Chapter 30

Air Quality

Chapter Outline

1 Overview

SLAC operations produce a wide range of air emissions. Sources of emissions include standard equipment such as boilers, generators, and motor vehicles, but SLAC also generates emissions associated with the fabrication and operation of experimental equipment. Because hazardous materials are involved in many of these operations, SLAC is subject to various local, state, and federal air quality programs.

Many federal and state air quality requirements are incorporated into local government agency statutes and permits. Since July 2002, SLAC has operated in accordance with a site-wide *synthetic minor operating permit* (SMOP) issued by the Bay Area Air Quality Management District (BAAQMD), to whom authority has been delegated by the United States Environmental Protection Agency (USEPA). This *umbrella permit* establishes facility-wide emissions caps to regulate all significant emissions associated with designated air pollutants. The BAAQMD administers the SMOP in tandem with a second permit, referred to as a *permit to operate (PTO)*. The PTO establishes the basis for assessing operating fees by pro-rating the emissions generated by SLAC operations. A range of both general and specific permit conditions are included in the SMOP/PTO along with regional requirements. Permit conditions delineate emissions limits, abatement criteria, and recordkeeping and reporting requirements.

This chapter describes all current permit conditions for SLAC, additional air quality requirements from other governmental agencies, and SLAC's proactive air pollution abatement efforts taken in accord with its waste minimization/pollution prevention program. Using these elements, SLAC minimizes its impact on regional air quality and maintains compliance with air quality regulations.

While the air quality program manager takes the lead in these activities, other SLAC personnel play important roles, notably *emissions source custodians* and *site owners*. (See Section 5.1, "General", for summary information and Air Quality: Roles, Responsibilities, and Authorities Matrix for details.[1])

1.1 Hazards / Impacts

The following hazards and impacts are generally associated with air pollution:

- Physical discomfort: watery eyes, sneezing, coughing
- Aggravation of various medical conditions, including asthma and emphysema
- Respiratory illnesses, especially in sensitive individuals
- Carcinogenicity, in particular mesothelioma, which is associated with exposure to asbestos
- Toxicity, as represented by cyanide compounds, chlorine gas, and other poisonous substances

1 Air Quality: Roles, Responsibilities, and Authorities Matrix (SLAC-I-730-0A16S-005), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqRRA.pdf

- Degradation of exposed surfaces of buildings, increasing maintenance and shortening service life
- Global climate change due to greenhouse gas accumulation
- Destruction of the ozone layer

Examples of air pollutant categories and specific air pollutants associated with SLAC operations are listed below.

Note *Because air pollutants may exist as solids, liquids, and/or gases, the primary phases are noted for each example as it is stored and used at SLAC.*

- *Volatile organic compounds (VOCs)*, which include solvents such as 1,1,1-trichloroethane, alcohols, and solvent-containing paints and coatings (liquid, gas)
- *Greenhouse gases*, especially sulfur hexafluoride (SF_6), which is used extensively in electrical equipment, and to a lesser degree in research apparatus (gas)
- *Ozone-depleting substances (ODSs)*, mainly freons, like refrigerants R-11 and R-22 (liquid, gas)
- *Asbestos*, which was once a common component of building materials, including water pipes, wall board, insulation, floor tiles, and adhesives (solid)
- *Precursor organic compounds (POCs)*, such as isobutane, which react in the atmosphere to form photochemical smog (liquid, gas)
- Hexavalent chromium, which was present in the past at low concentrations in the effluent from the wastewater treatment plant (solid)
- Cyanide compounds, which are used in plating shop operations (solid, liquid, gas).
- Dust and *particulates*, especially as mobilized during excavation and other construction-related activities (solid)

1.2 Exposure Sources

Air emissions are generated throughout the SLAC facility and comprise a wide range of sources and chemicals. Exposure is typically by inhalation but can be from ingestion or direct contact leading to adsorption or absorption. Actual or potential exposure to hazardous air emissions is an important (although sometimes less obvious) element of two interrelated SLAC programs: job hazard analysis and mitigation (JHAM) and area hazard analysis (AHA). A JHAM is required for every SLAC employee and is closely linked to job descriptions and training assessments. AHAs have been developed for many areas on-site and are available for review by anyone planning to visit any of these areas.[2]

2 Scope

The requirements of this chapter apply to all persons at SLAC whose duties may involve work with or around emissions sources. Emissions sources at SLAC comprise both equipment and activities that involve hazardous materials and actual or potential release of air pollutants. Equipment includes both stationary

2 “Hazard Analysis Programs”, http://www-group.slac.stanford.edu/esh/general/hazanalysis/

sources, such as experimental apparatus and industrial machinery, and mobile sources, such as portable generators and trailer-mounted fuel tanks. Common activities that may release hazardous materials into the air include applying paint or epoxy and cleaning with solvents.

SLAC's permitted and exempt sources of air emissions are described below and linked to various regulatory deliverables in order to convey both the risks associated with certain air pollutants and the complex regulatory framework that addresses these pollutants. Compliance requirements for all sources, including emissions tracking and reporting, are presented.

The air quality programs at SLAC encompass a wide range of disparate activities and derive from a similarly wide range of complementary programs. For additional information on requirements regarding hazardous materials handling, see Chapter 40, "Hazardous Materials",[3] Chapter 17, "Hazardous Waste",[4] Chapter 27, "Asbestos",[5] and Chapter 20, "Lead Safety".[6] For SLAC policy concerning minimizing pollution, see Chapter 22, "Waste Minimization and Pollution Prevention".[7]

2.1 Exemptions

Exemptions to the requirements of this chapter include most types of vehicles operated at SLAC, including passenger cars and trucks, as well as forklifts and heavy equipment such as mobile cranes. However, fuel emissions are monitored indirectly by tracking the amount of gasoline and diesel fuel purchased or dispensed from the on-site gasoline dispensing facility (GDF).

Note *Car and truck emissions are specifically exempted from the SMOP, since they are already regulated under California's smog certification program. However, all vehicles operated on-site, including commercial delivery trucks, are subject to SLAC's policy that prohibits engine idling, as described in this chapter.*

Note *Many exemptions are allowed under BAAQMD regulations, typically for low-volume hazardous materials use, contained work areas, or research and development activities.*

3 Standards

The following standards have been adopted for the air quality program.

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3 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 40, "Hazardous Materials", http://www-group.slac.stanford.edu/esh/hazardous_substances/haz_materials/policies.htm

4 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 17, "Hazardous Waste", http://www-group.slac.stanford.edu/esh/environment/hazardous_waste/policies.htm

5 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 27, "Asbestos", http://www-group.slac.stanford.edu/esh/hazardous_substances/asbestos/policies.htm

6 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 20, "Lead Safety", http://www-group.slac.stanford.edu/esh/hazardous_substances/lead/policies.htm

7 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 22, "Waste Minimization and Pollution Prevention", http://www-group.slac.stanford.edu/esh/environment/pollution_prevention/policies.htm

3.1.1 Federal

- Title 33, *United States Code*, "Navigation and Navigable Waters" [8]
  - Chapter 26, "Water Pollution Prevention and Control" (Clean Water Act, 33 USC 1251 and following)
- Title 42, *United States Code*, "The Public Health and Welfare"[9]
  - Chapter 85, "Air Pollution Prevention and Control" (Clean Air Act, 42 USC 7401 and following)
- Title 40, *Code of Federal Regulations*, "Protection of Environment", Chapter 1, "Environmental Protection Agency" [10]
  - Part 60, "Standards of Performance for New Stationary Sources" (40 CFR 60)
  - Part 61, "National Emission Standards for Hazardous Air Pollutants" (40 CFR 61)
  - Part 63, "National Emission Standards for Hazardous Air Pollutants for Source Categories", Section 460, "Applicability and Designation of Source" (40 CFR 63.460)
  - Part 68, "Chemical Accident Prevention Provisions" (40 CFR 68)
  - Part 82, "Protection of Stratospheric Ozone" (40 CFR 82)
  - Part 372, "Toxic Chemical Release Reporting: Community Right-to-Know" (40 CFR 372)

3.1.2 State

- *California Health and Safety Code*, Division 20, "Miscellaneous Health and Safety Provisions", Chapter 6.95, "Hazardous Materials Release Response Plans and Inventory", Article 2, "Hazardous Materials Management" (HSC 25531–25543.3)[11]
- *California Health and Safety Code*, Division 26, "Air Resources", Part 6, "Air Toxics 'Hot Spots' Information and Assessment" (HSC 44300–44394)[12]
- Title 19, *California Code of Regulations*, "Public Safety", Division 2, "Office of Emergency Services", Chapter 4.5, "California Accidental Release Prevention (CalARP) Program Detailed Analysis" (19 CCR 2735.1–2785.1)[13]
- California Air Resource Board (CARB) rules and regulations[14]

3.1.3 Regional

- Bay Area Air Quality Management District (BAAQMD)
  - Rules and regulations[15]

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8 "United States Code: Main Page", http://www.gpoaccess.gov/uscode/index.html

9 "United States Code: Main Page", http://www.gpoaccess.gov/uscode/index.html

10 "Code of Federal Regulations: Main Page", http://www.gpoaccess.gov/cfr/

11 "California Law", http://www.leginfo.ca.gov/calaw.html

12 "California Law", http://www.leginfo.ca.gov/calaw.html

13 "California Code of Regulations", http://ccr.oal.ca.gov/

14 "Air Resources Board: Laws and Regulations", http://www.arb.ca.gov/html/lawsregs.htm

- Air toxic control measures (ATCMs) for asbestos and diesel engines[16]
- Manual of Procedures[17]

3.1.4 Local

- San Mateo County Department of Health, Division of Environmental Health, Toxic Programs (certified unified program agency [CUPA] for SLAC)[18]

4 Definitions

Note *Air quality program-specific acronyms, initialisms, and abbreviations are compiled for reference in Air Quality: Acronym List.*[19]

Abatement device. Any equipment or process, the sole purpose of which is to reduce the amount of one or more pollutants from the source

Air contaminant or air pollutant. Any material that, when emitted, causes or tends to cause the degradation of air quality. Such material includes smoke, dust, soot, grime, carbon, fumes, gases, odors, particulate matter, acids or any combination of these.

Airborne toxic control measure (ATCM). A set of procedures and requirements established by the California Air Resources Board (CARB) that reduces, avoids, or eliminates the emissions of a specific toxic air contaminant or equipment. Asbestos-containing materials and internal combustion engines are examples of emissions sources affected by ATCMs.

Air Toxics "Hot Spots" Information and Assessment Act of 1987. This act directs the California Air Resources Board (CARB) and its member air quality management districts to collect information from industry on emissions of potentially toxic air contaminants and to inform the public about such emissions and their impact on public health

Asbestos. Chrysotile, amosite, crocidolite, tremolite, anthophyllite, or actinolite in any form, whether native, chemically treated, or otherwise altered

Asbestos-containing material, regulated (RACM). Asbestos-containing material that has or will become friable, or that has been subjected to sanding, drilling, grinding, cutting, or abrading, or that may become or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation

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15 "BAAQMD - Rules & Regulations", http://www.baaqmd.gov/dst/regulations/index.htm

16 "Airborne Toxic Control Measures", http://www.arb.ca.gov/toxics/atcm/atcm.htm

17 "Manual of Procedures", http://www.baaqmd.gov/dst/mop/index.htm

18 "San Mateo County – Health Department – Toxic Programs", http://www.co.sanmateo.ca.us/smc/department/home/0,2151,1954_187544,00.html

19 Air Quality: Acronym List (SLAC-I-730-0A16V-002), http://www-group.slac.stanford.edu/esh/eshmanual/references/airListAcronym.pdf

*Bay Area Air Quality Management District (BAAQMD).*The public agency entrusted with regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay. It is one of 35 localized air districts in California. BAAQMD primarily addresses ambient and off-site air quality, in contrast to the Occupational Safety and Health Administration (OSHA), which regulates air quality in the workplace

Biodiesel. A cleaner-burning diesel fuel containing renewable non-petroleum compounds such as new and used vegetable oils and animal fats. Biodiesel 20 (with 20 percent biologically based constituents) is the formulation used exclusively in all SLAC diesel-powered equipment.

California Accidental Release Program (CalARP). An amalgam of similar federal and state programs that derives from the Clean Air Act Amendments of 1990, requiring facilities that store and/or use certain toxic or flammable substances above regulatory thresholds to develop a risk management program and prepare a summary, known as a *risk management plan*

California Air Resources Board (CARB). The department of the California Environmental Protection Agency (Cal/EPA) that gathers and validates air quality data, designs and runs air modeling programs, compiles the state's emissions inventory, and sets ambient air quality standards for the state. In addition, the CARB administers various high-level programs to improve air quality in California.

Chlorofluorocarbon (CFC). An inert, nontoxic, and easily liquefied chemical used in refrigeration, air conditioning, packaging, and insulation or as solvents and aerosol propellants. When these compounds are released and drift into the upper atmosphere, their chlorine components destroy the ozone layer, hence their designation as *ozone-depleting substances (ODSs).*

Criteria air pollutants. As required by the federal Clean Air Act,[20] the EPA identifies and sets standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, particulate matter (PM2.5), sulfur dioxide, lead, and nitrogen oxide. The term *criteria* identifies this as a risk-based program, since the EPA must describe the characteristics and potential health and welfare effects of these pollutants.

