

# ES&H manual

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## Environment, Safety, and Health

### Volume III

#### Part 31: Discharge to Air

## Document 31.1 Nonradiological Air Quality Compliance

Recommended for approval by the ES&H Working Group

Approved by: Glenn L. Mara  
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New document or new requirements

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- New document  
 Major requirement change

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## 31.1

## Nonradiological Air Quality Compliance\*

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\* Major revision

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## 31.1

### Air Quality Compliance

## 1.0 Introduction

The impact of air pollution on public health and the environment can be substantial. As a result, air pollution sources are regulated through federal, state, and local government agencies to help mitigate these impacts. In California, stationary sources of air pollution are largely regulated through a system of permits and operating requirements. Permits may be required for:

- New equipment or operations that can cause air pollution.
- Modifications to equipment, processes, or related materials that may increase existing air pollutants or release new ones.

All activities involving emissions of chemicals to the atmosphere at Lawrence Livermore National Laboratory (LLNL) shall be evaluated to determine the need for air permits and shall operate in full compliance with applicable requirements of federal, state, and local regulatory agencies. This *Environment, Safety and Health (ES&H) Manual* document provides the information necessary to operate air emission sources at LLNL in full compliance with regulations.

### 1.1 Regulatory Background

Laws and regulations governing air quality can be divided into two groups: those that deal with pollutants generated mostly by combustion (the “criteria pollutants”), and those that deal with compounds known as toxic air contaminants. The latter is a term used in California for air toxics; they are called hazardous air pollutants (HAPs) under federal law.

The air-permitting process is primarily driven by the Federal Clean Air Act, the California Clean Air Act, and their amendments. The U.S. Environmental Protection Agency (EPA) is responsible for promulgating nationwide standards, overseeing air quality planning, and implementing regulations conducted by state and local air districts. The State of California Air Resources Board (CARB) is responsible for adopting state ambient air quality standards and for regulating vehicular sources of air pollution. At the regional level, local air districts implement Federal and state air quality standards. Most often, local air districts are the agencies that pursue enforcement actions against facilities not in compliance with regulations.

The Laboratory operates within two separate local air districts. The Livermore site operates within the Bay Area Air Quality Management District (BAAQMD). Site 300 operates within the San Joaquin Valley Air Pollution Control District (SJVUAPCD), except for a narrow strip along the western boundary, which falls within BAAQMD jurisdiction. Most air permitting activities are managed by the local air districts, although some statewide requirements are implemented by CARB and some federal requirements are implemented by EPA.

## 1.2 Scope

This document describes the hazards, controls, and responsibilities associated with air quality compliance for criteria pollutants and air toxics at LLNL, and focuses on identifying air-emission sources requiring a permit and the permitting and enforcement process. Radioactive air pollutants are outside the scope of this document and are discussed in detail in Document 31.2, "Radiological Air Quality Compliance," of the *ES&H Manual*. Appendix A provides a glossary of terms related to air quality compliance.

## 2.0 Hazards

The Federal Clean Air Act and other air quality standards enforced by the air districts are established to protect the health of the most sensitive portion of the population. Examples of sensitive individuals include children, the elderly, and those with allergies, asthma, emphysema, or compromised immune systems.

Several pollutants released to the atmosphere are of major environmental concern. These include the seven criteria pollutants: sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), particulate matter of respirable size (PM<sub>10</sub>), fine particulates (PM<sub>2.5</sub>), carbon monoxide (CO), and lead. The level of criteria pollutants is used as an indicator of ambient air quality.

Volatile organic compounds (VOCs) are of particular concern to the air districts and are divided into two categories: precursor organic compounds (POCs) and nonprecursor organic compounds (NPOCs). The POCs are chemical precursors that react with nitrogen oxides at ground level in the presence of sunlight to form photochemical smog, of which ozone is a primary constituent. For this reason, air districts are particularly interested in reducing POCs and NO<sub>x</sub>.

The NPOCs include methylene chloride, 1,1,1-trichloroethane, and the family of chemicals referred to as freons. Freons are subject to regulation because they are believed to deplete ozone in the stratosphere. Ozone depleting substances destroy our stratospheric ozone layer, resulting in potential health and environmental risks

including increased incidences of certain skin cancers and eye cataracts, suppression of the body's immune system, damage to plants and food crops, and reduced aquatic life growth. The BAAQMD and the SJVUAPCD retain separate lists for compounds classified as NPOCs.

Some organic and inorganic compounds, classified as toxic air contaminants, have the potential to pose serious public health hazards and are therefore subject to special and highly restrictive regulations. Air toxics can increase the likelihood of cancer or reproductive disorders and cause other acute or chronic health effects. The BAAQMD and SJVUAPCD add chemicals to the list of toxic air contaminants as they are reviewed. Contact the air quality specialist in the Environmental Protection Department (EPD) for a current list of such compounds.

## **3.0 Controls**

### **3.1 Engineering Controls**

Abatement devices can reduce air emissions by 70% to more than 99%, and can keep some air emissions to within allowable limits. Examples of abatement devices include baghouses (to capture dust), cyclones (to capture particulates), absorbers (to capture some liquid and gaseous substances), and adsorbers (to capture other gaseous materials). Abatement devices are included in air district regulations to control the quality of air emissions. An abatement device itself may also require a Permit to Operate.

### **3.2 Administrative Controls for Criteria Pollutants**

All new and modified LLNL activities that emit air pollutants may require permits and may need to comply with air-permit operating conditions and regulations issued by the applicable air district, the State of California and the EPA. In most cases, the air district regulations are the most applicable for managing LLNL air sources. Air quality regulations are subject to frequent change. The current air district regulations are available at the districts' Web sites, <http://www.baaqmd.gov/> and <http://www.valleyair.org/> and are applicable to the Livermore Site and Site 300, respectively.

