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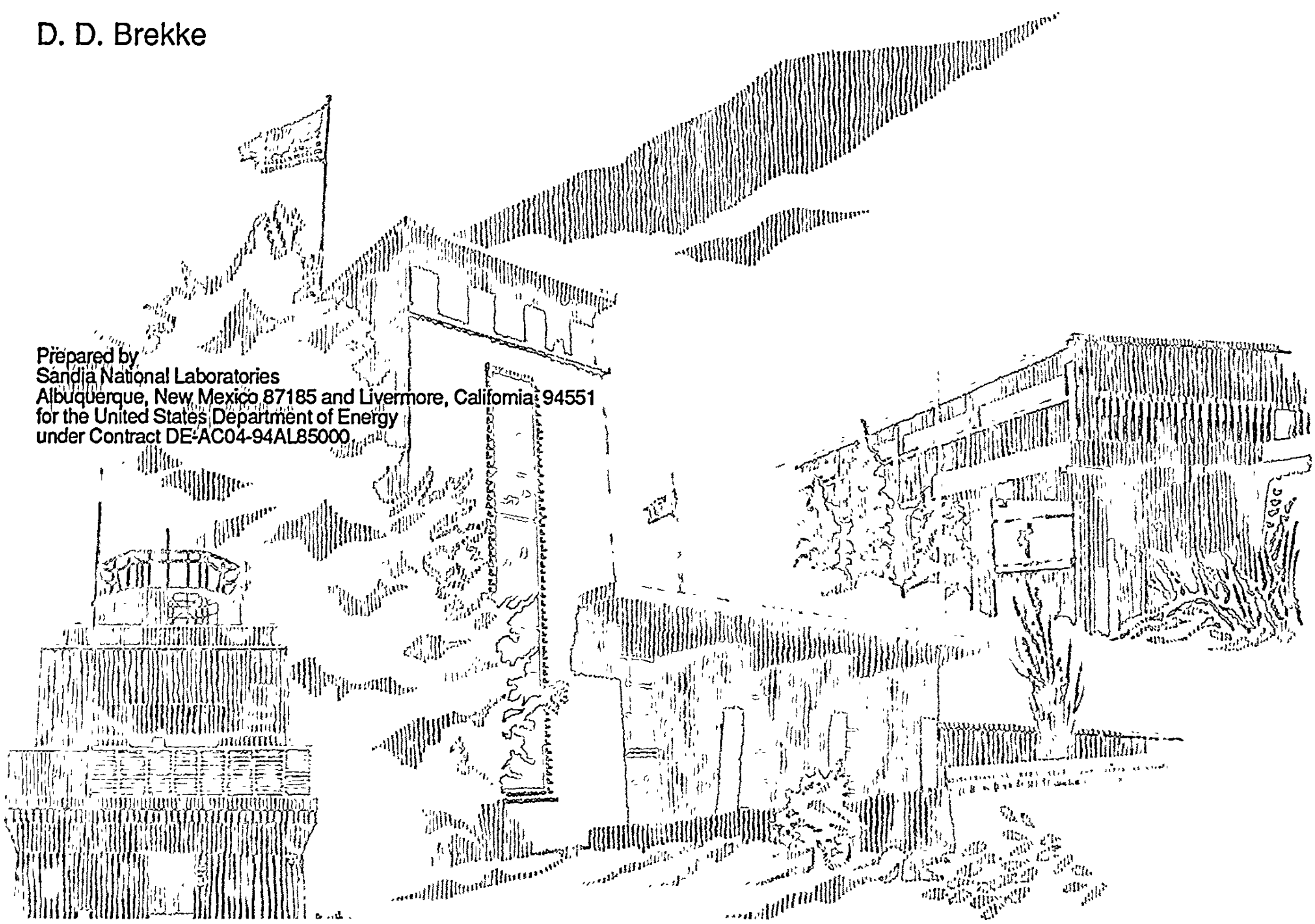
Environmental Protection Implementation Plan

D. D. Brekke



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ENVIRONMENTAL PROTECTION IMPLEMENTATION PLAN

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Sandia National Laboratories/California

Abstract

This *Environmental Protection Implementation Plan* is intended to ensure that the environmental program objectives of Department of Energy Order 5400.1 are achieved at SNL/California. This document states SNL/California's commitment to conduct its operations in an environmentally safe and responsible manner. The *Environmental Protection Implementation Plan* helps management and staff comply with applicable environmental responsibilities.

SANDIA NATIONAL LABORATORIES/CALIFORNIA

ENVIRONMENTAL PROTECTION IMPLEMENTATION PLAN

For the Period:

November 9, 1995 to November 9, 1996

Prepared: October 1995

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1.0 INTRODUCTION

Sandia National Laboratories (SNL) is a prime contractor to the Department of Energy (DOE). Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL, which maintains principal facilities in Albuquerque, NM; Livermore, CA; Tonopah, NV; and Kauai, HI.

As one of the United States' multipurpose national laboratories, SNL develops solutions to a wide range of problems facing the country. SNL's mission includes advanced military technology, energy and environmental research, arms control/nonproliferation, and advanced manufacturing technology. In addition, SNL is actively pursuing the transfer of commercially viable technology to the private sector to strengthen our nation's economic competitiveness in world markets. Operations at SNL's California facility in Livermore comprise three broad programmatic areas:

National Security: This program involves national security work, both nuclear and nonnuclear. Defense activities encompass maintenance and safeguarding of the nuclear weapons stockpile, control of the proliferation of nuclear weapons, and aerospace research.

Integrated Manufacturing Technologies: This program uses the systems and technology at the site to enhance the nation's economic competitiveness. Our aim is to be an agile manufacturing test bed for low-cost prototypes and development, as needed by U.S. industries. This program serves as a focus for partnerships with U.S. companies to develop joint manufacturing solutions.