Demolition. Wrecking, intentional burning, moving or dismantling of any load-bearing structural member, or portion thereof, of a building or facility. This includes any related cutting, disjointing, stripping, or removal of structural elements (see *renovation*). Asbestos-containing material constitutes the primary concern in both demolition and renovation.

Emissions source. Any equipment or activity that releases or is capable of releasing one or more air pollutants in any form (gas, mist, aerosol or particulate) to the atmosphere. Emissions sources include such equipment as diesel-powered generators and such activities as the removal of asbestos containing material.

Emissions source custodian (ESC). The primary operator and/or point of contact for a permitted or exempted emissions source

Fugitive emissions. All emissions from unintended openings in process equipment, emissions occurring from miscellaneous activities relating to the operation of a facility, and those emissions that could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening

Gasoline dispensing facility (GDF). Any stationary facility that dispenses gasoline directly into the fuel tanks of vehicles (and as such, it is an emissions source). There is one GDF on the SLAC site.

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20 "EPA – Clean Air Act", http://www.epa.gov/oar/caa/; codified at 42 USC 7401 and following

Greenhouse effect. The warming of the Earth's atmosphere caused by a buildup of carbon dioxide and other heat-trapping gases

Greenhouse gas. Any gas that, when released into the atmosphere, acts to prevent natural dissipation of heat energy from the Earth, thereby increasing the ambient temperature of the biosphere

Hazardous air pollutant (HAP). Any pollutant that is listed pursuant to Section 112(b) of the federal Clean Air Act. The list currently contains 188 chemicals.[21]

Hazardous material. For the purposes of this chapter, a hazardous material is any substance that requires a material safety data sheet (MSDS). Also referred to as *HazMat*.

Material safety data sheet (MSDS). A document produced by chemical manufacturers and importers to provide chemical, physical, and hazard information about specific substances

National Ambient Air Quality Standards (NAAQS). Health-based pollutant concentration limits established by the EPA that apply to outside air. By comparison, indoor air quality standards, such as in the workplace, are regulated by the Occupational Safety and Health Administration (OSHA). (Compare *criteria air pollutants*.)

National Emissions Standards for Hazardous Air Pollutants (NESHAPs). Emissions standards set by EPA for air pollutants not covered by NAAQS that are used in specified industrial activities and may cause an increase in deaths or in serious, irreversible, or incapacitating illness; including toxic emissions such as benzene. Nearly all of the NESHAPs applied to SLAC are associated with the Plating Shop complex.

Non-precursor organic compound (NPOC). Any compound designated as having a negligible contribution to photochemical reactivity by the US EPA as published in the *Federal Register*. (See *precursor organic compound*.)

Organic compound. Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate and methane. Many organic compounds evaporate readily (see *volatile organic compound*), and so are primary chemicals of concern in regard to air quality.

Ozone (O_3). A pungent, colorless, toxic gas. Close to the Earth's surface, ozone is produced photochemically from hydrocarbons, oxides of nitrogen, and sunlight and is a major component of smog. At very high altitudes, it protects the Earth from harmful ultraviolet radiation.

Ozone-depleting substance (ODS). Any substance that acts to dissociate ozone molecules in the upper atmosphere, thereby reducing the Earth's ozone layer, which shields the Earth from ultraviolet radiation.. (Also see *chlorofluorocarbon*.)

Particulate matter (PM). Small particles inherent to certain air pollutants, such as combusted diesel fuel. PM10 pertains to particulate matter with a diameter of 10 microns or less. Smaller particulates, for instance PM2.5, are of particular concern for health, since particles this size and smaller tend to lodge in lung tissue and may enter the bloodstream.

Permit to operate (PTO). The regulatory mechanism used by BAAQMD to assess operating fees, based on prorated emissions from permitted sources associated with hazardous materials. (See *SMOP*.)

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21 Clean Air Act, Section 112, "Hazardous Air Pollutants", http://www.epa.gov/oar/caa/caa112.txt

Portable equipment. Any emission source that, by itself or in or on a piece of equipment, is designed to be or capable of being transported from one location to another (see *statewide portable equipment registration program*)

Precursor organic compound (POC). Any *organic compound* as defined above (excepting the NPOCs). POCs react in the atmosphere to form photochemical smog.

Renovation. An operation other than demolition in which *RACM* is removed or stripped from any element of a building, structure, plant, ship, installation or portion thereof. Renovation does not involve the removal or processing of a load-bearing structural member. (Compare to *demolition.* See *asbestos-containing material*.)

Risk management plan (RMP). A document required by subject facilities under the California Accidental Release Program (CalARP) that summarizes the management of risks associated with use and/or storage of any subject chemical above its corresponding regulatory threshold. The RMP is based on one or more worst-case scenarios involving a release of the chemical. At SLAC, the RMP focuses on potassium cyanide, which is used solely in plating shop operations and stored temporarily in the Hazardous Waste Storage Area (HWSA).

Statewide portable equipment registration program. A uniform system administered by CARB for statewide registration and regulation of portable internal combustion and associated equipment

Synthetic minor operating permit (SMOP). A permit issued under Title V of the Clean Air Act (CAA) to facilities that emit less than 25 tons of *hazardous air pollutants (HAPs)* in any 12-month period, even though the potential exists to exceed this limit. In this chapter, the SMOP is also referred to as the *umbrella permit*. (See *PTO*.)

Toxic air contaminant (TAC). Any air pollutant that may cause or contribute to an increase in mortality or in serious illness or that may pose a present or potential hazard to human health. TACs are referred to collectively as *air toxics*.

Umbrella permit. See *synthetic minor operating permit (SMOP)*

Volatile organic compound (VOC). Any *organic compound* (see definition) which would be emitted during use of a solvent or other material. Most other categories of air pollutants are subsets of VOCs.

5 Requirements

5.1 General

The primary objective of the air quality program is to achieve and maintain compliance with both SLAC-specific permit conditions and other, more generic, regulatory requirements. This involves preparing and submitting permit applications and renewals, coordinating emissions tracking and recordkeeping, preparing regulatory deliverables, and reviewing proposed operations that have the potential to generate air emissions. The recordkeeping process incorporates periodic reviews to evaluate monitoring data for potential emissions reductions.

While the air quality program manager takes the lead in these activities, other SLAC personnel play important roles. Two most important are described here.

5.1.1.1 Emissions Source Custodian

The emissions source custodian is the recordkeeping contact for a given emissions source. This role is designated by line management, the work area supervisor, or the area manager. Typically, the emissions source custodian is the person most closely involved with the daily operations associated with the source.

5.1.1.2 Site Owner

The site owner is typically the supervisor who oversees the emissions source custodian. A site owner evaluates all recommendations for emissions reduction and corrective actions.

5.1.2 Emissions Source Permitting and Permit Renewal

5.1.2.1 Clean Air Act Programs and the SLAC Permit

SLAC is subject to Title V of the Clean Air Act, which offers three regulatory pathways (for large, medium, and small generators of air pollutants) to achieve compliance. SLAC falls into the category of a medium-sized facility, and so a synthetic minor operating permit (SMOP) was the most appropriate avenue. Essentially, this permit indicates that SLAC is not classified as a major source of air pollutants but has the potential to exceed the defining threshold of 25 tons/year of hazardous air pollutants. The SMOP is renewed annually and incorporates all the separate permits issued for individual emissions sources. Primary requirements of the SMOP include monthly recordkeeping and reporting, along with proper maintenance and periodic inspections.

5.1.2.2 SMOP/PTO Permit Renewal

The SMOP/PTO, or *umbrella permit,* is subject to renewal each July. The permit renewal fee is due July 1, and it is prorated from emissions data from the previous 12-month period. The annual emissions summary is due July 31.

Note *New permits are no longer posted on approved emissions sources, since emissions source limits are managed on a site-wide basis. The program manager keeps all approved permits on file, and they are available for inspection in keeping with BAAQMD rules and regulations.*

Gasoline Dispensing Facility Permit Renewal

The gasoline dispensing facility (GDF) is the only permitted emissions source at SLAC for which a separate permit is maintained, even though GDF emissions are included in the emissions reports required under the umbrella permit. The GDF permit is renewed annually after a source test is successfully performed. The source test is coordinated with the SLAC Fleet Services Group within the Conventional and Experimental Facilities Department (CEF) by the program manager and is conducted by a licensed subcontractor.

Note *Despite its name, the GDF also dispenses Biodiesel 20 to diesel powered vehicles and equipment. This fuel reduces air emissions without compromising efficiency or requiring engine modifications.*

5.1.2.3 New Emissions Source Permits

Every new emissions source must be evaluated by the air quality project manager to determine whether it requires an air permit. A new source can be a newly purchased piece of equipment or a modified existing source, depending on the nature of the modification. If a permit is required, the program manager prepares and submits an application; upon its approval, a new permit is issued for that source for a period of one year. However, at the next general permit renewal the new emissions source and concomitant permit conditions are incorporated into the facility-wide SMOP. This consolidation greatly simplifies the renewal process.

Note *The permitting process may require weeks or months, depending on the proposed emissions source. To prevent delays, initiate the permitting process as early as possible by contacting the program manager in the planning stages of the project to identify and evaluate sources of air emissions.*

Accelerated Permitting Process

Proposed projects that meet specific criteria (for example, minimum distance from the nearest school, low emissions volume) may qualify for accelerated permitting under the BAAQMD regulations. Once a complete application package is submitted by the program manager, the operation may proceed without waiting for completion of the formal review.[22]

5.1.3 Permit Conditions

Accurate tracking and recordkeeping of permitted emissions sources is critical to achieving and maintaining regulatory compliance with permit conditions.

5.1.3.1 Emissions Tracking

Two methods are used to track permitted emissions: purchasing records and use logs. Although actual use data is preferable, purchasing records provide an acceptable leading indicator of chemical usage.

Purchasing Records

All hazardous materials must be purchased through the chemical management services (CMS) system[23] in order to facilitate "cradle-to-grave" chemical tracking.[24] Purchases of individual chemicals are summarized annually, and the total quantities are reported in regulatory deliverables.

Note *All new chemicals proposed for addition into the CMS database must be evaluated by ES&H program managers and subject matter experts for potential hazards, air emissions, special storage requirements, usage restrictions, and possible substitutes.*

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22 "BAAQMD Accelerated Permit Program", http://www.baaqmd.gov/pmt/air_permit_programs/accelerated_permit_program.htm

23 "Chemical Management Services (CMS)", http://www-group.slac.stanford.edu/esh/groups/cgs/cms/

24 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 40, "Hazardous Materials", http://www-group.slac.stanford.edu/esh/hazardous_substances/haz_materials/policies.htm

Use Logs for Construction Projects

Monthly recordkeeping has long been the standard mechanism for monitoring permitted sources of air emissions (see Section 5.1.3.2, "Recordkeeping"), and now applies to longer-term construction projects as well. Use logs must be provided to the program manager on a monthly basis to monitor use of the following categories of equipment and materials:

- **SLAC-owned equipment.** All such equipment (whether used for construction or routine operations) having actual or potential air emissions must be evaluated by the program manager and permitted if necessary. Once a source is permitted, monthly hazardous material use, fuel consumption, and/or equipment operation logs must be kept, as appropriate. In addition, it must be inspected at least semi-annually to ensure proper operation and compliance.
- **Subcontractor-owned equipment.** All such equipment must be registered with the CARB under the statewide portable equipment registration program (PERP). This program allows registered portable equipment to be operated anywhere in the state without having to obtain a permit for each individual location or project. Monthly hazardous material use, fuel consumption, and equipment operation logs must be kept. This requirement applies primarily to generators, boilers, or other portable equipment brought on-site temporarily for a specific project.
- **Project-specific hazardous materials.** A pre-work hazardous material list must be submitted to the program manager prior to the start of work. This list provides the basis for a *HazMat use report* at the end of the month or at the end of the project, whichever comes first. For longer-term projects, monthly use logs must be filled out and submitted to the program manager.

Note *All project-specific hazardous materials must be tracked, including those brought on-site by subcontractors. As such, project managers may want to consider purchasing all project-related materials through the CMS and providing them to the subcontractor in order to simplify HazMat tracking requirements.*

5.1.3.2 Recordkeeping

The program manager compiles and analyzes monthly emissions data supplied by emissions source custodians and keeps a cumulative tally for each source. (For detail, see Air Quality: Roles, Responsibilities, and Authorities Matrix.[25]) This allows the program manager to provide timely feedback to any emissions source custodian if a particular source may be approaching a regulatory threshold value. In addition, quarterly summaries are routinely provided to emissions source custodians for their review.

5.1.3.3 Permit-exempt Emissions Sources

In order to maintain permit-exempt status, these sources must be properly maintained and periodically inspected. Inspections and maintenance should be documented to show compliance with applicable requirements.