#### **3.2.1 Air Emission Sources Requiring a Permit**

Rules and regulations of both the BAAQMD and SJVUAPCD require any person planning to build, erect, alter, replace, operate, or use any article, machine, equipment, or other contrivance that might cause the release of air contaminants to first obtain an air permit from the air district. (Appendix B provides examples of air emission sources at LLNL that are subject to regulation by the air districts, and may require a permit.) The local air district lists some equipment and operations considered to be insignificant

sources of air pollution and are exempt from local air district permitting. (Appendix C provides general classes of sources that may be exempt from permitting by the BAAQMD.)

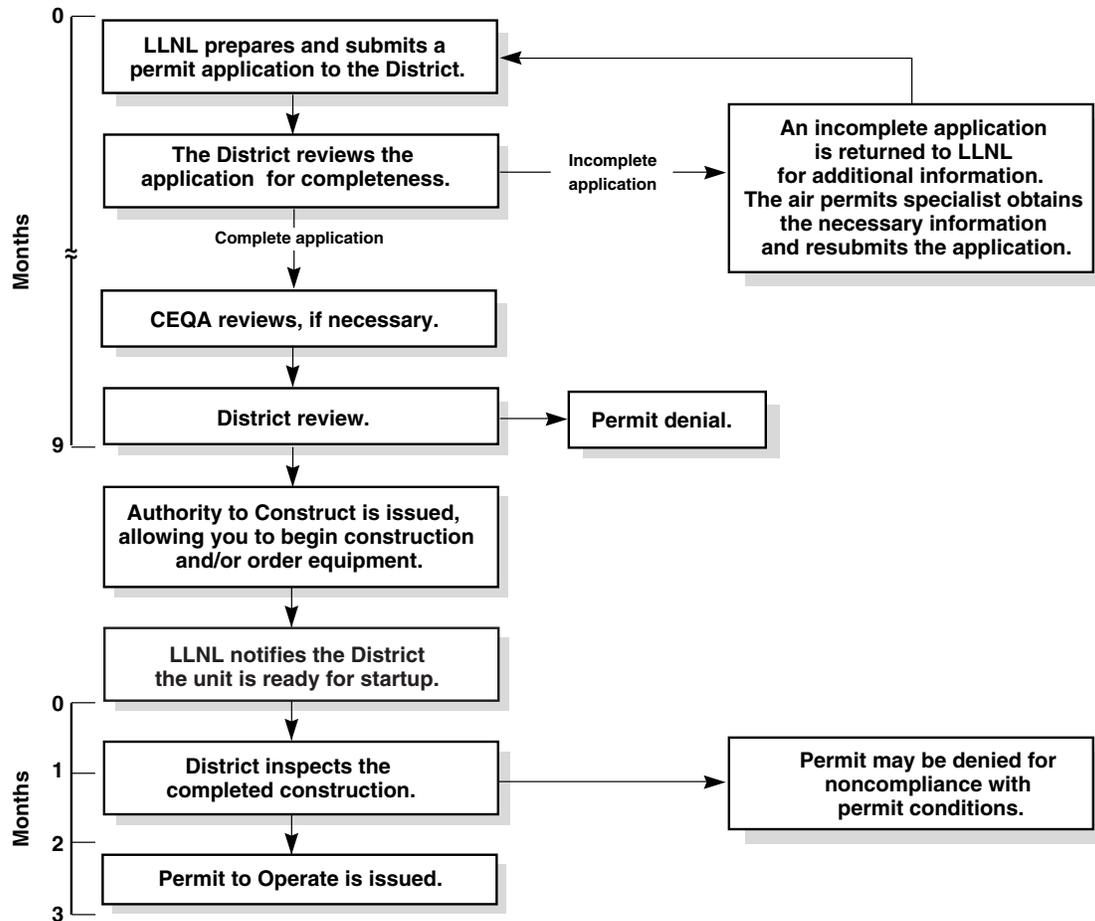
To determine what permit requirements apply, an air quality specialist from the EPD's Operations and Regulatory Affairs Division's (ORAD) Terrestrial Atmospheric Monitoring and Modeling (TAMM) Group evaluates each proposed release of air contaminants for permit requirements and provides advice on potential operating restrictions that may apply. The air quality specialist will need specific information to make this evaluation; a list of the information needed is summarized in Appendix D. A source may be exempt from an air district permit, but may require record keeping to ensure that the activity is operated within the parameters of the exemption. (If a source operates under an exemption, it is still required to comply with all applicable prohibitory regulations). All exempt operations shall be reviewed by the air quality specialist prior to implementation.

### 3.2.2 Permit Process

Figure 1 shows a typical timeline for the air permit process. If a Permit to Operate is required, the TAMM air quality specialist assists the authorizing organization through a three-part permitting process: (1) Application for Authority to Construct, (2) Notification of Startup, and (3) Permit to Operate. The local air district must issue the Authority to Construct before construction or modification begins on equipment that will emit pollutants.

It typically takes three months to two years to complete the entire process; the time required depends on the complexity of the equipment or process involved. A typical air permit requires six to nine months for air-district staff review for completeness, payment of fees, issuance of an Authority to Construct, source testing, final inspection by the air district, and issuance of a Permit to Operate. If the air district requires additional information after a permit has been submitted, the clock is restarted. Therefore, it is important to submit a complete application with all necessary information to streamline and expedite the permitting process.

Air emission offsets must be provided for new air emission sources and are integral to the permit process. For facilities with emissions of criteria pollutants below 50 tons/year, such as LLNL, BAAQMD allows the offsets to be borrowed from the district's "Small Facility Bank." The offsets borrowed must eventually be repaid in the form of curtailed emissions or the cash equivalent. The SJVUAPCD does not have an equivalent bank; therefore, offsets are provided by curtailing existing emissions at Site 300 (e.g., by lowering the number of gallons of gasoline that may be pumped in a year). Larger amounts of offsets could be procured from other facilities, resulting in significant costs and delays. (For more information on air emission offsets, see Appendix E and the resources listed in Section 6.2.)