Environmentally Driven Initiatives: This multifunctional program addresses a broad range of initiatives centered on combustion science and technology. Areas of emphasis include combustion processes, sensor technology, modeling, incinerator processes, and global climate change.

SNL/California incorporates the highest regard for environment, safety, and health (ES&H) into every experiment and all site operations. The site operates under the scope of Federal, State, and local regulatory authorities and has obtained all applicable operating permits. SNL is committed to operating in full compliance with the letter and spirit of applicable environmental laws, regulations, and standards. Furthermore, SNL/California strives to go beyond compliance with legal requirements by making every effort practical to reduce impacts to the environment to levels as low as reasonably achievable.

1.1 Site Description

The SNL/California site (Fig. 1) covers 1.7 km^2 (413 acres) of land located on the southeastern boundary of the City of Livermore, in eastern Alameda County, 65 km (40 miles) east of San Francisco (Fig. 2). The site lies at the western base of the Altamont Hills, which form the eastern boundary of the Livermore Valley.

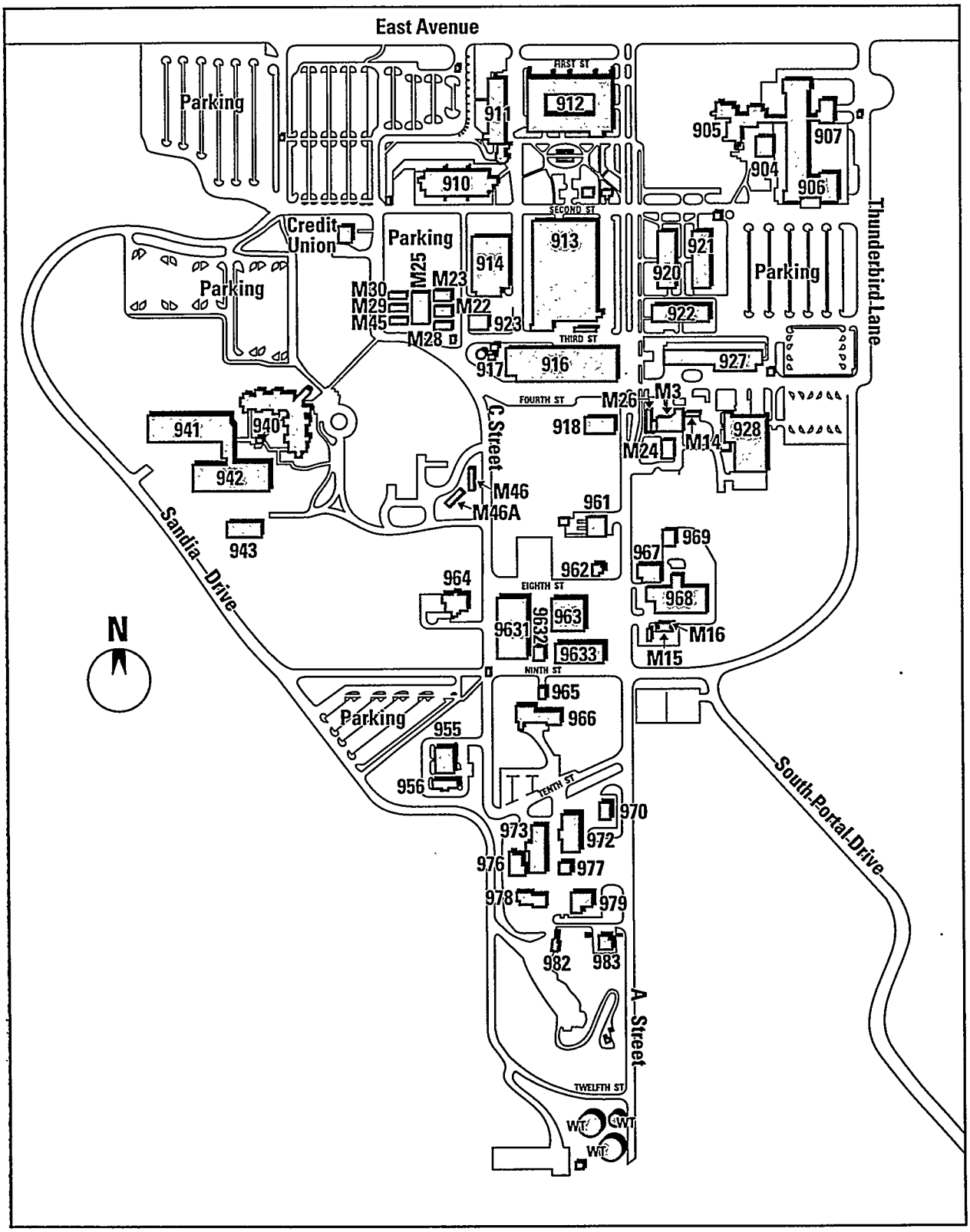

Figure 1. SNL/California site map.

