user at SLAC rather than placing a new order (see Section 2.3.1, “Redistribution”)
7. The ability to incorporate pollution prevention practices to minimize toxicity and quantity of all wastes and pollutants (see Chapter 22, “Waste Minimization and Pollution Prevention”)

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1 Refer to the California Building (24 CCR Part 2) and Fire (24 CCR Part 9) codes

8. The final disposition of the chemical

2.1 Approvals

The above considerations come into play when new chemicals and uses are being approved. In addition to project review by the Environment, Safety, and Health (ESH) Division (see ESH: Project Review Procedure), and work planning and control (Chapter 2, "Work Planning and Control"), the following may apply:

- Certain time-sensitive, highly hazardous, or toxic chemicals and threshold quantities for each are also subject to process safety analyses (see Section 2.1.1, "Process Safety Analyses").
- Additional approvals are required for experimental uses to ensure chemical hygiene requirements are met (see Laboratory Safety: Chemical Hygiene Plan).

2.1.1 Process Safety Analyses

SLAC is subject to two regulatory programs covering chemical process safety:

1. Cal/OSHA process safety management (8 CCR 5189) (see Appendix A for threshold quantities)
2. California Accidental Release Prevention Program (CalARP) (19 CCR 2735–2785) (see Article 8 for threshold quantities)

These two programs list certain highly hazardous or toxic chemicals and threshold quantities for each. If a facility uses one of these materials in any single process in an amount above the threshold quantity, the facility must prepare process safety management and accidental release prevention documentation for that process and implement the resulting safety and hazard control recommendations. The process safety management (PSM) program will be addressed with the help of ESH. The air quality program manager is responsible for the CalARP program. Any proposed new process at SLAC involving the use of chemicals listed on either the PSM or CalARP lists, or any modification of an existing process using these chemicals, must be reviewed by the appropriate program manager, who will perform a threshold determination analysis. In the event a threshold is exceeded, the line organization must change the process so exposure remains under threshold quantities, or perform the required safety studies and implement controls to satisfy the requirements of the PSM and CalARP programs.

2.2 Hazard Controls

To control exposure, the hazards associated with chemicals must be evaluated and appropriate hazard controls identified and implemented. Hazards should be eliminated through design or engineering before relying on administrative processes or personal protective equipment (PPE). Personnel selecting chemicals for use at SLAC will consider the following hazard controls:

2.2.1 Material / Process Design Selection

- Select the safest chemical for a given job.
- Use and store the smallest quantities necessary and minimize the amount of material on hand.
- Generate the smallest amount of hazardous waste.

2.2.2 Engineering Controls

- Provide engineering controls and suitable facilities to minimize hazards.
- Use the smallest vessels, apparatus, or equipment practical and safe for a given job.
- Complete design review to identify and qualify hazards, evaluate risks, and design appropriate control measures before installing equipment or using a chemical.
- Use warning devices (for example, horns and flashing lights).
- Comply with manufacturer operating instructions for equipment.

2.2.3 Administrative Controls

- Comply with purchasing procedures (see Chemical Lifecycle Management: Purchasing Procedures) and keep an accurate inventory (see Chemical Lifecycle Management: Management and Use Requirements).
- Take appropriate training.
- Review and understand safety data sheets on the materials being used.
- Label all chemicals and post appropriate hazard warning signs in areas of their use.
- Receive appropriate medical surveillance and certification.

2.2.4 Personal Protective Equipment

- Use appropriate personal protective equipment (PPE) for the chemicals involved, such as gloves, coveralls, aprons, indirectly vented goggles, and respirators (see Chemical Safety: Personal Protective Equipment Requirements).

2.3 Final Disposition

The end of the chemical lifecycle can take various forms. The material can be reused, recycled, returned, or become *hazardous waste* and disposed of or treated. Hazardous materials become hazardous waste not only when it is spent, contaminated, or spilt (or is an empty container last containing hazardous material), but also by a decision on its status, such as it is no longer useful or needed. Once a hazardous material meets the definition of a hazardous waste it must be managed more rigorously to meet regulatory requirements (see Chapter 17, "Hazardous Waste").