**Figure 1. Typical timeline for issuing a Permit to Operate.**

Upon receiving information describing a potential air emission source, the TAMM air quality specialist completes the appropriate documents needed to apply for the permit. All documents are reviewed by a designated representative of the authorizing organization and the TAMM group leader. The documents are then sent to an air district engineer, who determines the completeness of the permit application and either issues an Authority to Construct or denies the application.

The Authority to Construct is required for new sources and is valid for two years. An LLNL authorizing organization should not purchase equipment that may emit air pollutants until LLNL has received an Authority to Construct for the equipment. If the air district does not approve the equipment, the purchased equipment cannot be legally operated.

After the Authority to Construct is received, construction or installation may begin. When the equipment is ready for operation, the TAMM air quality specialist sends the air district a Notification of Startup. If the air district inspector finds the equipment to be as described in the permit application and meets the permit conditions, a Permit to Operate is issued, and operations may begin. BAAQMD permits are valid for one year; SJVUAPCD permits are valid for five years and are paid annually. Permits can be rescinded at any time for a violation of regulations or permit conditions.

There are significant costs associated with air permit application, including application fees and other hidden costs associated with emission offsets that must be “borrowed” from the BAAQMD Small Facility Bank. If a permit is cancelled, it may be difficult or impossible in the future to obtain an equivalent permit with the same conditions. The air districts tend to impose new, more restrictive conditions on new permit applications. Given the costs, time, and difficulty of obtaining new air permits, the existing permits are a valuable asset to LLNL. Therefore, it is recommended that every effort be taken to preserve, reallocate and reuse existing air permits to the extent practicable. Any decision to cancel an existing air permit shall be subject to approval by the Directorate Operations Manager (or his/her formally designated alternate) for the Directorate on whose behalf the permit was issued.

### **3.2.3 Operating Restrictions after a Permit Is Obtained**

The LLNL authorizing organization shall have the Authority to Construct or Permit to Operate available for inspection by the air district inspector. The EPD maintains files of all permit documents, responds to outside requests for air emissions information, coordinates with air district inspectors for compliance inspections, and prepares summaries of inspection results. Equipment operation shall be consistent with the description in the air permit application, the Authority to Construct/Permit to Operate, and in any other applicable regulations. If a source operates in violation of an air district regulation or permit condition, it shall be shut down and not restarted until corrective action has been completed.

The permit or exemption document may include specific conditions that limit an operation. For example, the document may require that detailed records of data related to air emissions, such as solvent use, be maintained. Records might show the number of gallons of solvents that are evaporated or otherwise lost to the atmosphere. The air district inspector uses the logs to determine whether LLNL is in compliance with permit conditions and district regulations, and may interpret missing data as a violation. The air quality specialist or environmental analyst provides guidance on creating and maintaining a logbook that meets requirements.

### 3.2.4 Permit Renewal Process

The BAAQMD and SJVUAPCD send permit renewal forms to the air quality specialist annually. The air quality specialist can renew the permit automatically through payment of annual fees if:

- The operation and applicable regulations have not changed.
- The representative of the authorizing organization provides information on annual use of permitted materials.
- The representative of the authorizing organization verifies that permit information is current.

The BAAQMD permits are renewed annually every March, and the SJVUAPCD permits are renewed every five years in January. Renewed permits are mailed to the representative of the authorizing organization. If the air district does not process the permit renewal prior to the expiration date, the districts advise LLNL that the expired permit will remain valid until the renewal process is complete. Inspectors do not issue a Notice of Violation in such instances.

### 3.2.5 Synthetic Minor Operating Permit

In addition to the local source-specific air permitting process, there is a federal "Title V" permitting process for "major" source facilities that have the potential to emit pollutants in amounts exceeding established thresholds. The Livermore site has the potential to exceed the SMOP thresholds due to the maximum emission capability of all of its sources combined. However, LLNL consistently operates below the thresholds and is unlikely to exceed the thresholds. Therefore LLNL chose to avoid the federal "Title V" process by agreeing to maintain air emissions below the major source levels, thereby becoming a "synthetic minor" source. LLNL's agreement is embodied in an umbrella permit issued by BAAQMD, called a Synthetic Minor Operating Permit (SMOP). One of the main features of the SMOP is that the records for all permitted sources must be summarized each month, in order to continuously ensure that the SMOP thresholds are not exceeded. The SMOP thresholds include limits on NO<sub>x</sub> and POCs to 50 tons/year and on HAPs to 23 tons/year (9 tons/year of any single HAP).

## 3.3 Administrative Controls for Air Toxics

California independently regulates sources of toxic air contaminants through a separate local air district permitting process. Each compound has a threshold value, which determines if a health-risk screening needs to be conducted as part of a permit application. If the calculated risk from screening a given source is high, a permit application may be denied or LLNL may be required to complete a full health risk

assessment and to mitigate emissions. For additional information on air toxics, see Appendix E.

### **3.3.1 National Emission Standards for Hazardous Air Pollutants**

If an activity involves contaminants regulated by the National Emission Standards for Hazardous Air Pollutants (NESHAPS), the air quality specialist shall help determine appropriate controls. In some cases, the air quality specialist may recommend appropriate control measures to the responsible organization, which will determine and implement the control measures

The most common nonradiological NESHAPs concern is asbestos, associated with demolition or renovation work. Regulated Asbestos Containing Material (RACM) is defined as a material that contains greater than 1% asbestos and is friable by nature. A material is considered friable if it can be crushed, crumbled or pulverized using simple hand pressure when dry. Regulated Asbestos Containing Material also includes materials which are normally considered nonfriable, but which contain greater than 1% asbestos and will become subjected to sanding, drilling, grinding, cutting, or abrading during the demolition or renovation process.