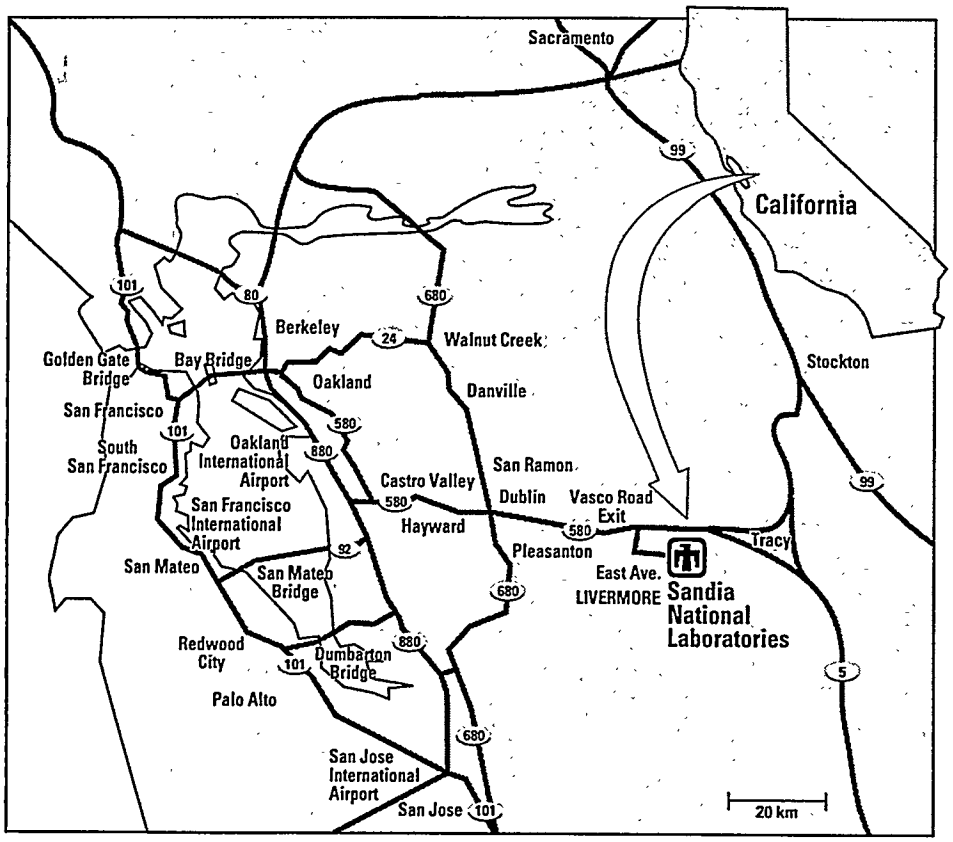

Figure 2. SNL/California in a regional setting.

The Livermore Valley is an irregularly shaped lowland in the Diablo Range of the California Coastal Mountain Range. The valley is approximately 26 km (16 miles) long (east to west) and averages about 11 km (7 miles) wide. The valley floor slopes downward generally to the west at about 10 m/km (50 ft./mile). The elevation is approximately 200 m (660 ft.) at the eastern boundary of the valley and 90 m (295 ft.) at the southwest corner.

The Valley's major drainage is intermittent streams (arroyos). These arroyos generally carry water to the southwest end of the Valley and into the Alameda Creek near Sunol. Alameda Creek then continues on to the San Francisco Bay.

1.2 Environmental Protection Policies

SNL, as part of the DOE Complex, is committed to full compliance with all applicable environmental laws and regulations. This *Environmental Protection Implementation Plan* (EPIP) is intended to ensure that the environmental program objectives of DOE Order 5400.1 are achieved at SNL/California.[1] The EPIP serves as an aid to management and staff to fulfill these responsibilities. SNL's ES&H policy, as stated in the SNL *ES&H Manual,* is as follows:[2]

> *SNL considers the protection of the environment, as well as human life and health to be its top priority. Conflicts between ES&H requirements and other programmatic needs will be resolved to fully meet the ES&H requirements. Accordingly, SNL shall design products and conduct operations with the highest regard for the protection and preservation of the environment and safety and health of its personnel, contractors, and the public. SNL shall ensure the occupational health and safety of SNL personnel, as well as environmental protection and preservation throughout all operations by complying with applicable federal, state, and local laws and regulations, DOE Orders, permit agreements, orders, and consent decrees. SNL shall make sure that contractors and site visitors are fully informed of this Policy and of their obligation to comply with it. In addition, SNL shall continuously evaluate regulatory requirements, corporate policies, and customer needs, and shall adjust its operations to meet these changing needs through the Sandia Quality Improvement Plan. This includes a goal of continuous improvement in ES&H processes.*
>
> *Concerns and conduct in matters pertaining to the environment, safety, and health are the responsibility of all SNL employees, on-site contractors and visitors. NO JOB IS MORE IMPORTANT THAN YOUR HEALTH, YOUR SAFETY AND THE PROTECTION OF OUR ENVIRONMENT.*

Long-standing DOE policy states that sites will comply with all applicable environmental statutes and regulations. The primary responsibility for assuring compliance with ES&H principles and procedures rests with line managers and those in charge of specific programs and experiments. To support line managers in fulfilling this responsibility, SNL maintains a staff of ES&H professionals.

1.3 Environmental ALARA

DOE Orders require that risks to the public and the environment be kept as low as reasonably achievable (ALARA). This aim is an essential part of corporate citizenship and an element by which the quality of the Laboratories is judged.

ALARA Program Implementation specifies the formation of an ALARA Committee.[3] SNL/California's ALARA Committee comprises representatives from the Health Protection Department, the Environmental Operations Department, the Component Technology Department, the Test Assembly Group, the Materials Technology Department, and the Physical Science Department. This committee directs line management to establish annual ALARA goals. These goals include the total radioactivity released to the environment in airborne and liquid effluents.

The ALARA Committee is also responsible for reviewing Facilities Management designs. Review includes technical, economic, practical, and public policy issues. The review process is formalized in an implementing procedure.

Another method by which ALARA concerns may be brought to the committee's attention is the National Environmental Policy Act (NEPA) review process. All major construction projects, changes in operations, and proposed new operations must be evaluated according to NEPA criteria. SNL/California has a formal NEPA review process. The reviews are done by a NEPA analyst, who works in the Environmental Operations Department. The site NEPA analyst is responsible for obtaining information from other departments in the ES&H, Facilities and Security Center, as appropriate. The NEPA analyst forwards all documentation of projects with potential radiological impacts on the public or the environment to the ALARA Committee for review.

1.4 Environment, Safety, and Health Organization

At SNL, ES&H is every employee's responsibility. ES&H management combines technical experts (who are educated and/or experienced in specific ES&H fields) with line personnel to implement ES&H requirements throughout the Laboratories. An SNL Quality Leadership Council meets regularly to establish ES&H policy related to issues affecting all of Sandia corporation.