5.1.3.4 Inspections

Periodic inspection of both permitted and permit-exempt emissions sources, including abatement devices, is required semi-annually, at a minimum, in order to verify or update the regulatory status of each source.

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25 Air Quality: Roles, Responsibilities, and Authorities Matrix (SLAC-I-730-0A16S-005), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqRRA.pdf

5.1.4 Reporting

5.1.4.1 Regulatory Deliverables

The program manager is responsible for preparing a wide range of annual reporting deliverables to federal, state, and regional governmental agencies, as listed in Air Quality: Reporting Requirements.[26]

5.1.4.2 Reportable Equipment Malfunction

Under the new BAAQMD Reportable Compliance Activities Program, all regulated facilities are required to report in a timely manner any operating irregularity or monitoring anomaly that may indicate or result in excess emissions. Emissions source custodians must notify the program manager immediately to determine specific reporting requirements.

5.1.5 Emissions Control or Reduction

As formalized in the integrated safety and environmental management system (ISEMS) program, SLAC endeavors to minimize environmental impacts by analyzing risks, collecting monitoring data, reviewing industrial processes, investigating the use where feasible of abatement strategies and technologies, and encouraging continual process improvement. Separate permits are issued by BAAQMD for abatement devices to control emissions sources that otherwise would not be allowed to operate.

5.1.5.1 Risk Management Plan

Under the California Accidental Release Prevention Program (CalARP), SLAC is required to maintain a risk management plan (RMP) for any subject chemical that is stored or used on-site above its respective threshold. Currently, the only chemical regulated under CalARP is potassium cyanide, which is used in the Plating Shop Complex and stored as hazardous waste in the Hazardous Waste Storage Area (HWSA).

5.1.5.2 Hazardous Materials

As required by JHAMs, all persons working with hazardous materials should periodically review the material safety data sheet (MSDS) for all chemicals used in their respective work areas to identify any changes that may affect personal protective equipment (PPE), contingency procedures, or other aspects of hazard mitigation. In particular, the actual or potential air emissions associated with each chemical needs to be understood, since they are typically less obvious than visible hazards. One possible forum for this review is the annual performance evaluation for each employee during which the JHAM is reviewed and updated as necessary.

Note *When ordering chemicals, check each MSDS for updates, especially for routinely used chemicals. If workable alternatives to hazardous materials are available, choose the least hazardous material.*

5.1.5.3 Process Improvements

Under the ISEMS, any ideas for process improvements that would reduce emissions or increase efficiency are strongly encouraged and should be brought to the attention of the program manager.

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26 Air Quality: Reporting Requirements (SLAC-I-730-0A16S-004), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqReporting.pdf

5.1.4.4 Vehicle Emissions

SLAC's no-idling vehicle policy applies to all on-site vehicles and comprises two distinct elements:

1. After starting the engine, minimize idling time and set the vehicle in motion immediately; be prepared to drive before turning the ignition key.
2. Turn the engine off whenever the vehicle is to be left unattended for any length of time.

Implementation of this policy is ongoing and will involve articles on the SLAC website, dashboard stickers, mailbox flyers, or other reminders, as appropriate.

5.1.6 Hazardous Waste Disposal

In addition to air emissions, certain emissions sources produce hazardous waste that must be managed by the Waste Management Group (WM). Requirements for hazardous waste disposal include obtaining appropriate containers from WM, regularly inspecting waste accumulation areas, and following all requirements of Chapter 17, "Hazardous Waste".[27]

Note *Examples of hazardous wastes associated with emissions sources include spent solvents, wipes contaminated with solvents and oils, debris and waste from construction projects, baghouse waste from (as an example) the Metal Finishing Pre-Treatment Facility (MFPF), and waste from the paint shop.*

5.1.7 Personnel

5.1.7.1 Personal Protective Equipment

Anyone working with or around an emissions source must comply with all safety notices, such as warnings posted in area signage, or precautions specified in the MSDS for the associated hazardous material(s).

5.1.8 Roles and Responsibilities

A summary of the responsibilities of various SLAC personnel regarding the air quality program is presented in Air Quality: Roles, Responsibilities, and Authorities Matrix.[28] Primary and secondary responsibilities are designated for significant operations and key deliverables.

5.1.8.1 Air Quality Program Manager

The air quality program manager will

- Administer the various SLAC air quality programs to ensure compliance with air permit conditions and to meet other applicable requirements
- Submit annual reports to BAAQMD, EPA, and the Department of Energy (DOE) to document compliance with permit conditions and overall air pollution control at SLAC

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27 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 17, "Hazardous Waste", http://www-group.slac.stanford.edu/esh/environment/hazardous_waste/policies.htm

28 Air Quality: Roles, Responsibilities, and Authorities Matrix (SLAC-I-730-0A16S-005), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqRRA.pdf

- Complete and submit permit applications for new source permits, permit modifications for existing sources, and air permit reports, and maintain program files
- Provide and assist with completing forms related to air quality (such as demolition and renovation notifications)
- Budget and coordinate payment of fees for new permits, annual permit renewals, and demolition notices
- Coordinate the annual GDF source test performed by a licensed subcontractor
- Review copies of all monthly recordkeeping data and notify emissions source custodians of any compliance issues
- Review project plans to identify issues related to air quality and communicate pertinent regulatory requirements
- Evaluate new equipment to determine permit requirements
- Develop and track an annual budget for materials and services
- Respond to non-routine or one-time requests for information from regulatory agencies
- Gather additional air emissions information for regulatory reports on a case-by-case basis
- Keep up-to-date with BAAQMD rules and regulations and provide regulatory guidance to managers and supervisors on air quality related issues
- Maintain records of BAAQMD site inspections (both routine annual inspections and targeted inspections)
- Inspect both permitted and permit-exempt facilities on a regular basis (monthly or quarterly) to verify compliance with permit conditions and to verify that permit-exempt status is being maintained
- Provide advice on recycling, waste minimization, and pollution prevention in areas that impact air quality

5.1.8.2 Emissions Source Custodian

Emissions source custodians must

- Operate and maintain equipment in accordance with accepted industrial practices and permit conditions
- Log transactions for the distribution and / or use of hazardous materials associated with the emissions source
- Provide use logs to the air quality program manager in a timely manner on a monthly basis in a mutually acceptable format
- Inspect emissions sources and associated equipment at least once every six months to ensure proper operation and to verify compliance. Examples of such equipment include solvent tanks and pollution abatement and control devices.
- Notify the program manager in advance of any operational changes that may affect the emissions from that source
- Notify the program manager of any operational problems, irregularities, or anomalies

5.1.8.3 Site Owner

The site owner

- Is typically the supervisor who oversees the emissions source custodian
- Evaluates all recommendations for emissions reduction and corrective actions

5.1.8.4 SLAC Fleet Services Group

Fleet Services, which is under the Conventional and Experimental Facilities Department, will

- Coordinate with the program manager to arrange for the annual GDF source test
- Keep maintenance records for all vehicles and equipment belonging to the DOE or the General Services Administration (GSA)
- Record fuel dispensed into all DOE and GSA vehicles and equipment that are re-fueled on-site

5.1.8.5 Waste Management Group

The Waste Management Group (WM) will

- Deliver appropriately labeled, empty hazardous waste containers to designated areas, and pick them up when they are full, or before the 45-day limit for waste accumulation has been reached, whichever occurs first
- Ensure proper transport and offsite disposal of all hazardous wastes, including solvents, paints, coatings, and RACM

5.1.8.6 ES&H Program Managers/Subject Matter Experts

ES&H program managers/subject matter experts (PMs/SMEs) will

- Evaluate chemicals in the CMS inventory periodically for applicability, appropriateness, and potential restrictions on usage
- Evaluate proposed new chemicals and identify potential alternatives with more suitable characteristics
- Ensure that users are familiar with all aspects of MSDS information, including emphasizing the importance of using personal protective equipment (PPE) and observing stated compatibilities, contingency procedures, and proper disposal
- Coordinate with CMS and Haas TCM to generate chemical use inventories

5.1.8.7 Managers and Supervisors

Line management has overall responsibility for implementing the air quality program with the advice and support of the program manager. Managers and supervisors, in their capacity as site owners, must be familiar with applicable permit conditions and supervise personnel to ensure that equipment meets these conditions.

Specifically, managers and supervisors must ensure that personnel

- Receive all required on-the-job and hazard-specific training

- Complete inspection records for abatement devices and submit these records to the program manager semi-annually
- Retain original inspection forms and usage logs and forward copies to the program manager
- Notify the program manager of any changes in emissions from new or existing processes
- Ensure that WM is contacted to manage hazardous waste associated with permitted sources
- Review MSDSs for all chemicals used in their work area at least annually
- Comply with the requirements of Chapter 22, "Waste Minimization and Pollution Prevention", to develop and implement procedures for recycling chemicals and decreasing hazardous waste[29]

5.1.8.8 Personnel

SLAC personnel must

- Become familiar with general site activities through on-the-job and hazard-specific training and be able to recognize conditions (for example, heating, burning, dust generation) that typically cause air pollution
- Be familiar with requirements for any emissions source(s) in their work areas and promptly notify their supervisor of any known or suspected violations
- Notify their supervisor when permitted source equipment and abatement devices require repair or modification
- Use process knowledge to help identify new products or processes that may be environmentally preferable

5.2 Procedures and Specific Requirements

The following are required for this program. For a full list of implementing documents, see Section 6, "Exhibits".

For detailed information on roles and responsibilities, see Air Quality: Roles, Responsibilities, and Authorities Matrix.[30]

5.2.1 New Emissions Sources

Potential new emissions sources that must be evaluated by the program manager are described in Air Quality: New Emissions Source Requirements.[31]

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29 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 22, "Waste Minimization and Pollution Prevention", http://www-group.slac.stanford.edu/esh/environment/pollution_prevention/policies.htm

30 Air Quality: Roles, Responsibilities, and Authorities Matrix (SLAC-I-730-0A16S-005), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqRRA.pdf

31 Air Quality: New Emissions Source Requirements (SLAC-I-730-0A16S-001), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqSourceNew.pdf

Permit requirements for construction projects are described in Air Quality: Construction Project Air Permit Requirements.[32]

5.2.2 Permitted Emissions Sources

5.2.2.1 Identification

For an overview of regulated air pollutants and where they are found at SLAC, see Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference.[33]

For a list of permitted emissions sources and emissions limits, see Air Quality: Permitted and Permit-exempt Emissions Source Requirements.[34]

Note *Certain permitted emissions are strictly limited. Note individual limits, and also the proportion each emissions source contributes to the overall limit.*

5.2.2.2 Recordkeeping

All tracked data for permitted emissions sources must be submitted to the program manager on a monthly basis in a mutually acceptable format. In addition, these explicit timeframes apply to the following emissions sources:

- **Halogenated solvent cleaners.** Use logs must be submitted to the program manager on the first working day of each calendar month for the previous month. (Per NESHAPs reporting requirements).
- **Construction and industrial projects associated with permitted emissions sources**. See timeframe indicated on the use log forms in Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms. [35]

Note *The program manager also gathers additional air emissions information on a case-by-case basis for other regulatory reports.*

5.2.2.3 Inspections

Inspection forms developed for specific SLAC emissions sources are currently in use. For all other emissions sources, unless a more appropriate inspection form exists, use Air Quality: Emissions Sources Inspection Form.[36]

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32 Air Quality: Construction Project Air Permit Requirements (SLAC-I-730-0A16S-003), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqConstruction.pdf

33 Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference (SLAC-I-730-0A16T-001), http://www-group.slac.stanford.edu/esh/eshmanual/references/airRefPollutants.pdf

34 Air Quality: Permitted and Permit-exempt Emissions Source Requirements (SLAC-I-730-0A16S-002), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqSources.pdf

35 Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001), http://www-group.slac.stanford.edu/esh/forms/

36 Air Quality: Emissions Source Inspection Form (SLAC-I-730-0A16J-002), http://www-group.slac.stanford.edu/esh/forms/

5.2.3 Reporting

5.2.3.1 Regulatory Deliverables

Tracking logs are compiled and analyzed to fulfill many reporting requirements, in addition to complying with permit conditions. For a full list of air quality program deliverables to government agencies, see Air Quality: Reporting Requirements. [37]

5.2.3.2 Reportable Equipment Malfunction

Equipment failures that may result in excess emissions must be reported under the BAAQMD Reportable Compliance Activities Program. For more information on determining reportable failures, contact the program manager or see the BAAQMD program form.[38]

5.3 Training

5.3.1 On-the-Job Training

On-the-job training is primarily the responsibility of managers and supervisors, but the program manager can provide additional assistance so that personnel are trained to

- Ensure proper operation of any process equipment that has the potential to generate air emissions
- Correctly operate associated air-pollution control devices
- Fill out required reporting forms correctly and completely

5.3.2 Hazard-specific Training

Hazard-specific training requirements can be found in Chapter 40, “Hazardous Materials”, and also in the training section of any chapters relevant to a particular hazard.[39]