District regulations require that for every demolition and for every renovation involving the removal of specified amounts of RACM, a notification must be made to the district prior to commencement of demolition/renovation. A demolition notification is required even when nonasbestos materials are to be demolished.

The TAMM Air Specialist prepares the written Demolition Notification form and/or the Asbestos Renovation form for such work to be performed by LLNL employees, and sends it to the district, along with the required fees. Contractors must submit separate notifications. Each notification must be received by the district at least 10 working days prior to commencement of demolition or renovation work. The RI for the project shall ensure that contractors are properly certified for asbestos-abatement work.

For radiological NESHAPs issues, refer to Document 31.2.

### **3.3.2 Assembly Bill 2588**

In order to assess the health risk to neighbors of significant facilities, California requires these facilities to conduct a one-time health risk assessment and to periodically update the assessment. LLNL completed its initial Assembly Bill 2588 (AB 2588) health risk assessment in 1990 (for toxic emissions released in 1989) and submitted the requisite documents to the BAAQMD and SJVUAPCD. The districts ranked LLNL in a low category of risk. Authorizing organization representatives shall report any significant changes in emissions of toxics to the air quality specialist, so that the AB 2588 report can be modified accordingly.

### 3.3.3 Health Risk Screening

A health risk screening shall be conducted when emissions of identified pollutants exceed specified threshold values. The pollutants requiring health risk screening differ for the BAAQMD and the SJVUAPCD, and lists are subject to periodic changes

(ref. <http://www.baaqmd.gov/permit/toxics/tacs.htm> and  
[http://www.valleyair.org/policies\\_per/Policies/APR 1905.pdf](http://www.valleyair.org/policies_per/Policies/APR1905.pdf)).

The information needed by the local air district to conduct a health risk screening is the same as that required for criteria pollutants, except that the quantity or concentration for each toxic air contaminant must be provided. Contact the TAMM air quality specialist whenever an operation involves any new toxic air contaminants, or when any changes are made to quantities of toxic air contaminants, equipment, or processes used. The TAMM air quality specialist shall determine whether additional air permitting requirements apply and, if necessary, obtain the information required to perform a health risk screening.

## 3.4 Ozone-Depleting Substances and Solvent Wipe Cleaning

There are two categories of sources at LLNL that are relatively common and require continuing management and record keeping. These are discussed in this section.

### 3.4.1 Ozone-Depleting Substances

Title VI, "Stratospheric Ozone Protection," of the Clean Air Act Amendments of 1990 established a production phase-out schedule and yearly reduction percentages for ozone-depleting chemicals. This amendment, and subsequent regulations, requires (1) recycling; (2) the ban of intentional venting or releasing of refrigerants during maintenance, service, repair, or disposal; (3) the restriction of the emission of refrigerants; and (4) the establishments of strict control over their use. These requirements are intended to reduce the emissions of ozone-depleting substances until their eventual complete phase-out.

The EPA regulations include equipment certification requirements, maintenance and service practices, refrigerant reclaiming requirements, training, and record-keeping on the purchase, use, sale, and transfer, and disposal of these substances. These activities do not require air permits from the local air districts, but are regulated by the EPA.

These chemicals are primarily used at LLNL as refrigerant for air conditioning and refrigeration equipment in buildings and vehicles. The Plant Engineering Department has procedures to comply with regulations regarding air conditioning equipment in buildings and vehicles under their control. There is an exemption for the use of ozone depleting substances for essential laboratory research. Federal regulations prohibit the sale of ozone-depleting substances to persons without the appropriate certifications.

### 3.4.2 Wipe-Cleaning

Solvent wipe cleaning is defined as the process of rubbing a material, such as a rag, wetted with a solvent on a surface to remove contaminants. Air districts strictly regulate this activity in order to encourage the use of non-solvent cleaning methods. . Solvent substitutes, such as aqueous-based cleaners, shall be used to the extent practicable. Both air districts have general “prohibitory rules” that restrict solvent wipe cleaning. No air permits for solvent wipe cleaning are needed at Site 300, except in association with the paint spray booth, because the incidental cleaning is below the permitting threshold of 2 pounds/day. Any new solvent wipe cleaning at Site 300, in excess of 2 pounds/day, would require an air permit.

At the Livermore site, all solvent-wipe-cleaning activity is covered by one of several existing air permits. In some cases, there is an air permit covering all wipe cleaning within a specific building, and solvent usage records are maintained for the building. In all other cases, the wipe cleaning is covered by the general site-wide wipe-cleaning permit, and solvent usage records are obtained through the procurement process. Contact your environmental analyst to determine if you are specifically or generally covered.

The LLNL worker wishing to purchase solvent for wipe-cleaning purposes orders these materials through their Technical Release Representative (TRR), who coordinates the solvent procurement with the LLNL ChemTrack Group. This ensures that solvents are tracked by ChemTrack and that the annual usage is reported for the site-wide permit. The quantity of solvents allowed in the site-wide permit is limited, therefore any continual solvent wipe cleaning operation that will use more than 5 gallons a year of solvents shall be evaluated for a separate air permit.

### 3.5 Inspections and Enforcement Programs

District inspectors routinely visit LLNL to inspect permitted sources to ensure that permitted sources match the description in the air district’s records and that additional equipment has not been installed without a permit. Equipment and associated abatement devices shall be in good working condition. Permit documents shall be on hand, and special requirements and conditions, including logbooks, shall be verified. Inspectors carefully scrutinize every operation and associated documents and records. Failure to comply with requirements can result in the issuance of a Notice of Violation (NOV), or similar enforcement action, which can include penalties, fines, and adverse publicity. In extreme cases, criminal penalties can be sought.