To fulfill its ES&H commitments, SNL has established a corporate-level ES&H organization. This resides in the Laboratory Services Division at SNL/New Mexico. The ES&H requirements are implemented using written ES&H programs and procedures.

SNL/California has an ES&H organization to carry out the corporate ES&H vision. Its organizational structure is shown in Fig. 3. This organization develops and implements ES&H programs and ensures compliance with regulations specific to the California site.

To help assure ES&H commitments are fulfilled, SNL/California has established a site ES&H Council (SCEC) and a Management Assurance Department (see sections 1.4.4 and 1.4.5).

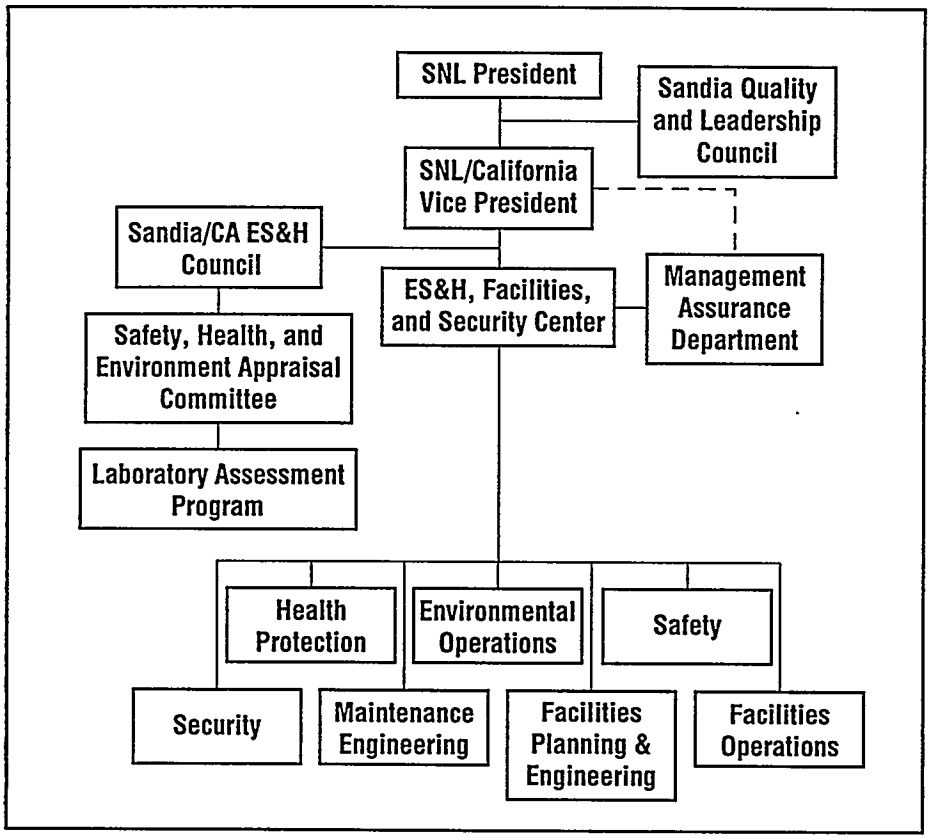

Figure 3. SNL/California Environment, Safety, and Health organizational chart.

1.4.1 ES&H, Facilities and Security Center

The ES&H, Facilities and Security Center is responsible for ES&H at the SNL/California site. An important part of the center's mission is to ensure the health and safety of SNL/California employees and the general public, and to protect the environment. This mission is fulfilled by helping SNL/California employees understand and comply with DOE Orders and their legal responsibilities under Federal, State, and local laws and regulations. The ES&H, Facilities and Security Center has three departments involved in ensuring workplace safety and protection of the environment: Health Protection, Environmental Operations, and Safety. An ES&H and Facilities quality assurance group reports directly to the center director and is functionally independent of the departments within the center.

The environmental programs at SNL/California are consolidated in the Environmental Operations Department, which is responsible for this plan. Therefore, the functions of this department are described below.

1.4.2 Environmental Operations Department

The Environmental Operations Department is responsible for ensuring that SNL/California operations minimally impact the environment. The department provides guidance to line organizations to help them comply with applicable environmental regulations and DOE orders. A staff of professionals provides consultation, safety reviews, and evaluations for the California site. To fulfill its mission, the department has groups responsible for waste management, environmental restoration, pollution prevention, environmental surveillance, air quality, environmental planning, and wastewater and storm water management (see Fig. 4). The following sections briefly describe these groups and the programs for which they are responsible.