6 Exhibits

- Air Quality: Implementation Plan (SLAC-I-730-0A16M-001)[40]
- Air Quality: Roles, Responsibilities, and Authorities Matrix (SLAC-I-730-0A16S-005)[41]

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37 Air Quality: Reporting Requirements (SLAC-I-730-0A16S-004), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqReporting.pdf

38 “Reportable Compliance Activity Notification Form” http://www.baaqmd.gov/enf/forms/reportable_compliance_activity_form.pdf

39 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 40, “Hazardous Materials”, http://www-group.slac.stanford.edu/esh/hazardous_substances/haz_materials/policies.htm

40 http://www-group.slac.stanford.edu/esh/eshmanual/references/airPlanImplement.pdf

41 http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqRRA.pdf

- Air Quality: New Emissions Source Requirements (SLAC-I-730-0A16S-001)[42]
- Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference (SLAC-I-730-0A16T-001)[43]
- Air Quality: Permitted and Permit-exempt Emissions Source Requirements (SLAC-I-730-0A16S-002)[44]
- Air Quality: Construction Project Air Permit Requirements (SLAC-I-730-0A16S-003)[45]
- Air Quality: Asbestos Notification Procedure (SLAC-I-730-0A16C-001)[46]
- Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001)[47]
- Air Quality: Reporting Requirements (SLAC-I-730-0A16S-004)[48]
- Air Quality: Emissions Source Inspection Form (SLAC-I-730-0A16J-002)[49]
- Air Quality: Acronym List (SLAC-I-730-0A16V-002)[50]
- Clean Air Act, Section 112, "Hazardous Air Pollutants"[51]
- Bay Area Air Quality Management District Reportable Compliance Activity Notification Form[52]
- Bay Area Air Quality Management Asbestos Renovation Notification Form and Instructions[53]
- Bay Area Air Quality Management Demolition Notification Form and Instructions[54]

7 References

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

- Chapter 5, "Industrial Hygiene"[55]

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42 http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqSourceNew.pdf

43 http://www-group.slac.stanford.edu/esh/eshmanual/references/airRefPollutants.pdf

44 http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqSources.pdf

45 http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqConstruction.pdf

46 http://www-group.slac.stanford.edu/esh/eshmanual/references/airProcedAsbestosNotify.pdf

47 http://www-group.slac.stanford.edu/esh/forms/

48 http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqReporting.pdf

49 http://www-group.slac.stanford.edu/esh/forms/

50 http://www-group.slac.stanford.edu/esh/eshmanual/references/airListAcronym.pdf

51 http://www.epa.gov/oar/caa/caa112.txt

52 http://www.baaqmd.gov/enf/forms/reportable_compliance_activity_form.pdf

53 http://www.baaqmd.gov/enf/forms/1102_renov04_030105.pdf

54 http://www.baaqmd.gov/enf/forms/1102_demolition_041306.pdf

- Chapter 12, "Fire and Life Safety"[56]
- Chapter 13, "Traffic and Vehicular Safety"[57]
- Chapter 16, "Spills"[58]
- Chapter 17, "Hazardous Waste"[59]
- Chapter 19, "Personal Protective Equipment"[60]
- Chapter 20, "Lead Safety"[61]
- Chapter 22, "Waste Minimization and Pollution Prevention"[62]
- Chapter 27, "Asbestos"[63]
- Chapter 29, "Respiratory Protection"[64]
- Chapter 37, "Emergency Management"[65]
- Chapter 40, "Hazardous Materials"[66]
- Chapter 42, "Subcontractor Construction Safety"[67]

Other SLAC Documents

- "Chemical Management Services (CMS)"[68]
- "Hazard Analysis Programs"[69]

Other

- "EPA – Clean Air Act"[70]

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55 http://www-group.slac.stanford.edu/esh/hazardous_substances/industrial_hygiene/policies.htm

56 http://www-group.slac.stanford.edu/esh/general/fire_safety/policies.htm

57 http://www-group.slac.stanford.edu/esh/hazardous_activities/traffic_vehicular/policies.htm

58 http://www-group.slac.stanford.edu/esh/environment/spills/policies.htm

59 http://www-group.slac.stanford.edu/esh/environment/hazardous_waste/policies.htm

60 http://www-group.slac.stanford.edu/esh/general/ppe/policies.htm

61 http://www-group.slac.stanford.edu/esh/hazardous_substances/lead/policies.htm

62 http://www-group.slac.stanford.edu/esh/environment/pollution_prevention/policies.htm

63 http://www-group.slac.stanford.edu/esh/hazardous_substances/asbestos/policies.htm

64 http://www-group.slac.stanford.edu/esh/hazardous_substances/respirator/policies.htm

65 http://www-group.slac.stanford.edu/esh/emergency/chapter/policies.htm

66 http://www-group.slac.stanford.edu/esh/hazardous_substances/haz_materials/policies.htm

67 http://www-group.slac.stanford.edu/esh/hazardous_activities/subcon_construction/policies.htm

68 http://www-group.slac.stanford.edu/esh/groups/cgs/cms/

69 http://www-group.slac.stanford.edu/esh/general/hazanalysis/

70 http://www.epa.gov/oar/caa/

- "BAAQMD Accelerated Permit Program"[71]

8 Implementation

The requirements of this chapter will be implemented according to the schedule in Air Quality: Implementation Plan.[72]

9 Ownership

Department: Chemical and General Safety

Program: Air Quality

Owner: Program Manager

71 http://www.baaqmd.gov/pmt/air_permit_programs/accelerated_permit_program.htm

72 Air Quality: Implementation Plan (SLAC-I-730-0A16M-001), http://www-group.slac.stanford.edu/esh/eshmanual/references/airPlanImplement.pdf

Air Quality: Implementation Plan

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

The requirements of Chapter 30, "Air Quality", will be phased in according to the following schedule.

Section Number	Section Title	Requirement Note	Effective Date	Schedule Note
5	Requirements			
5.1	General Requirements			
5.1.1	Emissions Source Permitting and Permit Renewal		Immediate	Already in place
5.1.2	Permit Conditions		Immediate	Already in place
5.1.2.1	Emissions Tracking		Immediate	
5.1.2.2	Recordkeeping		Immediate	Already in place
5.1.2.3	Permit-exempt Emissions Sources (No Idling Policy)		Immediate	
5.1.2.4	Inspections		Immediate	
5.1.3	Reporting		Immediate	
5.1.4	Emissions Control or Reduction		Immediate	
5.1.5	Hazardous Waste Disposal		Immediate	Already in place
5.1.6	Personnel		Immediate	
5.1.7	Roles and Responsibilities		Immediate	
5.2.1	New Emissions Sources		Immediate	Already in place

1 SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

Section Number	Section Title	Requirement Note	Effective Date	Schedule Note
5.2.2	Permitted Emissions Sources		Immediate	Already in place
5.2.3	Reporting		Immediate	
5.3	Training		Immediate	

Air Quality: Roles, Responsibilities, and Authorities Matrix

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

The following tables summarize major air quality program requirements and map them to the appropriate responsible person(s).

Program requirements are divided into *operations* and *construction activities*:

- Table 1 pertains to operations, which include routine industrial activities such as electroplating, welding, saw cutting, solvent cleaning, and painting, as well as running experimental apparatus.
- Table 2 pertains to construction activities, which include new construction, demolition of buildings, component assembly, and installation of large stationary equipment.

Air quality program requirements in the operations category are nearly always performed by SLAC employees, while requirements for construction activities are performed by both SLAC and non-SLAC employees, as shown in the tables.

Personnel type is further subcategorized in terms of the job classification – technical, administrative (admin), general or industrial – and typical job titles are associated with air quality program requirements.

The level of responsibility for each job title is described as

- Primary: the person who does the activity
- Secondary: the person who verifies that the activity was done and/or communicates the results to the appropriate persons or agency
- Peripheral/support: May share responsibility for this requirement
- No or not applicable (n/a): no responsibility for this requirement

Note *This overview is intended to map out the most common requirements and types of personnel responsible for them. For a full list of program requirements, check Chapter 30, "Air Quality", or contact the air quality program manager.*

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

Table 1 Operations

	SLAC Personnel						
	Technical	*Technical*	*Admin*	*General*	*Admin*	*Technical*	*Technical*
Air Quality Program Requirements	Emissions Source Custodian	Non-ES&H Staff (or point of contact) CEF/SSRL/LCLS	Project Manager (if any)	SLAC Employee	Supervisor (of emissions source custodian, typically)	Researcher (if not an emissions source custodian)	Air Quality Program Manager
Monthly recordkeeping and reporting	primary	operations logs and maintenance logs	long-term projects only	noi	secondary	secondary	secondary
Chemical ordering and inventory	primary	Primary	primary	as appropriate	secondary	primary	review and advise
Maintenance	primary	as appropriate	maybe	Not likely	secondary	not likely	secondary
New source permit (for SLAC-owned equipment)	secondary	No	possibly	No	secondary	no	primary
Inspection (permitted sources)	primary	If delegated by EnvSC	n/a	no	secondary	no	no
Inspection (permit exempt sources)	primary	If delegated by EnvSC	n/a	no	secondary	no	no

CEF = Conventional and Experimental Facilities Department; SSRL = Stanford Synchrotron Research Laboratory; LCLS = Linac Coherent Light Source; EnvSC = Environmental Safety Committee

Table 2 Construction Activities

	SLAC Personnel							Non-SLAC Personnel		
	Technical	*Technical*	*Admin*	*General*	*Admin*	*Technical*	*Technical*	*Technical*	*Industrial*	*Industrial*
Air Quality Program Requirements	Emissions Source Custodian	Non-ES&H staff (or point of contact) CEF/SSRL/LCLS	Project Manager (any)	SLAC Employee	Supervisor (of emissions source custodian typically)	Researcher (if not an emissions source custodian)	Air Quality Program Manager	Researcher	Contractor / operator	Portable Equipment Owner
New source Permit / documentation (for non-SLAC equipment)	n/a	n/a	secondary	no	n/a	n/a	secondary	secondary	secondary	primary
Demolition / Renovation Notice	for discrete projects	per project specs	per project specs	per project specs	secondary	per project specs	primary (facilitator)	n/a	n/a	n/a
Pre-work Chemical List	report any changes to AQPM	report any changes to AQPM	secondary	no	secondary	primary	n/a	yes	yes	no
Use logs: HazMat Equipment Fuel Use	primary	operations logs and maintenance logs	long-term projects only	no	secondary	secondary	secondary	yes	yes	yes
Post-work chemical usage report	no	Possibly	secondary	no	secondary	primary	n/a	yes	yes	no

CEF = Conventional and Experimental Facilities Department; SSRL = Stanford Synchrotron Research Laboratory; LCLS = Linac Coherent Light Source; AQPM = air quality program manager

Air Quality: New Emissions Source Requirements

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

All new sources that involve actual or potential air emissions must be evaluated by the air quality program manager beforehand to determine if an emissions source permit is required. The following categories of new sources are discussed below: construction and demolition projects; hazardous materials (new or new use); and equipment (new or lease-to-purchase).

Note *Emissions sources includes both individual pieces of equipment, such as parts cleaners and generators, and activities that release emissions, such as construction, applying epoxies or paint, and wipe-cleaning with solvents.*

Note *For the purposes of the air quality program,* hazardous material *(also referred to as* HazMat*) is any material that requires a material safety data sheet (MSDS).*[2]

Construction and Demolition Projects

All construction and demolition projects, whether performed by SLAC employees or subcontractors, must be evaluated for both potential emissions and reporting and recordkeeping requirements based on the hazardous materials and equipment involved. The air quality program manager determines these requirements by evaluating a Pre-work HazMat List submitted by the construction project manager or operator. This form is included in Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms.[3] For an overview, also see Air Quality: Construction Project Air Permit Requirements.[4]

Hazardous Materials

An evaluation of hazardous materials not associated with construction and demolition projects is triggered through the purchasing process as described below. Hazardous material **use** is the key component of new source evaluation: this applies to new chemicals that are classified as hazardous materials and also to hazardous materials that are already approved for one or more specified uses at SLAC but possibly not approved for unconditional use. Requirements are as follows:

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1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

2 "MSDS Viewer", http://www.tcmis.com/tcmis/doe/msds

3 Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001), http://www-group.slac.stanford.edu/esh/forms/

4 Air Quality: Construction Project Air Permit Requirements (SLAC-I-730-0A16S-003), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqConstruction.pdf

- All hazardous materials must be purchased through the chemical management services (CMS) system to facilitate chemical tracking and reporting.[5]
- The purchase requester must provide sufficient information on the request form regarding the intended use of the chemical.
- All new chemicals proposed for use at SLAC must be evaluated by ES&H program managers and subject-matter experts. This group reviews the MSDS and related information to identify potential hazards, air emissions, special storage requirements, usage restrictions, and possible substitutes.

Note *As one generic category example, new cleaning and degreasing solvents are evaluated with the aim of replacing existing products that contain such hazardous or ozone-depleting chemicals as chlorofluorocarbons (CFCs) and methyl chloroform.*

New Equipment

All new SLAC-owned equipment must be evaluated for compliance with applicable air quality regulations. This review is triggered during the purchasing process through an explicit request for ES&H review on the purchase requisition.