Inspections are coordinated by EPD. The TAMM air quality specialist notifies personnel in the authorizing organization when an air permit source is scheduled to be inspected.

The ES&H Team environmental analyst supports the authorizing organization in preparing for the inspection.

### **3.6 Consequences of a Violation**

Air districts can initiate an enforcement action when permit conditions or district regulations are violated. Information regarding violations is obtained from citizen complaints, reports from facility employees, and routine inspections by district staff. The BAAQMD and SJVUAPCD can revoke permits if their terms and conditions are not followed. Violations can result in civil or criminal actions against LLNL or an operator. In a case of extreme and continuing violations, an air district could shut down a process and possibly a facility.

If an inspector finds a violation, an NOV may be issued. The recipient of the NOV has 10 calendar days to provide a written response to the air district, describing the actions taken to correct the situation. The air quality specialist shall prepare the response, with assistance from the authorizing organization and environmental analyst. All NOVs require the authorizing organization to submit an Occurrence Report to the DOE.

All information regarding violations is public information after a settlement has been reached. Both the BAAQMD and the SJVUAPCD are required to send settlement information to CARB, which reports it to the EPA. Both districts publish lists or reports of settlements quarterly, which are available to the public.

## **4.0 Responsibilities**

All workers and organizations shall refer to Document 2.1, "Laboratory and ES&H Policies, General Worker Responsibilities, and Integrated Safety Management," in the *ES&H Manual* for a list of general responsibilities. The following sections describe the specific responsibilities of LLNL organizations and individual workers who have key safety roles related to the air emission permitting process.

### **4.1 Air Quality Specialist Responsibilities**

Each ES&H Team is supported by a TAMM air quality specialist who is typically a member of the EPD Environmental Support Team. Air quality specialists shall:

- Evaluate the need for an air permit.
- Obtain and negotiate permits and exemptions for authorizing organization equipment and processes.

- Maintain copies of permit records issued by BAAQMD and SJVUAPCD.
- Renew permits, if there are no changes in equipment or operations.
- Perform air compliance assessments.
- Prepare monthly reports required under the SMOP.
- Respond to enforcement action, such as a Notice of Violation, Notice to Comply, or Request for Information.
- Coordinate any agency contact or inspections of permitted equipment and processes with the authorizing organizations.
- Prepare special reports regarding air emissions required by various agencies.

#### **4.2 ES&H Team Environmental Analyst Responsibilities**

Each ES&H Team has an environmental analyst from the Environmental Operations Group (EOG) within ORAD. Environmental analysts are familiar with the more common air emission sources within various authorizing organizations. Environmental analysts shall:

- Help Responsible Individuals (RIs), Authorizing Organizations and air quality specialists locate and identify potential sources of air emissions.
- Help authorizing organizations determine permitting and the National Environmental Protection Act (NEPA) requirements.
- Periodically check permitted equipment to ensure that authorizing organization personnel understand and comply with current regulatory and record keeping requirements.
- Check permitted equipment to ensure that the RI understands and complies with regulations and permit conditions associated with equipment.
- Assist Air Quality Specialist to respond to enforcement action.

#### **4.3 Responsible Individual Responsibilities**

The RI from the authorizing organization shall:

- Notify the environmental analyst of any new or modified operations that are potential sources of air emissions and consult with the assigned air quality specialist to determine whether a permit is required.

- Contact the ES&H Team environmental analyst whenever a new or modified potential air emission source is identified, or when assistance is required in locating or identifying potential sources of air emissions.
- Comply with the terms of any air permit issued for the air emission source, including any record-keeping requirements of the permit.
- Maintain necessary records to verify that a source is operating within the parameters required to be exempt from air permitting.
- Provide monthly data reports to the TAMM Group of ORAD, as required by the SMOP.

LLNL authorizing organizations may designate an individual who is responsible for contacting the air quality specialist and environmental analyst. However, the RI has ultimate responsibility for ensuring that EPD personnel are notified.

#### **4.4 Environmental Protection Department Responsibilities**

The EPD provides resources to support the air quality and air emission control needs of LLNL authorizing organizations through ORAD. The EPD is responsible for paying application fees and permit fees assessed by the air district.

#### **4.5 Authorizing Organization Responsibilities**

The LLNL authorizing organization shall:

- Identify potential new or modified sources of air emissions, which have not been addressed by an RI, and consult with the ES&H Team environmental analyst and the TAMM air quality specialist to determine whether a permit is required.
- Ensure that an Authority to Construct has been received before purchasing or fabricating new equipment that may emit air pollutants.
- Implement emission control strategies to comply with air quality regulations.
- Assist Air Quality Specialist to respond to enforcement action.