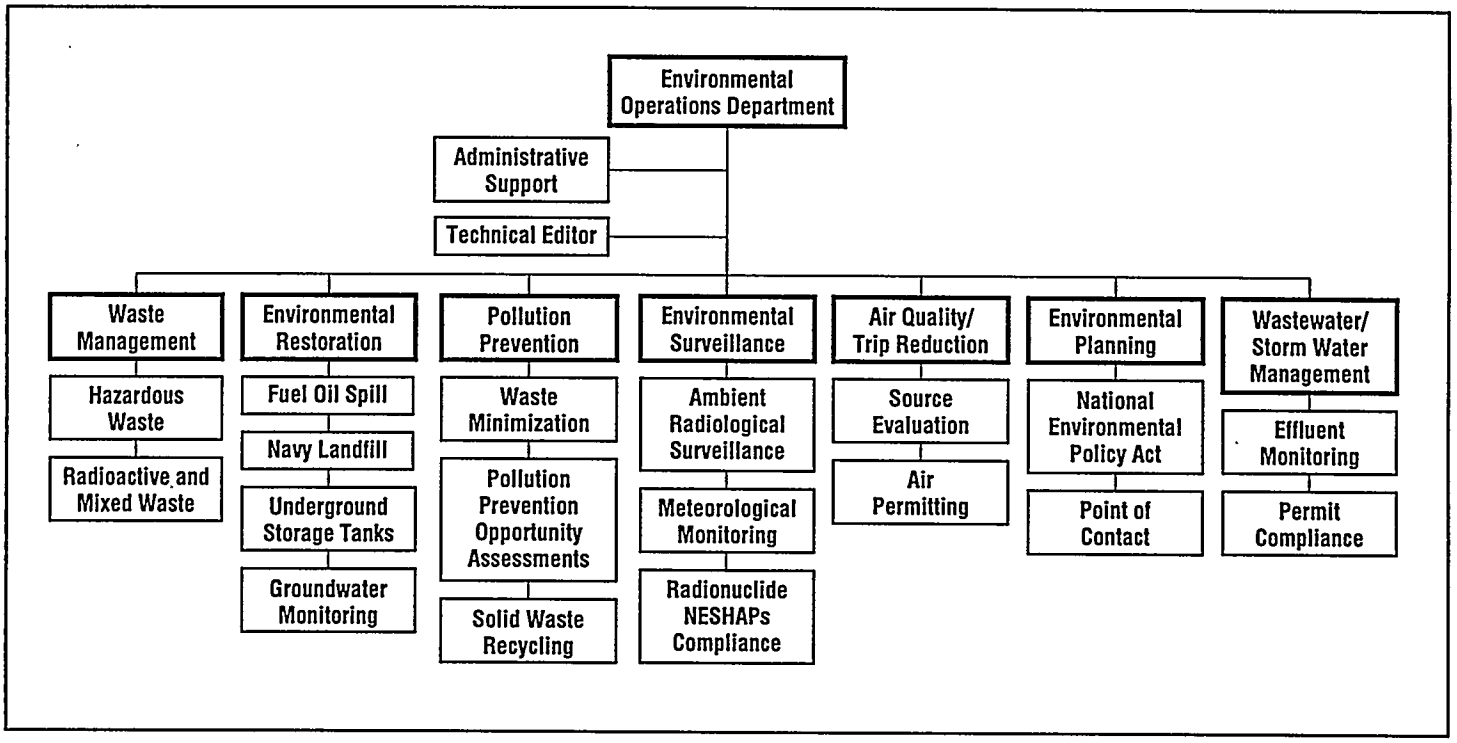

Figure 4. SNL/California, Environmental Operations Department organizational chart.

Waste Management

The Waste Management Group manages hazardous, radioactive, energetic, medical, and mixed wastes. Responsibilities include picking up, transporting, storing, and disposing of wastes in accordance with DOE, EPA, and State regulations. The Waste Management Group also is responsible for employee training in hazardous waste generation, disposal, and spill control and remediation. The only waste treatment processes done on-site are compaction (to reduce waste volume), consolidation, and commingling. No transuranic nor high-level waste is generated at this site. No hazardous, radioactive, or mixed waste has ever been disposed of on site by SNL/California.

Environmental Restoration

The Environmental Restoration Group is responsible for assessing the extent of historical contamination at the SNL/California site and managing any necessary restoration efforts. This group also is responsible for characterizing groundwater flow, for monitoring groundwater, and for managing the underground storage tank program. The group fulfills SNL/California's responsibilities under the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA).

Pollution Prevention

The Pollution Prevention Group is responsible for promoting pollution prevention and source reduction of all wastes, for all site activities. This group performs pollution prevention opportunity assessments (PPOAs) for the site. Other program activities include gathering process information, recycling, and sanitary waste treatment. SNL/California has a waste minimization coordinator to manage this effort.

Environmental Surveillance

The Environmental Surveillance Group at SNL/California assesses potential impacts to the public and the environment from site operations. This group oversees airborne effluent monitoring and the ambient environmental surveillance network. It also is responsible for maintaining a meteorological monitoring system and for monitoring the general environment of SNL/California and nearby vicinity to verify that emission controls are effective in preserving the local environs. The group conducts these activities to ensure that SNL/California complies with Federal, State, and local regulations and DOE orders governing protection of the environment (specifically the *National Emission Standards for Hazardous Air Pollutants* (NESHAPs) Rule for Radionuclides, under the Federal Clean Air Act).[4] The group prepares numerous reports and other documents to demonstrate compliance.

Air Quality/Trip Reduction

The Air Quality/Trip Reduction Group is responsible for the regulatory compliance of all air emission sources at the SNL/California site. This group does the following:

- updates the site air emissions inventory,
- evaluates SNL/California operations that are potential sources of air pollutants,
- determines and documents compliance requirements,
- maintains compliance records,
- prepares reports and permit applications required by air quality regulations, and
- manages the Trip Reduction Program, which surveys employee/contractor transportation methods and educates employees and contractors about transportation alternatives.

The Air Quality Group also works with managers to formulate strategies to achieve compliance with applicable air emissions regulations.

Environmental Planning

The Environmental Planning Group is responsible for implementing NEPA at the SNL/California site by evaluating proposed projects, activities, and programs for potential environmental and human impacts. Key environmental concerns include potential air emissions (through vents or stacks on buildings), water effluents (storm water or sanitary sewer outfall), human exposure to hazardous substances, and waste generation and minimization.

In addition, the Environmental Planning Group acts as the point of contact for the ES&H Interdisciplinary Team (IDT). The IDT comprises representatives from the ES&H, facilities management, and security programs. The IDT is responsible for providing guidance to the line organizations as they plan and implement projects on or off site. By reviewing proposed projects early in the planning stages, the IDT helps make sure that projects begin on time and that consideration is given to the various programmatic requirements at SNL/California.

Wastewater/Storm Water Management

The Wastewater/Storm Water Management Group is responsible for ensuring that SNL/California complies with all Federal, State, and local regulations and DOE orders regarding the quality of wastewater and storm water discharges. The group monitors these discharges both visually and through analytical effluent sampling. The group ensures that SNL/California site activities do not negatively impact the quality of surface waters in the vicinity and in the San Francisco Bay. The group verifies that wastewater and storm-water discharges are in compliance with established standards and requirements, respectively. The group prepares numerous reports, permit applications, and other documents to demonstrate compliance.