Note *If new equipment, such as emergency back-up generators, qualifies to be added to the umbrella air permit, equipment use will be strictly controlled by permit conditions.*

In the event that rental equipment is subsequently purchased, the program manager, the Conventional and Experimental Facilities (CEF) Department, and the Property Control Department must be notified 30 days in advance of the actual purchase to prepare a permit application and other required documentation.

Post Evaluation: Next Steps

Permit Application

Once a new emissions source evaluation is triggered by a purchase request for hazardous materials or new equipment, the program manager processes information to obtain the required permit. This includes

- Compiling information for a health risk screening assessment
- Compiling the application package, which involves selection of appropriate forms from the Bay Area Air Quality Management District (BAAQMD) web site
- Payment of applicable fees

Note *Unabated emissions from some sources are severe enough to preclude permit approval. Abatement can take various forms, but typically constitutes some type of filter installed at the end of the pipe just prior to the release of the spent chemicals into the air. It can reduce emissions to acceptable levels so that the*

5 "Chemical Management Services (CMS)", http://www-group.slac.stanford.edu/esh/groups/cgs/cms/

source can be permitted, although more aggressive abatement measures may exempt the source from permitting requirements entirely.

Use Tracking

Once the emissions source is permitted, permit conditions may include emissions caps, usage restrictions, contingency notifications, specific recordkeeping and reporting requirements, and periodic sampling or testing. Be sure to coordinate with the program manager so that permit conditions are understood and met in a timely manner.

Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

SLAC's air emissions are regulated through a federally mandated site-wide permit as well as through local, regional, and state regulatory requirements, as outlined in Chapter 30, "Air Quality". Air permit regulations are designed to track, record, and control air pollutants belonging to several different categories, some of which are based on public health concerns, and some of which are based on chemical classifications. This reference outlines major categories of air pollutants found at SLAC and associates them with the areas where they are found or produced.

Note *For a complete list of emissions sources, locations, and SLAC's umbrella permit conditions, see Air Quality: Permitted and Permit-exempt Emissions Source Requirements.*[2]

Air Pollution Classifications

Air pollution can exist in many different forms, including gas, mist, aerosol, and particulates, and it can consist of many types of chemical constituents, including inorganic gases, hazardous pollutants, and organic compounds. The main regulatory categories of air pollutants at SLAC are *criteria pollutants, organic compounds, hazardous air pollutants (HAPs),* and *air toxics,* and g*reenhouse gases.*

Criteria Pollutants

The US Environmental Protection Agency (USEPA) regulates *criteria pollutants*, which are considered harmful to public health and the environment, under the National Ambient Air Quality Standards (NAAQS). The six criteria pollutants are[3]

- Carbon monoxide (CO)
- Oxides of nitrogen (NO_x)
- Sulfur dioxide (SO_2)
- Particulate matter (PM10 and PM2.5)
- Lead (Pb)
- Ozone (O_3)

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

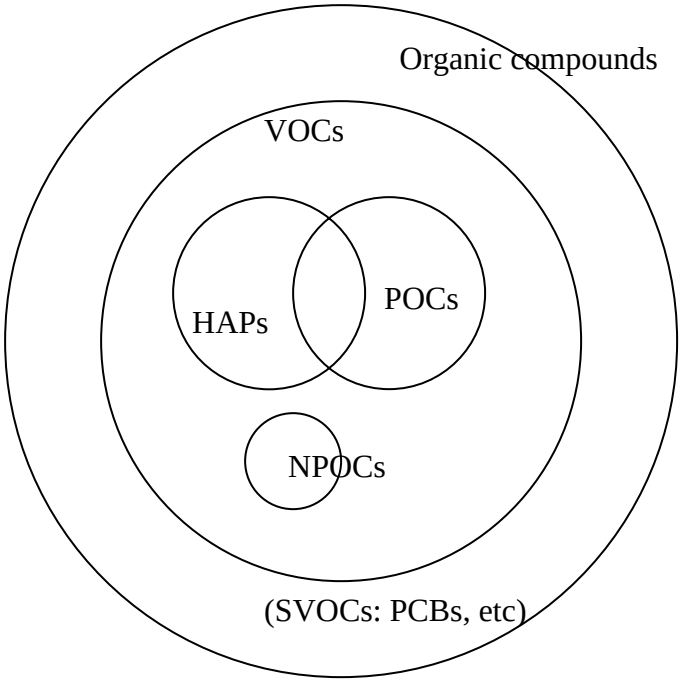
2 Air Quality: Permitted and Permit-exempt Emissions Source Requirements (SLAC-I-730-0A16S-002), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqSources.pdf

3 "EPA National Ambient Air Quality Standards, NAAQS", http://epa.gov/air/criteria.html

Note *Ozone is a pollutant when close to the Earth's surface, but in the upper atmosphere the ozone layer protects the Earth from harmful ultraviolet rays. Stratospheric ozone is depleted by various man-made chemicals (mostly freons) known as* ozone-depleting substances (ODSs).

Organic Compounds

The Bay Area Air Quality Management District (BAAQMD) has established strict requirements for many processes and products that emit organic – or carbon-containing – compounds. This complex group of compounds comprises multiple interlaced subgroups as illustrated and described below. These compounds are regulated because they contribute to smog, global warming, and/or depletion of the ozone layer.



ACRONYM	EXPLANATION
VOCs	volatile organic compounds
SVOCs	semi-volatile organic compounds
POCs	precursor organic compounds
NPOCs	non-precursor organic compounds
HAPs	hazardous air pollutants
PCBs	polychlorinated biphenyls
ODSs	ozone-depleting substances

Figure 1 Organic Compounds Classification Overlap

Volatile Organic Compounds

Volatile organic compounds (VOCs) vaporize when used, thus releasing potentially harmful organic compounds into the atmosphere. Examples of liquids that contain VOCs include paints, paint thinner, solvents, petroleum hydrocarbons, and liquid fuel. Although they are not as reactive as VOCs, certain semi-volatile organic compounds (SVOCs) are also regulated – for example, those that persist in the environment and break down very slowly.

Precursor Organic Compounds

Precursor organic compounds (POCs), which react with light to form photochemical tropospheric smog, include gasoline vapors, perchloroethylene (perc), alcohols (such as ethanol or methanol), and ketones (such as acetone).

Non-precursor Organic Compounds

Non-precursor organic compounds (NPOCs) do not contribute to photochemical smog, although they may deplete the ozone layer in the stratosphere. This group includes methylene chloride, methyl chloroform, and chlorofluorocarbons (CFCs), which are commonly referred to as *freons*. At SLAC, NPOCs are used in equipment such as vapor degreasers, cold cleaners, and air-conditioning equipment.

Note *Many organic compounds belong to two or more regulated overlapping classifications. Air permits specify the allowable amount for specific sources and also express limits in terms of pollutant type (for instance, HAPs, POCs, and VOCs).*

Hazardous Air Pollutants

This category comprises the 188 pollutants that are listed in Section 112(b) of the federal Clean Air Act.[4] The USEPA established emissions standards for a wide range of industrial activities that involve use of these chemicals under the National Emission Standards for Hazardous Air Pollutants (NESHAPs) program.

Hazardous air pollutants (HAPs) are used at SLAC in several permitted emissions sources. Most of the halogenated-solvent cleaners used at SLAC and regulated under NESHAPs are located in the Plating Shop Complex. These chemicals are

- Perchloroethylene (PCE) or Perc
- 1,1,1-trichloroethane (TCA)
- Trichloroethylene (TCE)

Air Toxics or Toxic Air Contaminants

The National Ambient Air Quality Standards (NAAQS) were established in order to identify and address airborne chemicals with potentially significant impacts to human health and the environment. More recently, the state of California has compiled a list of toxic air contaminants (TACs) that expand the scope of air quality management. Specifically, TACs are thought to cause or contribute to irreversible illness,

4 Clean Air Act, Section 112, "Hazardous Air Pollutants", http://www.epa.gov/oar/caa/caa112.txt

incapacitating illness, or death.[5] Selected substances from the list of TACs that may typically be found at SLAC include

- Arsenic, cyanide
- Glycol ethers, methanol
- Asbestos
- Hydrochloric acid (HCl)
- Radionuclides
- Nickel, lead, chromium, cadmium, beryllium, mercury

Greenhouse Gases

Greenhouse gases (GHGs) comprise a variety of chemicals that trap heat in the lower atmosphere, rather than allowing it to dissipate. Each GHG has a characteristic global warming potential (GWP) that measures its heat-trapping ability relative to carbon dioxide (CO_2), which has a GWP of one.

Many freons and other halogenated compounds have substantial GWP values in the hundreds or thousands, but the most powerful GHG known is sulfur hexafluoride (SF_6), which has a GWP of 23,900. This gas is used routinely in electrical equipment around the world, and is used at SLAC in both electrical and research applications.

In California, the passage of Assembly Bill 32 in 2006 paves the way for these emissions to be regulated in the near future.[6]

SLAC Emissions Sources

Gasoline fumes and vehicle exhaust probably represent the most typical chemical exposure for most persons, both at SLAC and elsewhere, but specific areas at SLAC present specific hazards. These are noted on signage outside each building and work area and incorporated into area hazard analyses (AHAs).

A simplified overview of the main emissions sources at SLAC is provided below. These sources, listed in alphabetical order, are associated with the type of pollutant, the hazard category, and regulatory responsibilities for emissions source custodians (ESCs). Each of these topics is described in more detail in the exhibits indicated at the bottom of the table.

The recordkeeping efforts outlined under regulatory responsibilities are translated by the air quality program manager into the required reports and deliverables itemized in Air Quality: Reporting Requirements.7 Each of the emissions sources is discussed in more detail in the following section.

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5 New Source Review of Toxic Air Contaminants, http://www.baaqmd.gov/dst/regulations/rg0205.pdf

6 Assembly Bill 32, http://www.arb.ca.gov/cc/docs/ab32text.pdf

7 Air Quality: Reporting Requirements (SLAC-I-730-0A16S-004), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqReporting.pdf

Emissions Source[1] (activity and/or equipment)	Permitted (P), Exempt (E), or Not Applicable (n/a)	Pollutant	Hazard Category[2]	Regulatory Responsibilities[3]
Abrasive blasting	E	Particulates	Particulates	Periodic inspection to maintain exempt status
Asbestos removal; construction	P	Asbestos dust	HAP	BAAQMD advance notification
Boilers	P	Nitrous oxides (NO_x) Carbon monoxide (CO)	Criteria pollutant	Read flow meter (ccf , hundred cubic feet)
Cutting/grinding	E	Particulates	Criteria pollutant	Periodic inspection to maintain exempt status
Electroplating	P	Cyanide compounds VOCs / solvents Acids Corrosives	HAP (NESHAPs) Air toxics Organic compounds	Process chemical use Recordkeeping (solvents and alcohols)
Epoxies and adhesives	P	Resins Solvents	Air toxics	Recordkeeping
Generators (Emergency backup)	P	Hydrocarbons, particulates	Criteria pollutant	Recordkeeping (operating hours)
Lead shielding	n/a	Lead oxides	Criteria pollutant	Inventory and reporting for the Toxics Release Inventory (TRI) Integrated Safety and Environmental Management System (ISEMS)
Paints and coatings Spray paint booths	P	VOCs	HAP	Recordkeeping of hazardous material use
Sludge dryer	P	Particulates	Criteria pollutant	Sludge volume throughput
Solvent cleaning operations (facility-wide) Wipe and cold cleaners and hot vapor degreasers	P	VOCs	HAP	Recordkeeping Find substitutes
Solvent recyclers	E	VOCs	HAP	Recordkeeping
Vehicles	E	Petroleum hydrocarbons, asbestos from brake pads, copper, chromium, other metals	Air toxics Criteria pollutants	Recordkeeping

[1]For a full list, see Air Quality: Permitted and Permit-exempt Emissions Source Requirements

[2]For a full list of regulatory reports and deliverables, including program details, see Air Quality: Reporting Requirements

[3]For an overview of personnel responsibilities, see Air Quality: Roles, Responsibilities, and Authorities Matrix

Asbestos

Renovation or demolition projects can cause *regulated asbestos-containing material* ([R]ACM) to contaminate the air unless the renovation or demolition is carried out in accordance with the BAAQMD airborne toxic control measure (ATCM) for asbestos. Such projects must be evaluated by the industrial hygiene program manager, and depending on the project scope, a notification form must be submitted to the BAAQMD. Asbestos work can only be performed by qualified personnel. For details and requirements, see

- Chapter 27, "Asbestos"[8]
- Air Quality: Construction Project Air Permit Requirements[9]
- Air Quality: Asbestos Notification Procedure[10]

Boilers

SLAC's boilers supply heat that is used for climate control in buildings and for various industrial operations, including plating processes. The two main boilers burn natural gas, but can be switched to diesel in an emergency. Fuel combustion produces the criteria pollutants nitrogen oxides and carbon monoxide. These emissions are minimized by performing regular maintenance and annual tune-ups.