## **5.0 Work Smart Standards**

17 CCR Sections 60030–60053, “Administrative Procedures (Permitting Requirements).”

17 CCR Sections 80100–80175, “Agricultural Burning Guidelines.”

- 17 CCR Sections 90700–90702, “Air Toxics (Hot Spots) Fee Regulation.”
- 17 CCR Sections 91100–91220, “Determination of Emission.”
- 17 CCR Sections 92000–92540, “Abrasive blasting.”
- 17 CCR Sections 93000–93110, “Air Resources Board (Control of Toxic Air Contaminants).”
- 17 CCR Sections 93300–93355 and appendices, “Emission Inventory Criteria and Guidelines.”
- 17 CCR Sections 94100–94161, “Compliance with Nonvehicular Emissions Standards.”
- 40 CFR Section 60, “Standards of Performance for New Stationary Sources.”
- 40 CFR Section 61, “National Emission Standards for Hazardous Air Pollutants.”
- 40 CFR Section 63, “National Emissions Standards for Hazardous Air Pollutants for Source Categories.”
- 40 CFR Section 82, “Protection of Stratospheric Ozone.”
- 42 USC Section 7401 et seq., “Clean Air Act (CAA).” 42 USC Section 7671 et seq., “Clean Air Act amendments of 1990.”
- Bay Area Air Quality Management District (BAAQMD) Regulation 1, General Provisions and Definitions, 1-112 to 1-441 (Breakdown to Right of Access to Information).
- Bay Area Air Quality Management District (BAAQMD) Regulations 1–12, Regulations and Permitting Requirements.
- CA Health & Safety Code Section 41950, Gasoline Vapor Control.
- CA Health & Safety Code Sections 40825–40843, Hearing Boards, Procedures.
- CA Health & Safety Code Sections 40918–40925.5, District Plans to Attain State Ambient Air Quality Standards.
- CA Health & Safety Code Sections 41700–41704, Emission Limitations, General Limitations.
- CA Health & Safety Code Sections 41750–41755, Emission Limitations, Portable Equipment.
- CA Health & Safety Code Sections 41800–41804, Nonagricultural Burning Requirements.
- CA Health & Safety Code Sections 42300–42314.1, Enforcement, Permits.
- CA Health & Safety Code Sections 44300–44346, Air Toxics “Hot Spots” Information and Assessment.
- CA Health & Safety Code Sections 44360–44384, Air Toxics “Hot Spots” Information and Assessment, Risk Assessment, Fees and Regulations.

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Regulations Rules 1010–9120, Regulations and Permitting Requirements.

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rule 1100, Equipment Breakdown.

## 6.0 Resources for More Information

### 6.1 Contacts

Air regulations and policies affect many operations at LLNL. At times, obtaining the necessary documentation for an operation can be complicated and time consuming. A principal objective of TAMM air quality specialists is to assist authorizing organizations in obtaining all necessary air permits with minimal disruption to operations. Contact the following organizations or individuals for assistance in the following areas:

- For assistance in locating or identifying potential sources of air emissions and understanding regulatory requirements, contact the ES&H Team environmental analyst.
- For assistance in obtaining, renewing, and closing out local district permits as well as clarifying the conditions of a permit or answering any other questions pertaining to air permits, contact the TAMM air quality specialist.
- For assistance in identifying the air quality specialist, contact the ES&H Team.

TAMM air quality specialists also aid LLNL programs in designing record-keeping logs and clarifying application rules and regulations relative to specific equipment and operations.

### 6.2 Other Sources

Bay Area Air Quality Management District, *Bay Area Air Quality Management District Quality Handbook*, can be found at the following Internet address:

<http://www.baaqmd.gov/pmt/handbook/default/htm>

Gallegos, G. M., P. E. Althouse, N. A. Bertoldo, R. G. Blake, S. L. Brigdon, R. A. Brown, C. G. Campbell, E. Christofferson, L. M. Clark, A. R. Grayson, R. J. Harrach, H. E. Jones, D. H. MacQueen, S. Mathews, S. R. Peterson, M. A. Revelli, L. Sanchez, M. J. Taffet, P. J. Tate, R. J. Ward, R. A. Williams, *Environmental Report 2001*, Lawrence Livermore National Laboratory, Livermore, CA, UCRL-50027-01 (2002).

Lawrence Livermore National Laboratory, "Air Emissions Offsets Management Plan," can be found at the following Internet address:

[http://www.llnl.gov/es\\_and\\_h/hsm/doc\\_31.01/air.html](http://www.llnl.gov/es_and_h/hsm/doc_31.01/air.html)

The BAAQMD and SJVUAPCD air toxics lists are found at the following Internet addresses:

BAAQMD:

[http://www.baaqmd.gov/pmt/toxics/toxic\\_triggers.asp](http://www.baaqmd.gov/pmt/toxics/toxic_triggers.asp)

and

SJVUAPCD:

[www.valleyair.org/policies\\_per/Policies/APR%201905.pdf](http://www.valleyair.org/policies_per/Policies/APR%201905.pdf).

## Appendix A

### Glossary

Air contaminant or air pollutant	Any material that, when emitted, causes or tends to cause the degradation of air quality. Such material includes, but is not limited to smoke, charred paper, dust, soot, grime, carbon, fumes, gases, odors, particulate matter, acids, or any combination of such material.
Air pollution	The presence of man-made gases and suspended particles in the atmosphere in excess of air quality standards.
Air Quality Management District	Local agency, on a regional level, responsible for controlling pollutants discharged into the atmosphere from stationary sources.
Air Quality Standard	The prescribed level of a pollutant in the outside air that cannot be exceeded during a specific time in a specified geographical area. Established by both federal and state governments.
Air Resources Board	The State of California agency responsible for air pollution control.
Ambient air	Any portion of the atmosphere not confined by four walls and a roof; outside air.
Atmosphere	The air that surrounds the earth, excluding the general volume of gases contained within a building or structure.
Authority to Construct	A preconstruction permit issued by an air district.
BAAQMD	Bay Area Air Quality Management District, which governs LLNL's main site. The BAAQMD is a regional district, including all seven Bay Area counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara) and the southern halves of Solano and Sonoma counties.
Baghouse	An air pollution abatement device that traps particulate (dust) by forcing gas streams through large bags usually made of glass fibers.