1.4.3 SNL/California Management Assurance Department

The Management Assurance Department develops the methods for internal organizations to conduct self-appraisals. It helps line organizations with self-assessment activities to assure that the site is fulfilling its ES&H responsibilities. The Management Assurance Department tracks audit findings and is developing a trend analysis program in partnership with SNL/New Mexico.

1.4.4 SNL/California Vice Presidential ES&H Council

The SNL/California vice president chairs the SNL/California ES&H Council (SCEC), which includes the directors of the line organizations (centers) and ES&H coordinators. The SCEC ensures top-level management's involvement in developing and monitoring ES&H goals. It establishes, promotes, and communicates a culture that recognizes ES&H as a top priority at the California site. The SCEC also provides leadership and consistency of approach in the California ES&H program, as well as a mechanism for organizational communication—both horizontal and vertical.

1.4.5 Self-Assessment Program

SNL has a comprehensive system to assess and track ES&H commitments. The Sandia ES&H Self-Assessment Program consists of three key sub-programs: Appraisal, Performance Indicators, and Operating Experience Evaluation.

The ES&H Appraisal Program establishes an internal appraisal hierarchy consisting of independent appraisals, management surveillance, and line inspection activity. The independent appraisals are done under the auspices of the ES&H Assessment Department (SNL/New Mexico), which also performs the SNL tracking and lessons-learned functions. SNL/California has the Laboratory Assessment Program for conducting independent inspections throughout the site.

The ES&H Performance Indicator Program establishes a set of quantitative measures for the DOE to evaluate and track the Laboratories' ES&H performance. The Management Surveillance Program provides for line self-assessment, which is supplemented by line inspection activity, as deemed necessary by line management.

The ES&H Operating Experience Evaluation Program documents incidents and lessons learned from these incidents. This information is distributed to employees to heighten their awareness of ES&H principles.

In addition, SNL/California's ES&H, Facilities and Security Center has a Quality Assurance Group, which coordinates quality assurance/technical assessments within SNL/California's ES&H organizations.

1.5 Environmental Protection Responsibilities

This section describes the organizations and individuals responsible for ensuring compliance with DOE Order 5400.1.[1] Compliance includes incorporating the thirteen responsibilities required of the Head of the Field Organization, as identified in the Order [pgs. 12–14, paragraphs f.(1)–f.(13)]. The responsibilities are listed below in the context of how SNL/California fulfills them:

1. The SNL Quality Leadership Council and the SNL/California ES&H Council issue environmental policy statements and goals.
2. Line organizations, with the help of the Environmental Operations Department, ensure that all SNL/California operations comply with applicable environmental laws and regulations.
3. The ES&H coordinators and the Environmental Operations Department facilitate implementation of the ES&H programs.
4. The Environmental Operations Department coordinates the receipt and renewal of all required environmental permits for SNL/California operations.
5. The Livermore Assessment Program (with line participation) conducts internal environmental appraisals of SNL/California programs, projects, and facilities in accordance with DOE Order 5482.1B and other ES&H requirements.[5]

6. The Environmental Operations Department maintains liaison with appropriate Federal, regional, State, and local environmental officials to facilitate effective environmental management. This liaison with regulatory agencies is conducted in accordance with the protocols established by the DOE Albuquerque Operations Office (DOE/AL), Kirtland Area Office (DOE/KAO).
7. The ES&H, Facilities and Security Center works with the Procurement Services Department to:
   a. develop and implement programs that direct contractors to execute environmental protection compliance programs; and
   b. oversee, confirm, and independently verify these contractor programs.
8. The Environmental Operations Department prepares long-range environmental protection plans.
9. The ES&H, Facilities and Security Center ensures that budget requests provide for required environmental protection upgrades and that corrective actions are consistent with the Office of Management and Budget (OMB) Circular A-106 report.[6]
10. The Environmental Operations Department oversees the preparation of the semiannual pollution abatement plans, which are required by the OMB Circular A-106 report.[6]
11. The Environmental Operations Department gives DOE Headquarters (DOE/HQ) all environmental information and documentation requested by the DOE.
12. Any SNL employee has the authority and the responsibility to curtail or suspend any operation that poses a clear and present danger to members of the public or the environment.
13. The ES&H, Facilities and Security Center and the Public Information Office provide public information and educational materials about SNL/California's environmental protection programs.

1.6 Implementation Plan

ES&H concerns are built into projects from planning to completion. Projects are reviewed by the appropriate authorities, including the Environmental Planning Group, the Health Physics Group, and the Pollution Prevention Group. The aim is to reduce risks to employees, the public, and the environment to the lowest reasonable levels. The procedures used to implement ES&H requirements are identified below.

1.6.1 Early Planning

SNL/California's IDT is the point of contact for incorporating ES&H requirements in a project before it begins. It brings together line organizations and key support organizations to address the various programmatic requirements at SNL/California in relation to the ES&H requirements. The IDT comprehensively reviews proposed projects.

The IDT also incorporates NEPA review, guidance and consultation in a project's early planning stages. The NEPA process assures that all risks of a proposed action are considered, controls or mitigation of hazards are planned, and pollution prevention and waste minimization are considered before operations begin.

1.6.2 Department Manager Responsibilities

Managers have the following responsibilities for implementing ES&H requirements:

1. Participate as a member of the SCEC (as required);
2. Implement the SNL ES&H policy and programs, establish appropriate procedures within their departments, and communicate SNL's ES&H policy and expectations to all employees;
3. Identify and assign department staff to implement the ES&H programs and procedures within the organization;
4. Approve Preliminary Hazard Assessments, Qualitative Risk Assessments, ES&H Safe Operating Procedures (SOPs), and corrective action reports;
5. Set ES&H goals for the department and establish metrics to measure progress toward those goals;
6. Establish a manager-led self-appraisal activity, to include participating in management and functional appraisals of facilities and project activities;
7. Survey all facilities or project activities within the department for ES&H compliance, at least semiannually;
8. Hold a department meeting semiannually to discuss ES&H performance with respect to metrics and to draw out employees' ES&H concerns; and
9. Maintain ES&H documentation, including the *ES&H Manual* and the "Management Assurance Notebook."