Note *SLAC's permit limits the amount of fuel consumed. The site-wide limit for natural gas is 770,000 therms. The boilers must operate within this constraint, as well as an operational limit of 500 hours maximum per year running on diesel.*

Cutting and Grinding

SLAC shops include wheels used for grinding and various kinds of saws and torches used for cutting. These sources are all permit-exempt due to either to adequate abatement, low-use frequency, or use of non-hazardous materials.

Electroplating / Plating Shop Complex

The Plating Shop Complex offers complete onsite plating and solvent-cleaning services that necessitates the use of an extensive range of hazardous materials, including cyanides, halogenated solvents, strong acids and bases, and alcohols.

Due to the range and volume of hazardous materials used, the Plating Shop manager is highly proactive regarding worker protection, process safety management, waste minimization, chemical substitution, and alternate plating technologies. Process improvements include the installation of a near-zero emissions (NZE) degreaser, a chromium reduction tank, and the regeneration and re-use of ferric chloride.

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8 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 27, "Asbestos", http://www-group.slac.stanford.edu/esh/hazardous_substances/asbestos/policies.htm

9 Air Quality: Construction Project Air Permit Requirements (SLAC-I-730-0A16S-003), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqConstruction.pdf

10 Air Quality: Asbestos Notification Procedure (SLAC-I-730-0A16C-001), http://www-group.slac.stanford.edu/esh/eshmanual/references/airProcedAsbestosNotify.pdf

The complex encompasses the Plating Shop, the annex, and the cyanide room (all in Building 25), a chemical storage area (Building 36), and a wastewater treatment plant (Building 38). The treatment plant includes a sludge press, sludge dryer (see below), and bag-house. Dedicated air scrubbers provide emissions abatement for this area.

Epoxies and Adhesives

Epoxies and adhesives generally contain organic solvents that make application easier but when they evaporate they become hazardous air emissions.(See also Paints and Coatings, below.) Proper ventilation is essential, as well as appropriate personal protective equipment (PPE) as specified on the MSDS.

Note *Epoxies, adhesives, epoxy/adhesive containers, disposable face masks, and particulate filters must be disposed of as described in Chapter 17, "Hazardous Waste".*[11]

Generators

Electric power shortages and increasing electricity costs have led to a sharp rise in the purchase and use of fossil fuel-powered generators in California. SLAC generators use Biodiesel 20 exclusively, but increasingly stringent regulations to protect air quality limit the amount of fuel that may be used. SLAC's permit specifies that

- No more than 95,000 gallons of diesel will be purchased or dispensed in any 12-month period, including emergency use
- A monthly log of gallons of diesel used in the previous month with a year summary of gallons used in the previous 12 months must be kept on site
- The log must be submitted at the time of permit renewal

Portable generators are regulated under the statewide portable equipment registration program (PERP).[12] Subcontractors and university technical representatives (UTRs) must provide registration documentation to the program manager before such non-SLAC portable equipment can be brought on site. In addition, use logs must be kept to record hazardous material use, fuel consumption, and equipment operating hours.[13]

Paints and Coatings

Surface coatings, such as paint, lacquer, varnish, enamel, and sealant, contain regulated organic solvents such as xylenes, glycol ethers, and chlorinated hydrocarbons. While organic solvents make applying a coating easier, they also constitute a regulated hazardous emissions source when they evaporate.

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11 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 17, "Hazardous Waste", http://www-group.slac.stanford.edu/esh/environment/hazardous_waste/policies.htm

12 Regulation to Establish a Statewide Portable Equipment Registration Program, http://www.arb.ca.gov/portable/perp/newreg.pdf

13 Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001), http://www-group.slac.stanford.edu/esh/forms/

SLAC's central paint shop is equipped with filters to control air emissions during routine painting of equipment and fabricated metal and wood parts. When paint is applied elsewhere, considerations such as limiting VOC emissions must be taken into account. Often, a water-based surface coating may be available, and any suitable surface coating that is below the applicable VOC limit should be the preferred choice.

Note *Paints, coatings, paint/coating containers, disposable face masks, and particulate filters must be disposed of as described in Chapter 17, "Hazardous Waste".*[14]

Abrasive Blasting

Abrasive blasting mechanically cleans equipment parts or prepares surfaces for coating. This method generates fine particulates of dry aluminum oxide or wet abrasives, together with paint chips and other materials, and these emissions are regulated due to their small size. Virtually all abrasive blasting at SLAC is performed within containments to control the release of particulates. SLAC's air permit specifies a cap of 8,000 pounds per year of particulates (PM10).

Indoor Abrasive Blasting

SLAC's abrasive-blasting booths provide a controlled environment where emissions are drawn into a collection reservoir, typically a baghouse.

Note *Baghouses function like vacuum cleaners, collecting suspended dusts and solids from exhaust air as it passes through filters. Cyclone baghouses use centrifugal force and gravity to perform the same function. The filtered air is then discharged to the atmosphere.*

Outdoor Abrasive Blasting

Any unconfined dry sandblasting that is to be done outdoors must first be evaluated by the program manager. Examples of outdoor abrasive-blasting activities include preparing a building for repainting or cleaning stationary equipment.

The abrasive blasters used at SLAC are permit-exempt due to low use frequency and use of non-hazardous materials such as glass beads or sand.

Sludge Dryer

A sludge dryer is associated with the Metal Finishing Pre-Treatment Facility (MFPF), which services the Plating Shop Complex. The sludge is produced in the course of processing the effluent from that area's metal finishing operations and the industrial wastewater treatment facility.

The sludge is dewatered by first passing it through a filter press and then through a dryer, where a packed-tower fume scrubber collects emissions. Water sprayed through the tower absorbs any gas and particulates in the exhaust as it travels upward. The dried sludge is bagged and collected by the Waste Management Group (WM) for offsite disposal.

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14 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 17, "Hazardous Waste", http://www-group.slac.stanford.edu/esh/environment/hazardous_waste/policies.htm

Solvent Recyclers

Solvents are used for cleaning equipment parts, usually by dipping or placing them in vapor-degreasing and cold-cleaning tanks, or by wiping the surface. Cleaning can be performed by automated stationary equipment, or manually anywhere on site.

Vapor degreasing involves heating solvents such as TCA or PCE and using the vapors and spray wands to clean equipment parts. Cold cleaning is done at room temperature, using such solvents as petroleum distillates or isopropyl alcohol. Wipe cleaning involves using a solvent-soaked cloth or paper towel to clean equipment parts.

Halogenated solvent cleaning sources such as TCE, trichloroethane, and methylene chloride are subject to special reporting requirements under the NESHAP program.

Note *Place used cloths/paper towels into a covered waste container provided and managed by WM. For additional information, see Hazardous Waste: Rags, Wipes, Swabs, and Other Items Contaminated with Hazardous Material - Guidelines.*[15]

Vehicles

Passenger cars and trucks, along with forklifts, mobile cranes, and other heavy equipment are exempt from the air permit. However, both personal and government vehicles are subject to the California Air Resources Board's (CARB) smog certification program, which aims to keep vehicles within allowable emissions standards. In addition, vehicles are subject to SLAC's policy to minimize motor idling to reduce emissions.

Fleet Services, which operates under Conventional and Experimental Facilities (CEF), maintains vehicle records for both General Services Administration (GSA) and Department of Energy (DOE) vehicles. SLAC is continuing its efforts to convert its vehicle fleet to newer, cleaner, more efficient electric and alternative-fuel vehicles.

Abatement Devices and Strategies

An abatement device is any equipment or process whose sole purpose is to reduce the amount of one or more pollutants released into the atmosphere. Abatement devices include catalytic converters on cars and particulate filters. Although a given source might never qualify for a permit without emissions abatement, effective abatement can reduce emissions sufficiently to exempt that same source from permitting requirements entirely.

In the course of processing a permit application for a new source, the regulator may determine that the source would be in violation if allowed to operate without abatement. In such cases, the applicant would be directed to prepare a proposal to reduce the emissions from the source in order to get the source approved. In the case of an existing source, its regulated emissions may become unacceptable, due to aging of the equipment and/or more stringent limits over time, and an abatement device is added on under a separate permit.

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15 Hazardous Waste: Guidelines for Rags, Wipes, Swabs, and Other Items Contaminated with Hazardous Material (SLAC-I-750-0A08T-004), http://www-group.slac.stanford.edu/esh/eshmanual/references/hazwasteGuideRag.pdf

Abatement strategies include waste minimization efforts outlined in Chapter 22, "Waste Minimization and Pollution Prevention".[16] Examples of such strategies include finding alternatives to products that reduce air quality, such as choosing water-based paints instead of paints containing a solvent carrier, or replacing equipment that uses ozone-depleting substances (ODSs), such as chillers, with newer models that operate using ODS substitutes.

Vehicle Emissions Abatement

Electric Vehicles

SLAC's growing fleet of electric vehicles is replacing older, less efficient gasoline and diesel powered vehicles. As of 2007, 50 such vehicles are in use at SLAC.

Biodiesel

Biodiesel is a cleaner-burning diesel fuel containing natural, renewable non-petroleum compounds such as new and used vegetable oils and animal fats. Like petroleum diesel, biodiesel operates in compression-ignition engines. Biodiesel 20, a blend of conventional diesel mixed with 20 percent biologically based compounds, is dispensed exclusively from the SLAC Gasoline Dispensing Facility (GDF). It can be used in temperate climates in nearly all diesel equipment, and is compatible with most storage and distribution equipment. Such low-level blends (20 percent and less) require no engine modifications and can provide the same payload capacity as diesel. In addition, using biodiesel in a conventional diesel engine substantially reduces emissions.

Natural Gas

The two main boilers account for nearly three-quarters of SLAC's total natural gas usage. SLAC's smaller boilers (generating less than 1 million BTU/hour) are permit-exempt if they run solely on natural gas. (A secondary supply line for diesel fuel can be installed for contingency use.)

16 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 22, "Waste Minimization and Pollution Prevention", http://www-group.slac.stanford.edu/esh/environment/pollution_prevention/policies.htm

Air Quality: Permitted and Permit-exempt Emissions Source Requirements

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

SLAC's synthetic minor operating permit (SMOP) specifies the conditions that apply to processes that produce air pollutants. The SMOP specifies a site-wide cap of 95 tons for regulated air pollutants, but many additional restrictions apply, as noted below.

The table on this page summarizes SLAC's site-wide permit caps, and the following tables list permitted and permit-exempt emissions sources, their corresponding limits, and any additional conditions. Sources are listed in the numerical order specified in the SMOP, and gaps in the order represent sources that are either permit-exempt (typically due to the presence of abatement devices) or no longer in service. Permit-exempt emissions sources are listed on the last page. Emissions from any sources not explicitly listed in the SMOP (such as unpermitted, temporary, or portable sources) must also be tracked and accounted for.[2]

For additional information, particularly on hazardous air pollutants (HAPs) and precursor organic compounds (POCs), see Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference.[3] For a key to abbreviations, see Air Quality: Acronym List.[4]

1 SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

2 For details, see Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001), http://www-group.slac.stanford.edu/esh/forms/

3 Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference (SLAC-I-730-0A16T-001), http://www-group.slac.stanford.edu/esh/eshmanual/references/airRefPollutants.pdf

4 Air Quality: Acronym List (SLAC-I-730-0A16V-002), http://www-group.slac.stanford.edu/esh/eshmanual/references/airListAcronym.pdf

Permitted Emissions Sources (Updated 1 May 2007)

BAAQMD Source No.	SLAC Bldg. No.	Location	Source	Chemical(s) Emitted / Data Quantity Tracked	Primary Limit	Individual Limit(s) and Additional Conditions	Category or Site-wide Limit
Site-wide (Source numbers range: 4 to 81)	All	Site-wide	All	Air pollutants	Limits for each source are itemized below	Unpermitted, temporary or portable sources: 5 tons/yr of any single regulated air pollutant or 400 lbs/yr combined	SMOP 95 tons/year for all regulated air pollutants 23 tons/yr for any combination of hazardous air pollutants (HAPs) 9 tons/yr for any single HAP POCs: 30 tons/yr
S-4	25	Plating Shop	TCA degreaser	TCA	590 gal TCA		
S-5	35	Paint Shop	Paint booth	Paints, coatings, solvents	700 gal paints and coatings 88 gal solvents		
S-21	25	Plating Shop	Sulfuric acid bath (with scrubber)	Sulfuric acid	0.01 mg/dscm of air5		
S-26	26	Machine maintenance area	Cold cleaner (now exempt)	Bio-based solvent cleaning system (new)	60 gal solvent (Limit applies to D-Greeze 500™, which is no longer used)		Unlimited use of bio-based solvent, which has no VOCs
S-34	40	Machine Shop	Cold cleaner (now exempt)	Bio-based solvent cleaning system (new)	10 gal solvent (Limit applies to D-Greeze 500™, which is no longer used)		Unlimited use of bio-based solvent, which has no VOCs

5 0.01 mg/dscm = milligrams per dry standard cubic meter ($4.4x10^{-6}$ gr/dscf) of air