CARB	California Air Resources Board.
Cyclone	An air pollution abatement device that removes heavy particles by centrifugal force.
Environment	The aggregate of all external conditions and influences affecting the life, development, and, ultimately, survival of an organism.
Fluorocarbon	An organic compound that contains fluorine. Some such compounds may affect health, but they do not produce smog.
HEPA	High-efficiency particulate abatement device.
NAAQS	National Ambient Air Quality Standards.
Nitrogen oxides (NO <sub>x</sub> )	Product of combustion and a major contributor to acid deposition and the formation of ground-level ozone. A criteria pollutant.
Nonprecursor organic compound (NPOC)	<p>The following compounds: methylene chloride, 1,1,1-trichloroethane, 1,1,2-trichlorotrifluoroethane (CFC-113), trichloro-fluoromethane (CFC-11), dichlorodifluoro-methane (CFC-12), dichlorotetrafluoroethane (CFC-114), chloro-difluoromethane (CFC-22), chloropentafluoroethane (CFC-115), 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124), pentafluoroethane (HFC-125), 1,1,2,2-tetrafluoro-ethane (HFC-134), 1,1,1-trifluoroethane (HFC-143a), 1,1-difluoroethane (HFC-152a), trifluoromethane (CFC-23), and perfluorocarbons that fall into the following classes:</p> <ol style="list-style-type: none"> <li>1. Cyclic, branched, or linear, completely fluorinated alkanes.</li> <li>2. Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations.</li> <li>3. Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations.</li> <li>4. Sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.</li> </ol>

Notice of Violation (NOV)	A notice to a source owner of an apparent violation of air district regulations.
Organic compounds	Chemical compounds that contain carbon.
Ozone (O <sub>3</sub> )	A criteria pollutant in ambient air. In the stratosphere, ozone is an essential covering of protection to the earth from ultraviolet radiation.
Particulate matter	Particles of solid or liquid matter less than 10 microns in diameter, such as soot, dust, aerosols, fumes, and mists. A criteria pollutant.
Permit to Operate	An operational permit issued yearly by the BAAQMD and every five years by the SJVUAPCD.
Precursor organic compound (POC)	Any compound of carbon, except the nonprecursor organic compounds.
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District, which governs LLNL's Site 300.
SMOP	Synthetic Minor Operating Permit
Source	Any operation that produces and/or emits air pollutants.
Sulfur dioxide (SO <sub>2</sub> )	A product of natural gas and diesel fuel combustion. A criteria pollutant.
TAMM	Terrestrial, Atmospheric, Monitoring, and Modeling Group of ORAD.
United States Environmental Protection Agency (EPA)	The federal agency that develops and enforces environmental regulations, including those pertaining to air quality.
Volatile organic compound (VOC)	Any compound of carbon, excluding methane, carbon monoxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which could be emitted during use, processing, application, curing, or drying of a solvent, surface coating, or other material.

## Appendix B

### Air Emission Sources And Chemicals That May Require An Air Permit

Abrasive blasting (sand, steel, shotblast)	Liquefied petroleum gas, propane
Acids	Materials crushing
Adhesives	Metal heat treating
Aeration of contaminated soils	Metal shops (cyclone exhaust)
Alcohols	Natural gas
Automotive repair (solvent cleaning, brake shoe bonding)	Open burning
Boilers (oil and natural gas fired)	Organic chemical storage (large containers, tanks)
Casting and molding	Organic dyes or pigments
Ceramics (drying or grinding)	Organic solvent evaporation (degreasing, metal cleaning)
Chemicals	Paints
Cleaning chemicals	Petroleum storage tanks
Coating ovens	Photographic equipment (resins, toners)
Cold cleaners (stripping and washing)	Plastics formulation
Cooling towers (blowdown)	Prescribed burning of vegetation
Crushing or screening	Pressure tanks (gas cylinders)
Degreasers (open top, conveyor, portable)	Printing and publishing (inks, solvents, adhesives)
Distillate oil (diesel oil, No. 2)	Sand or gravel (transferring, conveying, hauling)
Electroplating (rinsing, finishing)	Sanders (cyclone exhaust)
Emergency generators	Semiconductor operation
Explosives (burning, detonation)	Solid-waste disposal (storage, fugitive emissions)
Fluorocarbons and CFCs	Solvent cleaning or wiping
Fugitive emissions	Specialty cleaners
Gasoline dispensing operations (auto, truck, tanks)	Steam generators (steam cleaning)
General processes (storage, transfer, distillation)	Surface coating (primer, varnish, lacquer)
Grinders	Thinning solvents
Ground water or soil vapor extraction	Waste gas flares
Health Services Department (laboratory chemicals)	Wastewater (oil-water) separator
	Woodshops (sawing, cyclone exhaust)

## Appendix C

### Sources That May Be Exempt From BAAQMD Permits

Class	Examples
General combustion equipment	Sources with <1 million BTU/hr capacity.
Internal combustion equipment	Internal combustion engines with <50-hp output rating.
Furnaces, ovens, and kilns	Enameling furnaces; equipment used for diffusion treating of metals; covers used for curing plastics that are in a vacuum mold.
Surface preparation and cleaning equipment	Abrasive blast cabinets; cold solvent cleaners of <1 ft <sup>2</sup> surface area or using <1 gal of solvent, with tight covers.
Surface coating	Any powder-coating operation; printing presses using <150 lb/yr of ink that have <1% printing VOCs and consume <20 gal/yr; use of coatings that contain <1% VOC (wt); coating operations using only hand-held, nonrefillable aerosol cans.
Material working and handling equipment	Equipment for buffing, carving, machining of ceramic precision parts, metals, plastics, etc.; equipment used exclusively for sintering of glass or metals.
Casting and molding equipment	Molds for metal casting; equipment for compression molding and injection molding of plastics.
Liquid storage and loading equipment	Storage tanks and vessels with <260-gal capacity; tanks, vessels, and pumping equipment used to store or dispense aqueous solutions with 1% by weight organic compounds; containers for liquefied gases, lubricating oils, and certain fuel oils.
Semiconductor manufacturing	Areas that contain only the following equipment: ion implantation, lapping and polishing, sputtering, vacuum deposition, plasma etching; wet chemical solvent or acid cleaning stations with <100-gal capacity per fabrication area; buffing, polishing, etc., of semiconductor wafers.
Printed circuit board manufacturing equipment	Equipment used exclusively for plating, buffing, polishing, turning, etc., of printed circuit boards.
Testing equipment	Laboratory equipment used exclusively for chemical or physical analyses and bench-scale laboratory equipment; equipment used for inspecting metal products, and fume hoods.
Chemical processing	Containers, reservoirs, or tanks used exclusively for electrolytic plating, polishing, or stripping of brass, bronze, cadmium, copper, iron, nickel, tin, zinc, and precious metals.
Miscellaneous	Comfort air conditioning systems; natural draft hoods; equipment used to liquefy or separate oxygen, nitrogen, or rare gases from air; brazing, soldering, or welding equipment.