1.6.3 Employee Training

Department managers are responsible for making sure that all employees and contractors are trained appropriately in ES&H. The ES&H Training Group (in the Diversity and Development Department) designs, develops, and presents all Laboratory-wide ES&H training for employees, contractors, and visitors. As needed, the ES&H Training Group may request assistance from line organizations or contractors with acknowledged expertise. This assistance may include developing qualification guidelines for instructors. The ES&H Training Group also maintains the database of ES&H training records.

1.7 Schedule for DOE Order 5400.1

Table 1 contains SNL/California's schedule for complying with the reporting requirements of DOE Order 5400.1.[1]

Table 1. SNL/California's DOE Order 5400.1 Compliance Schedule

Report/Plan	Due Date	Review/Update
Implementation Plan	11/9/89	none/annual
OMB Circular A-106	semiannual (5/1 and 12/15)	none/semiannual
Site Environmental Report	annual (6/1)	none/annual
Groundwater Protection Management Program Plan	5/9/90	annual/every 3 years
Waste Minimization Pollution Prevention Awareness Program Plan	11/1/91	annual/every 3 years
Environmental Monitoring Plan	11/9/91	annual/every 3 years

2.0 NOTIFICATION OF ENVIRONMENTAL OCCURRENCES

Pursuant to DOE Orders 5400.1, 5484.1, and 5000.3B, SNL/California, as a DOE-operating contractor, is responsible for appropriately reporting environmentally significant events.[1,7,8] SNL/California will comply with the notification criteria contained in the DOE emergency preparedness orders (DOE Order 5500 series). Various Federal, State, and local laws and regulations also require SNL/California to report environmentally significant occurrences.

2.1 Notification Procedures

SNL/California has established procedures for notifying the DOE and appropriate regulatory agencies of environmental occurrences. The notification procedures are described below.

2.1.1 Line Organizations

Every employee in every line organization has been instructed to report environmental incidents of any type to the ES&H Hotline, ext. 4–ES&H (4–3724), at SNL/California. The Occurrence Reporting Group, in the Safety Department, provides training in occurrence reporting procedures and responsibilities to all SNL/California employees and contractors.

2.1.2 ES&H, Facilities and Security Center

The Occurrence Reporting Group in the ES&H, Facilities and Security Center evaluates incidents and determines the appropriate level of notification. The Security Systems Department maintains the SNL/California *Emergency Preparedness Plan*. This plan includes "Emergency Plan Implementation Procedures," which address notification responsibilities. As appropriate, the ES&H, Facilities and Security Center notifies DOE/KAO, SNL/New Mexico organizations, and other agencies of any incidents.

2.1.3 DOE Kirtland Area Office

DOE/KAO is responsible for reporting events to the DOE/AL Emergency Operations Center (EOC). DOE/KAO acts as a liaison between SNL/California and Federal, State, and local agencies.

2.1.4 DOE Albuquerque Operations Emergency Operations Center

If necessary, the DOE/AL EOC notifies the DOE/HQ EOC, which in turn, notifies the appropriate DOE/HQ Program Office and the Assistant Secretary for ES&H.

2.1.5 Reporting Occurrences or Complaints After Working Hours

If an event or condition requires immediate attention or emergency response, the employee involved is to call the Sandia emergency phone number, ext. 911. This extension connects to the Central Alarm System (CAS), which dispatches the appropriate emergency response personnel. The CAS then notifies the appropriate Sandia Occurrence Management Representative (OM Rep.). (An OM Rep. is available 24 hours a day.)

If an event or condition does not require emergency response, employees are to call the ES&H Hotline, which is answered by the CAS after hours. The CAS notifies an OM Rep. The OM Rep. determines if the event or condition is reportable under DOE Order 5000.3B.[8] If it is, the OM Rep. notifies the appropriate facility manager, and the occurrence is reported to DOE/KAO, DOE/AL EOC, DOE/HQ (Assistant Secretary for Defense Programs—DP-1), and SNL/New Mexico, as necessary. If it is not reportable under DOE 5000.3B, or if the call is a complaint rather than a report of an occurrence, the OM Rep. follows up to see that appropriate action is taken to resolve the problem.

2.2 Notification Requirements

DOE Orders clearly state that DOE operations are to be conducted in full compliance with all applicable environmental laws and regulations. SNL/California is committed to this policy. Proper communication is a vital component of this commitment. SNL/California has policies and procedures to ensure proper and timely notification of the appropriate organization or regulatory agency in case of environmental occurrences.

Operations at SNL/California are regulated under a wide range of environmental statutes. The type and magnitude of an environmental occurrence dictate which agencies are to be notified. Some of the agencies that may need notification include:

- Lead DOE Agency
- National Response Center
- Office of Emergency Services
- U.S. EPA
- California EPA (Cal-EPA)
- U.S. Coast Guard
- U.S. Department of Transportation (highway spills)
- San Francisco Bay Area Regional Water Quality Control Board (RWQCB)
- Bay Area Air Quality Management District (BAAQMD)
- Alameda County
- City of Livermore
- California Department of Health Services

2.2.1 Department of Energy

General Requirements for Notification

SNL/California notifies the DOE of significant environmental occurrences and significant "near misses" in accordance with the requirements of DOE Orders 5484.1 and 5000.3B.[7,8] The ES&H, Facilities and Security Center at SNL/California is responsible for appropriately notifying DOE/KAO, which notifies DOE/HQ. SNL/California also notifies DOE/KAO any time an environmental occurrence is reported to an outside agency.

DOE Order 5484.1 provides "Summary Charts for Accident Notification, Investigation, and Reporting."[7] These charts, as well as the complete guidance in the order, are used to determine the appropriate level of notification.