BAAQMD Source No.	SLAC Bldg. No.	Location	Source	Chemical(s) Emitted / Data Quantity Tracked	Primary Limit	Individual Limit(s) and Additional Conditions	Category or Site-wide Limit
S-36	Vari-ous	Site-wide	Designated distribution points	Methanol, ethanol, isopropanol, TCA, TCE, et al.	140 gal TCA 5 gal TCE (Unlimited: acetone)		1253 gal solvents
S-37	25	Plating Shop	IPA cleaner	Isopropanol	600 gal solvent		
S-52	23	Central Utilities	Main Boiler No. 2 (#201 - west unit)	Natural gas	770,000 therms (Site-wide limit)	Fuel oil operating limit: 500 hrs/yr	
S-53	23	Central Utilities	Main Boiler No. 1 (#200 - east unit)	Natural gas	770,000 therms (Site-wide limit)	Fuel oil operating limit: 500 hrs/yr	
S-54	25	Plating Shop	NZE Degreaser	PCE	50 gal PCE or TCA		
S-55	626	Gas Shack	BaBar Drift Chamber (DCH)	Isobutane	2,300 lbs/yr		15 lbs/day for organics
S-56	626	Gas Shack	BaBar Instrumented Flux Return (IFR) / Resistive Plate Chamber (RPC)	Isobutane (POC) H134a, Fluorinert™	2,500 lbs/yr for isobutane		15 lbs/day of organic compounds from any single operation

BAAQMD Source No.	SLAC Bldg. No.	Location	Source	Chemical(s) Emitted / Data Quantity Tracked	Primary Limit	Individual Limit(s) and Additional Conditions	Category or Site-wide Limit
S-57	38	MFPF	Sludge dryer (including scrubber)	Sludge Copper (Cu) Hexavalent Chromium (Cr+6) Nickel (Ni) Natural gas	71 tons/yr sludge 463 lbs Cu 0.0014 lbs Cr+6 0.75 lbs Ni 770,000 therms (site-wide limit)		
S-58	6	Cryogenics / SSRL	TCE "Chili Pot" Solvent Tank	TCE	5 gal/yr TCE (BAAQMD limit)	150 kg/m2/month (NESHAP limit)	
S-59	31	Building-wide	Solvent cleaning operations	Ethanol (no TCA or acetone currently in use)	90 gal ethanol	100 gal TCA	
S-60	25	Plating Shop	Ultrasonic cleaner	Isopropanol Acetone Ethanol Methanol	100 gal isopropanol 100 gal acetone 100 gal ethanol 100 gal methanol		
S-61	25	Plating Shop	Dynasolve ™ Degreaser	Methylene chloride (primary ingredient in Dynasolve)	10 gal Dynasolve		
S-62	Various	Site-wide	Epoxies and adhesives	Epoxies and adhesives	Unlimited: acetone		1183 gal epoxies and adhesives 395 gal aerosol epoxies and adhesives
S-63	Various	Site-wide	Paints and coatings	Paints and coatings	Unlimited: acetone		1132 gal paints and coatings 323 gal aerosol paints and coatings

BAAQMD Source No.	SLAC Bldg. No.	Location	Source	Chemical(s) Emitted / Data Quantity Tracked	Primary Limit	Individual Limit(s) and Additional Conditions	Category or Site-wide Limit
S-64	81	West of B-35	Gas Dispensing Facility (GDF)	Unleaded gasoline Biodiesel 20	Max. purchased or dispensed per 12-month period: 60,000 gal gasoline 95,000 gal Biodiesel 20		
S-65	18	North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-66	756	North of B-750	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-67	505	Research Yard (E of B-104)	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-68	7	Main Control Center	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-70	686	IR-8 Mechanical Pad	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-71	23	East pad on North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	

BAAQMD Source No.	SLAC Bldg. No.	Location	Source	Chemical(s) Emitted / Data Quantity Tracked	Primary Limit	Individual Limit(s) and Additional Conditions	Category or Site-wide Limit
S-72	23	West pad on North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-73	18	North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-74	706	IR-10 (West of B-137)	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-75	18	North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/yr	Monthly use logs are required	
S-71	23	East pad on North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/y	Monthly use logs are required	
S-72	23	West pad on North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/y	Monthly use logs are required	
S-73	18	North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/y	Monthly use logs are required	
S-74	706	IR-10 (West of B-137)	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/y	Monthly use logs are required	

BAAQMD Source No.	SLAC Bldg. No.	Location	Source	Chemical(s) Emitted / Data Quantity Tracked	Primary Limit	Individual Limit(s) and Additional Conditions	Category or Site-wide Limit
S-75	18	North side	Generator	Biodiesel 20	Operating limit for non-emergency use is 20 hrs/y	Monthly use logs are required	
S-76	81	Outside SE corner	Oil/water separator	Wastewater throughflow	2000 gal/day		
S-77	15	Power Conversion	Soil vapor extraction system (initial installation ; replaced by S-80, below)	VOCs (various)	Emissions limits (lbs/day): 0.018 Benzene 0.0066 Vinyl chloride 0.49 Methylene chloride 0.082 PCE 0.25 TCE 0.3 1,1-DCA 0.024 1,2-DCA 0.012 Carbon tetrachloride 0.066 1,4-dioxane		See S-80: Unabated emissions meet individual VOC permit limits
S-79	750	Collider Hall	Limited Streamer Tube Testing	Isobutane	700 lbs per 12-month period Flow rate limit: 19,936 liters/day		Emissions limits: 1,749 lbs per 12-month period 5 lbs/day organics

BAAQMD Source No.	SLAC Bldg. No.	Location	Source	Chemical(s) Emitted / Data Quantity Tracked	Primary Limit	Individual Limit(s) and Additional Conditions	Category or Site-wide Limit
S-80	15	Power Conversion	Soil Vapor Extraction System (DVE)	VOCs (various)	Emissions limits (lbs/day): 0.018 Benzene 0.0066 Vinyl chloride 0.082 PCE 0.49 Methylene chloride 0.25 TCE 0.3 1,1-DCA 0.024 1,2-DCA 0.012 Carbon tetrachloride 0.066 1,4-dioxane		Unabated emissions meet individual VOC permit limits
S-81	15	Power Conversion	Ground-water extraction system	VOCs	Emissions limits (lbs/day): 0.017 Benzene 0.0065 Vinyl chloride 0.082 PCE 0.49 Methylene chloride 0.25 TCE 0.3 1,1-DCA 0.024 Ethylene chloride	Total VOCs 10 lbs/day	Unabated emissions from S-80 currently meet individual VOC permit limits Groundwater inflow limit: 14,400 gal/day
S-32100	Various	HVAC systems site-wide	Fugitive Freons™	R-11, R-12, R-22, et al.	Exempt, but recordkeeping is required		None

Permit-exempt Emissions Sources (Updated 1 May 2007)

BAAQMD Source No.	SLAC Bldg. No.	Location	Permit-exempt Source	Chemical(s) Emitted or Data Quantity Tracked	Inspection Requirements[6]
S-10	35	Carpenter Shop	Woodworking Ops / abatement device	Particulates[7]	Inspect once every six months to verify exempt status. Check that ▪ Operations have not changed significantly ▪ Systems are properly maintained ▪ All abatement measures continue to function
S-11	29	Metal Stores Saw	Metalworking Ops / abatement device	Particulates[4]	
S-13	25	Grinding Room	Metalworking Ops / abatement device	Particulates[4]	
S-14	123	Klystron Shop	Sandblasting / abatement device	Particulates[4]	
S-16	123	Klystron Shop	Sandblasting / abatement device	Particulates[4]	
S-17	24	Controls Dept	Metal Grinding Ops / abatement device	Particulates[4]	
S-40	37	Boiler (formerly S-6)	Above-ground diesel fuel tank (3,700 gal)	Biodiesel 20	
S-41	23	Central Utilities	Above-ground diesel fuel tank (10,000 gal)	Biodiesel 20	
S-42	7	Main Control Center	Above-ground diesel fuel tank (500 gal)	Biodiesel 20	
S-43	505	East of B-104	Above-ground diesel fuel tank (500 gal)	Biodiesel 20	
S-44	82	Fire Station	Above-ground diesel fuel tank (500 gal)	Biodiesel 20	
S-45	112	Master Substation	Above-ground diesel fuel tank (2,000 gal)	Biodiesel 20	
S-46	44	Klystron Test Lab	Bench top spray painting	Aerosol paints	
S-49	25	Cyanide Room	Wet scrubber for cyanide room	Cyanides	
S-50	120	SSRL	Sandblast booth at Machine Shop	Particulates[4]	
S-51	25	Light Fabrication	Small parts blast cab (PC17285)	Particulates[4]	
S-78	26	Welding Shop	Plasma-arc cutting torch with DCS	Cr+6 emissions	
---	750	North of CEH	Above-ground diesel - to generator S-66 (250 gal)	Biodiesel 20	
---	750	SLD/NE of CEH	Above-ground diesel - to compressor (55 gal)	Biodiesel 20	
---	Various	Site-wide	Above-ground diesel - mobile refueling (250 gal)	Biodiesel 20	

6 For an inspection form template, see Air Quality: Emissions Source Inspection Form (SLAC-I-730-0A16J-002), http://www-group.slac.stanford.edu/esh/forms/

7 The site-wide limit for particulate emissions is 8,000 lbs/yr as PM10. If abrasive blasting unit emissions are abated by a dust collector, use an emission factor of 0.26 lbs/ton (PM10) of abrasive material. If unabated, use a factor of 26 lbs/ton. All SLAC units are currently abated.

Air Quality: Construction Project Air Permit Requirements

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

All construction and demolition projects, whether performed by SLAC employees or subcontractors, must be evaluated for both potential emissions and reporting and recordkeeping requirements, based on the hazardous materials and equipment involved. This exhibit provides an overview of requirements and points to additional information to help meet them.

Note *Examples of construction projects include demolishing or constructing buildings as well as installing or replacing boilers, chillers, generators, or transformers.*

New Source Permitting – Prior to Starting Work

Construction activities per se constitute an emissions source, regardless of the type of project. To evaluate potential new emissions sources, documentation, if applicable, is required for hazardous materials, asbestos, and portable equipment.

Pre-work HazMat List

The pre-work HazMat list is the first of a set of three forms that tracks hazardous materials emissions. The construction project manager or operator must submit the completed form to the air quality program manager before the project starts so that the materials list can be reviewed and evaluated. The pre-work HazMat list is included in Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms.[2]

Asbestos Notification

The Bay Area Air Quality Management District (BAAQMD) requires 10-working day advance formal notification of any project that involves demolition or major renovation. For information on how to prepare the notification, see Air Quality: Asbestos Notification Procedure.[3]

Note *If the project involves ACM, be sure to also see Chapter 27, "Asbestos".*[4]

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1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

2 Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001), http://www-group.slac.stanford.edu/esh/forms/

3 Air Quality: Asbestos Notification Procedure (SLAC-I-730-0A16C-001), http://www-group.slac.stanford.edu/esh/eshmanual/references/airProcedAsbestosNotify.pdf

4 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 27, "Asbestos", http://www-group.slac.stanford.edu/esh/hazardous_substances/asbestos/policies.htm

Demolition versus Renovation

Demolition of older buildings often involves *asbestos-containing material (ACM)* removal, although its presence is not always apparent at the outset. According to BAAQMD regulations, the definition of demolition hinges primarily on the removal of load-bearing structural members.

In contrast to demolition, *renovation* consists of the removal of ACM from a structural member. Small renovations, even if ACM is present, may be exempt from the notification requirement if the quantity of ACM is below one of the applicable thresholds as delineated in the instructions for the form. If notification is required, the same rules apply as those for demolition.

Portable Equipment Registration

Any *portable equipment* (defined as any emission source that, by itself or in or on a piece of equipment, is designed to be or capable of being transported from one location to another, including non-propulsion engines such as generator sets) transported onto the SLAC site must first be registered with the statewide portable equipment registration program, which is administered by the California Air Resources Board (CARB). Such equipment must meet all state and regional requirements for efficiency and compliance with air quality standards. (The most current regulations for portable equipment, including definitions and details about the application process, are available on the CARB web site.[5])

Dust Control

Dust generation is an inherent aspect of many construction activities. Dust control measures must be implemented to minimize airborne particulates. Typically, this involves spraying the substrate with just enough moisture to keep the dust down without creating runoff, which becomes a stormwater management problem.

Recordkeeping Requirements – Once the Project Is Underway

Monthly recordkeeping and reporting requirements must be met for all hazardous materials and equipment, including materials and equipment brought on site by subcontractors. Required forms include

- HazMat use log, which is a follow-up form for the pre-work HazMat list
- Fuel consumption log, which records the amount of all types of fuel used
- Equipment operation log, which records the number of hours the equipment was operated

Forms to record this information are included in Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms.[6]

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5 Regulation to Establish a Statewide Portable Equipment Registration Program, http://www.arb.ca.gov/portable/perp/newreg.pdf

6 Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001), http://www-group.slac.stanford.edu/esh/forms/

HazMat Use Report – When the Project Is Complete

A HazMat use report completes the set of three required HazMat forms, and a completed report must be submitted within 10 working days after work is completed. The form is included in Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms.[7]

7 Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms (SLAC-I-730-0A16J-001), http://www-group.slac.stanford.edu/esh/forms/

Air Quality: Asbestos Notification Procedure

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

The Bay Area Air Quality Management District (BAAQMD) requires notification of any project that involves demolition or major renovation. The following procedure describes how to prepare a notification for work conducted at SLAC.