## Appendix D

### Information Required To Determine Whether An Air Permit Is Required For A Particular Source

To determine whether a permit is required, an air quality specialist shall need the following information:

- Name(s) of chemicals used. Include the composition of paints, coatings, and adhesives, as well as material safety data sheets (MSDSs).
- Quantities of chemicals used.
- Type of operation or equipment (e.g., painting, solvent cleaner, boiler, or fume hood).
- Release points (e.g., stack information height, diameter, flow rate, and location).
- Maximum frequency of emissions (e.g., is it a one-time puff, continuous, 4 hours per day, or 2 to 5 days per month).
- Existence of abatement equipment [such as high-efficiency particulate air (HEPA) filters, scrubber, baghouse].
- Efficiency of the abatement equipment.
- Description of abatement equipment. Include a manufacturer's catalog description or an engineer's drawing.
- Project description. What does it do? Does it produce any waste? Include a flow diagram of the process.
- Equipment installation date and time frame of operation.

## Appendix E

### Regulatory Background For Air Quality Compliance

Criteria pollutants are regulated by the Federal Clean Air Act and the California Clean Air Act based on an area's classification. The Federal Clean Air Act requires each state to develop a State Implementation Plan (SIP) that defines a strategy to attain National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (EPA). SIPs must be approved by the EPA. California has an approved implementation plan that delegates responsibility for attaining the NAAQS to Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMDs).

LLNL is regulated by two air districts—the Bay Area Air Quality Management District (BAAQMD) for the Livermore site, and the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) for Site 300, except for a narrow strip along the western boundary, which falls within BAAQMD jurisdiction. In general, both the California Clean Air Act and California Ambient Air Quality Standards (CAAQS) are more restrictive than their Federal counterparts.

The classification for each pollutant in a given area indicates whether the area meets the NAAQS. If an area meets standards, it is an "attainment area." If an area exceeds the health-based standards, it is a "nonattainment area." In a nonattainment area, a subcategory that indicates severity of nonattainment determines the rules, regulations, and requirements that are applied in an attempt to meet air quality standards. The EPA has designated both the BAAQMD and the SJVUAPCD as nonattainment areas for ozone. The San Joaquin Valley also experiences violations of state standards for ozone and particulate matter (PM). Due to the fact that air quality in the SJVUAPCD is deteriorating more rapidly than in any other area of the nation, air pollution regulations in that area are expected to become more stringent over time.

California air districts are required to regulate emissions to reduce ambient levels of pollutants and to ensure that both the CAAQS and the NAAQS are not violated. The California Clean Air Act requires nonattainment areas to reduce emissions by five percent per year retroactive to the base year 1987 to attain the CAAQS. Each air district is required to submit a Clean Air Plan to the CARB that identifies new measures to be implemented to achieve mandated reductions in air pollution. To help reduce emissions, local districts require facilities to comply with prohibitory rules and obtain air permits for equipment and operations that emit air pollutants.

The "no-net-increase" provision of the California Clean Air Act prevents any air district from issuing an air permit that represents a growth in emissions above the level established on January 1, 1988. Both the BAAQMD and SJVUAPCD have adopted "no-net-increase" provisions as part of their plans. To comply with this provision, local districts require that offsetting emissions from existing sources be obtained as part of

the district's permitting program. LLNL has adopted an "Air Emission Offsets Management Plan," which guides Laboratory efforts in providing offsets. The Plan was written before BAAQMD provided emissions offsets from their "Small Facility Bank;" therefore, the provision for purchase of offset credits on the open market is not currently in effect.

BAAQMD currently loans air emission offsets credits to medium-sized facilities (less than 50 tons/year of criteria pollutants). LLNL emits less than 50 tons per year of POCs or NO<sub>x</sub>, thus qualifying under BAAQMD regulations to receive offsets from the Small Facility Bank. LLNL is eligible to borrow and retain offsets as long as its growth remains below district-specified limits. If LLNL exceeds the limits or fails to comply with other conditions, such as a requirement for Best Available Retrofit Control Technology on other air emission sources at the facility, or fails to comply with permit conditions, all offsets borrowed from the bank may have to be repaid, and the "Air Emissions Offsets Management Plan" would again be in full effect.

Toxic air contaminants are regulated at both federal and state levels. At the federal level, such contaminants are regulated by the National Emission Standards for Hazardous Air Pollutants (NESHAPS), established under Section 112 of the Clean Air Act. The EPA has established health-based emissions standards for some hazardous air pollutants, including inorganic arsenic, beryllium, mercury, asbestos, radionuclides, vinyl chloride, benzene, and coke oven gas. Except for radionuclides, the EPA has delegated enforcement of these standards to California. Non-radionuclide National Emission Standards for Hazardous Air Pollutants (NESHAPs) are implemented through local district regulations. Radionuclide NESHAPs are controlled differently as discussed in Document 31.2, "Radiological Air Quality Compliance."

The California Air Toxics "Hot Spots" Information and Assessment Act, AB 2588, requires facilities to report the types and quantities of certain substances they routinely release into the air. AB 2588 also requires periodic facility inventory reviews and submission of updated data on toxics emissions. Goals of the program are to identify facilities that create air toxic hot spots, collect emission data from those facilities, ascertain health risks, determine the cumulative impacts of toxic air contaminants from facilities, and notify nearby residents of significant risks.