2.3.1 Redistribution

If the material is no longer needed or is excess inventory, SLAC encourages redistributing the material to another work group that can use it.

SLAC has various mechanisms to redistribute materials. Contact the chemical lifecycle management program manager for assistance.

2.3.1.1 In-house

SLAC will take any excess or unwanted material that is in good condition, even if it has been opened. This material will be stored for up to one year and made available at no cost to any work group that can use it.

2.3.1.2 Partnership with Stanford

SLAC has partnered with Stanford University to redistribute unopened laboratory chemicals. These chemicals are available for free to SLAC staff and users.

Note *Stanford does not accept compressed gases or opened containers.*

2.3.1.3 Direct Contact between Users

Chemical users can search the Chemical Management System to see who has ordered a material. This is a good route if chemical are needed in small amounts or immediately. For reports access, please contact the chemical coordinator.

2.3.1.4 Material Excess

If there is a large quantity of chemicals or a storage asset such as a tank, it can be characterized it as excess and posted it on the Department of Energy (DOE) Material Exchange for other DOE facilities to acquire for free.

2.4 Additional Subcontractor Requirements

Subcontractors using and storing their own chemicals on-site must meet the following additional requirements:

- Obtain ESH approval beforehand. This can be done through the ESH project review process (see ESH: Project Review Procedure).
- Have and make available upon request to the field construction manager (FCM)/service manager (SM) and contract administrator *safety data sheets (*SDSs*)* for all chemicals.
- Remove all chemical products from the site at the completion of their project.

3 Forms

The following forms and systems are required by these requirements:

- Chemical Management System. System used for ordering and tracking chemicals and storing safety data sheets

4 Recordkeeping

The following recordkeeping requirements apply for these requirements:

- None

5 References

SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001)

- Chapter 40, "Chemical Lifecycle Management"
  - Chemical Lifecycle Management: Purchasing Procedures (SLAC-I-730-0A09C-001)
  - Chemical Lifecycle Management: Chemical Screening Requirements (SLAC-I-730-0A09S-033)
  - Chemical Lifecycle Management: Management and Use Requirements (SLAC-I-730-0A09S-038)
  - Chemical Management Services (CMS)
  - Chemical Management Services Program Site (SharePoint)
- Chapter 1, "General Policy and Responsibilities"
  - ESH: Project Review Procedure (SLAC-I-720-0A24C-001)
- Chapter 2, "Work Planning and Control"
- Chapter 17, "Hazardous Waste"
- Chapter 22, "Waste Minimization and Pollution Prevention"
- Chapter 30, "Air Quality"
- Chapter 53, "Chemical Safety"
  - Chemical Safety: Personal Protective Equipment Requirements (SLAC-I-730-0A09S-017)
- Chapter 58, "Laboratory Safety"
  - Laboratory Safety: Chemical Hygiene Plan (SLAC-I-730-0A09S-040)

Other Documents

- Title 8, *California Code of Regulations*, "Industrial Relations", Division 1, "Department of Industrial Relations", Chapter 4, "Division of Industrial Safety", Subchapter 7, "General Industry Safety Orders", Group 16, "Control of Hazardous Substances", Article 109, "Hazardous Substances and Processes", Section 5189, "Process Safety Management of Acutely Hazardous Materials" (8 CCR 5189)
- Title 19, *California Code of Regulations*, "Public Safety", Division 2, "California Emergency Management Agency", Chapter 4.5, "California Accidental Release Prevention (CalARP) Program Detailed Analysis", Article 8, "Regulated Substances for Accidental Release Prevention" (19 CCR 2770)
- Title 24, *California Code of Regulations*, "California Building Standards Code"
  - Part 2, "California Building Code" (24 CCR Part 2)
  - Part 9, "California Fire Code" (24 CCR Part 9)
- San Mateo County Health Department. California Accidental Release Prevention Program (CalARP)