Note *The project start date must be at least 10 working days after the notification package is mailed by the program manager. If either the start or end date changes, the revised date(s) must be faxed to the BAAQMD by the program manager as soon as feasible.*

Step	Person	Action
1.	University technical representative (UTR) and air quality program manager	Determine if the project is classified as a demolition or renovation, as defined in the BAAQMD regulations[2, 3]
2.	UTR and air quality program manager	Select the form that applies and fill out all applicable sections. Note that the start and end dates must be provided.
3.	Person performing the work or the subcontractor representative	Signs the form on the top of page 2 of the form
4.	UTR	Forwards the form to the air quality program manager for ES&H evaluation
5.	Air quality program manager	Completes and submits the package, including fees
6.	UTR and air quality program manager	Determine if any work may proceed during the 10-day waiting period that commences when the notification package is mailed. Only work that does not involve asbestos containing material (ACM) may be performed.

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

2 Bay Area Air Quality Management Demolition Notification Form and Instructions, http://www.baaqmd.gov/enf/forms/1102_demolition_041306.pdf

3 Bay Area Air Quality Management Asbestos Renovation Notification Form and Instructions, http://www.baaqmd.gov/enf/forms/1102_renov04_030105.pdf

Air Quality: Monthly Hazardous Material Use, Fuel Consumption, and Equipment Operation Forms

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

The conditions of SLAC's air quality permits specify that all subject hazardous air emissions generated at SLAC must be recorded and reported to the air quality program manager on a monthly basis. SLAC employees and subcontractors may use the following five templates or any equivalent forms to accomplish reporting requirements:

1. Pre-work HazMat list
2. HazMat use log
3. Fuel consumption log
4. Equipment operation log
5. HazMat use report

If you have any questions about which forms apply, the equivalency of alternative forms, or the reporting due date, contact the air quality program manager. For additional information on reporting requirements, see Air Quality: Construction Project Air Permit Requirements.[2]

Before Work Begins: Pre-work HazMat List

Before starting work, a completed pre-work HazMat list must be submitted to the program manager for review. Any materials that require a material safety data sheet (MSDS), such as solvents, paints, epoxies, adhesives, and concrete, are considered hazardous and must be listed if they will be used or stored on-site.[3]

All applicable MSDSs must be submitted. The program manager may recommend less toxic alternatives, identify special storage conditions, or verify training required to use certain chemicals.

While Work Is in Progress: Logs

Monthly recordkeeping is essential to facilitate tracking of HazMat use over the course of longer-term projects. The three monthly use logs are

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1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

2 Air Quality: Construction Project Air Permit Requirements (SLAC-I-730-0A16S-003), http://www-group.slac.stanford.edu/esh/eshmanual/references/airReqConstruction.pdf

3 "MSDS Viewer", http://www.tcmis.com/tcmis/doe/msds

1. **HazMat use log.** Record the use of all hazardous materials. This list should be a subset of the pre-work HazMat list.
2. **Fuel consumption log.** Record all fuel consumed, including gasoline, diesel, natural gas, propane, and any other fuel. Indicate fuel used in terms of fuel dispensed into equipment or fuel consumed as indicated by a fuel tank gauge.
3. **Equipment operation log**. Record the initial and final readings on the direct reading meter each day the equipment is operated.

Note *The BAAQMD has established a hierarchy that imposes strict time limits on non-emergency use for emergency backup generators, depending on date of manufacture, power rating, and other characteristics. Use of these generators must be logged and coordinated so that no regulatory limits are exceeded.*

Once the Project Is Complete: Use Report

Once work is completed, complete the HazMat use report.

Note *Use the pre-work HazMat list as a baseline and account for all hazardous materials initially listed, as well as any added in the course of the project.*

PRE-WORK HAZMAT LIST **Page _____ of _____**

Project:	**Scheduled start date:**
Location(s):	**Date list submitted:**
SLAC contact:	**Phone number:**
Subcontractor contact:	**Phone number:**
Prepared by:	**Affiliation:**

No.	Trade name	Technical name or primary constituent	CAS# (if applicable)	Unit size (e.g.: 5-gallon bucket)	Intended use	MSDS provided?
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Please complete this form and submit to the air quality program manager at least 5 working days prior to start of work.

HAZMAT USE LOG for month of: _____ **Page _____ of _____**

Project:	**Project start date:**
Location(s):	**Date list submitted:**
SLAC contact:	**Phone number:**
Contractor contact:	**Phone number:**
Prepared by:	**Affiliation:**

Use this form to record monthly use of hazardous materials, including solvents, paints, epoxies, adhesives, concrete, et al.

No.	Trade name	Technical name or primary constituent	CAS# (if applicable)	Unit / size used (e.g.: 5-gallon bucket)	Amount procured	Amount used	Amount remaining
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

Please complete this form and submit to the air quality program manager by the 5th working day of each new month.

FUEL CONSUMPTION LOG for month of: _____ **Page _____ of _____**

Project:	**Project start date:**
Location / Equipment ID:	**Date list submitted:**
SLAC contact:	**Phone number:**
Contractor contact:	**Phone number:**
Prepared by:	**Affiliation:**

Use this form to record all monthly fuel usage: gasoline, diesel, natural gas, propane, etc.
Record either fuel dispensed into equipment OR fuel consumed as indicated by a fuel tank gauge.

No.	Trade name	Technical name or primary constituent	CAS# (if applicable)	Date and time	Initial gauge reading	Final gauge reading	Amount dispensed or consumed
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

Please complete this form and submit to the air quality program manager by the 5th working day of each month.

EQUIPMENT OPERATION LOG for month of: _____ **Page _____ of _____**

Project:	**Project start date:**
Location / equipment ID:	**Date list submitted:**
SLAC contact:	**Phone number:**
Contractor contact:	**Phone number:**
Prepared by:	**Affiliation:**

Use this form to record monthly operating hours of portable equipment (e.g., generators)

No.	Fuel Type	Technical name or primary constituent	Portable equipment ID number	Date and time	Initial meter reading	Final meter reading	Operating hours
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Please complete this form and submit to the air quality program manager by the 5th working day of each month.

HAZMAT USE REPORT **Page _____ of _____**

Project:	**Project end date:**
Location(s):	**Date list submitted:**
SLAC contact:	**Phone number:**
Contractor contact:	**Phone number:**
Prepared by:	**Affiliation:**

No.	Trade name	Technical name or primary constituent	CAS# (if applicable)	Unit size (e.g.: 5-gallon bucket)	No. units used	Total usage	Same as pre-work list?
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

Please complete this form and submit to the air quality program manager within 10 working days after work is completed

Air Quality: Reporting Requirements

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

The air quality program manager, in addition to ensuring that SLAC's synthetic minor operating permit (SMOP) permit conditions are met, must collect and analyze data in order to stay in compliance with a range of federal, state, and regional requirements. This table summarizes all air quality program elements and reporting requirements. The NESHAPs and TRI reports are submitted to the USEPA, while the others are submitted to the Bay Area Air Quality Management District (BAAQMD). For more detailed information, see Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference.[2]

Program	Regulatory Level	Program Element(s)	Program Description	Reports / Deliverables	Annual Due Date (approximate)
Overall	Federal	SMOP (Title V)	Clean Air Act	Annual report / permit renewal	July 31
National Emissions Standards for Hazardous Air Pollutant s (NESHAPs)	Federal	Halogenated solvent cleaners (currently four units on-site)	Emissions standards for air pollutants	Annual emissions report (incorporates first semi-annual exceedance report)	January 30
Toxics Release Inventory (TRI)	Federal	Reporting for copper (Cu) and lead (Pb) (typically)	Toxic chemical release reporting	Annual report (one form per chemical)	June 30
NESHAPs	Federal	Halogenated solvent cleaners	Emissions standards for air pollutants	Second semi-annual exceedance report	July 30
Air Toxics Inventory	State	Compare chemicals against thresholds	Air toxics information and assessment	Annual air toxics information update	April 13
Overall	Regional	Recordkeeping and data management for permitted sources	Air Quality	Annual update	April 13
Overall	Regional	Recordkeeping and data management	Air Quality	Adhesives use report	April 13
Gasoline Dispensing Facility (GDF)	Regional	Annual source test	Air Quality	Annual permit renewal	September 30

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

2 Air Quality: Air Pollutants, SLAC Emissions Sources, and Regulatory Reference (SLAC-I-730-0A16T-001), http://www-group.slac.stanford.edu/esh/eshmanual/references/airRefPollutants.pdf

Air Quality: Emissions Source Inspection Form

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

This inspection form includes generalized categories of information covering a wide range of emissions sources and is meant to serve primarily as a template. Modify it to suit your particular source. All permitted and permit-exempt sources must be inspected a minimum of once every six months.

General Information

Inspector / preparer _____ Inspection date _____

Inspection frequency Dept. or Group _____

☐ Daily ☐ Weekly ☐ Monthly ☐ Quarterly ☐ Semi-annually ☐ Annually

Emissions Source Identification

Custodian _____ Owner _____

BAAQMD status ☐ Permitted ☐ Exempt

BAAQMD number _____ Source name _____

Location (bldg./ room) _____ Type _____
(Equipment, activity, other)

Description _____ Category _____
(For example, solvent cleaner, generator)

Operational Status and Maintenance

Current status ☐ Active ☐ Standby ☐ Inactive

Last operated on _____ Current operating frequency _____

If not currently operational, test, if appropriate. ☐ Tested ☐ Not tested _____
(Explain)

_____

Are all gauges and displays functional? ☐ Yes ☐ No _____
(Describe malfunction)

Most recent maintenance and/or repair _____
(Date)

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

Hazards and Safeguards

Signage present on or near unit to alert operator or personnel in area _____

Current hazardous materials associated with source ☐ Absent ☐ Present _____
(List hazardous material)

_____

Evidence of leaks or spills _____
(For example stains, discoloration, odors, dust, powder)

Noise level ☐ Silent ☐ Conversation ☐ Highway traffic ☐ Jet airplane at takeoff

Safeguards in place _____
(For example secondary containment, lids, vents, caps, shielding, machine guards)

_____

Environmental Factors

Housekeeping in and around source unit _____
(Note any containers, rags, stepstools, tools))

Note nearby activity that might affect this emissions source _____

_____

Comments / Observations / Recommendations or Necessary Actions

_____

_____

_____

_____

_____

Inspector _____ _____ _____
Printed name *Signature* *Date*

Air Quality: Acronym List

Department: Chemical and General Safety
Program: Air Quality
Owner: Program Manager
Authority: ES&H Manual, Chapter 30, Air Quality[1]

ACM	asbestos-containing material
AHA	area hazard analysis
AQPM	air quality program manager
ARP	accidental release prevention
ATCM	air toxic control measure
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CalARP	California Accidental Release Prevention Program
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCR	*California Code of Regulations*
CFC	chlorofluorocarbon
CFR	*Code of Federal Regulations*
CMS	chemical management system
CO	carbon monoxide
CO_2	carbon dioxide
DCA	dichloroethane
FedARP	Federal Accidental Release Prevention Program
ESC	emissions source custodian
EtOH	ethanol (synonym: ethyl alcohol)
GDF	gasoline dispensing facility
GHG	greenhouse gas
GWP	global warming potential
HAP	hazardous air pollutant
HazMat	hazardous material
IH	industrial hygienist

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 30, "Air Quality", http://www-group.slac.stanford.edu/esh/environment/air_quality/policies.htm

IPA	isopropanol, (synonym: isopropyl alcohol)
JHAM	job hazard analysis and mitigation
MeCl	methylene chloride
MeOH	methanol (synonym: methyl alcohol)
MSDS	material safety data sheet
NAAQS	National Ambient Air Quality Standard
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NO_x	oxides of nitrogen
NPOC	non-precursor organic compound
NZE	near-zero emissions
O_3	ozone
ODS	ozone-depleting substance
PERP	portable equipment registration program
Pb	lead
PCE	perchloroethylene, perc
PM	particulate matter
PM-2.5	particulate matter less than 2.5 microns
PM-10	particulate matter less than 10 microns
POC	precursor organic compound
PTO	permit to operate
RACM	regulated asbestos-containing material
RMP	risk management plan
SF_6	sulfur hexafluoride
SMOP	synthetic minor operating permit
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SVOC	semi-volatile organic compound
TAC	toxic air contaminant
TCA	trichloroethane
TCE	trichloroethylene
TRI	toxics release inventory
USEPA	United State Environmental Protection Agency
UV	ultraviolet

VOC	volatile organic compound
WSS	work smart standard