Occurrence Reports

Occurrence reports (ORs) are required for any off-normal or unplanned event having programmatic significance, such that it adversely affects or potentially affects performance, reliability, or safety of a facility. An example is a "near miss," which is a situation that could have resulted in an accident (but did not). The Occurrence Reporting Group is responsible for complying with the OR requirements described in DOE Order 5000.3B.[8]

SNL/California reports events or conditions significant enough to require an OR to the DOE, in accordance with the time requirements specified in DOE Order 5000.3B.[8] All reportable incidents require the facility manager to submit a written report to the DOE within 24 hours. Depending on the severity of the occurrence, oral notification to DOE/HQ and DOE/KAO may be required within 15 minutes to 2 hours of an incident.

2.2.2 Environmental Protection Agency

The EPA has established emergency notification requirements, which are published in Title 40, Code of Federal Regulations (CFR), Parts 112, 117 and 302 (CERCLA).[9] Under CERCLA, SNL/California (through the DOE) reports any hazardous pollutant release exceeding the reportable quantity to the National Response Center within 24 hours.

The EPA has established reportable quantities for specific chemicals and radionuclides. The SNL/California Environmental Operations Department is responsible for maintaining the list of reportable quantities. Line organizations are responsible for reporting all releases of one pint/one pound or more of any chemical or radionuclide on the list to Environmental Operations Department personnel, who will evaluate all releases and determine the appropriate level of notification. An unplanned release that exceeds a reportable quantity must be reported to the National Response Center and to the DOE under the requirements of DOE Order 5000.3B. Environmental Operations personnel are responsible for immediately notifying the appropriate center director, department managers, and the OM Rep., who ensures that the DOE is notified per DOE Order 5000.3B requirements.

2.2.3 State of California Bay Area Air Quality Management District

SNL/California is required to notify the BAAQMD of any excess air emission or system failure, defined as:

- a failure of pollution abatement equipment resulting in an unplanned release to the atmosphere;
- an unplanned release to the atmosphere of a NESHAPs regulated material that exceeds the reportable quantity;[3] or
- a violation of the requirements stated in any air discharge permit held by SNL/California.

An unplanned air release that requires reporting to the BAAQMD is reportable to the DOE under DOE Order 5000.3B requirements. The Air Quality Group will notify the Environmental Operations Department manager and the OM Rep., who will ensure that the DOE is informed.

2.2.4 City of Livermore Water Reclamation Plant

The *Clean Water Act* (CWA) establishes standards for industrial discharges to waterways and Publicly-owned Treatment Works (POTWs). SNL/California holds a discharge permit issued by the City of Livermore Water Reclamation Plant (LWRP). This permit requires SNL/California to notify the LWRP of any discharge that exceeds permit limits, including any release that may harm treatment plant operations.

SNL/California may notify the LWRP two ways:

1. If a release to the sanitary sewer system exceeds permit limits, the knowledgeable Environmental Operations Department engineer will immediately notify the responsible DOE/KAO staff member, who will notify the LWRP. If a DOE/KAO representative cannot be contacted, the SNL/California engineer will notify the LWRP directly.
2. Within 30 days, the SNL/California Environmental Operations Department will submit a written investigation report of the incident to DOE/KAO, which will forward the report to the City of Livermore.

2.3 Documentation of Environmental Occurrences

2.3.1 DOE Requirements

Following an environmental occurrence, SNL/California will prepare a written report in accordance with the requirements of DOE Orders 5484.1 and 5000.3B.[7,8] The appropriate facility manager is responsible for ensuring that the reports are transmitted electronically to the Occurrence Report and Processing System database. The Environmental Operations Department is responsible for maintaining evidence files and copies of all reports. These reports are made available to auditors and regulatory agencies.

2.3.2 Annual Summary and Public Disclosure

Environmental occurrences are summarized each year in the *Site Environmental Report*.[10] This report is available to the DOE, regulatory agencies, and the general public.

2.4 Effluent Information System Report

The DOE Effluent Information System manages a database of radiological effluents released from DOE facilities. SNL/California measures radioactivity discharged in liquid and airborne effluent streams, and prepares radioactive effluent and on-site discharge data reports. SNL/California sends copies of these data to the DOE for its database.

At the end of each calendar year, the Environmental Surveillance Group at SNL/California summarizes radiological emissions from the site. A DOE Form F-5821.1 is completed for each discharge point. The completed forms are submitted to DOE/KAO and, once approved, are forwarded to EG&G Idaho, Inc., Waste Management Program.

3.0 GENERAL PLANNING AND REPORTING

3.1 Long-range Environmental Protection Plan

Chapter III of DOE Order 5400.1 requires that each DOE field organization develop a long-range environmental protection plan.[1] This plan should define specific environmental objectives and outline strategies for attaining those objectives, to include budgetary and staff resources, as well as milestones.

The Environmental Operations Department satisfies this requirement for SNL/California by providing information for the DOE's *Environmental Restoration and Waste Management Five-Year Plan.*[11]

3.2 Annual Site Environmental Report

3.2.1 Purpose

DOE Orders 5400.1 and 5484.1 require each DOE site to prepare an annual summary environmental report.[1,7]

SNL/California's *Site Environmental Report* documents all significant environmental activities throughout the year.[10] It presents effluent and environmental monitoring data and discusses the Environmental Restoration Program and other environmental protection activities. Results of a radiological dose assessment, done to evaluate potential impacts on the general public, are included. The report also evaluates SNL/California's compliance records according to applicable environmental standards and includes a compliance summary section, which discusses any areas of noncompliance. The report's major emphasis is environmental management performance, which is evaluated by how well SNL/California's environmental protection activities comply with environmental laws and regulations. A quality section expresses Sandia's efforts to continually improve its corporate citizenship. In addition, SNL/California works to make the document easy for the general public to understand.

3.2.2 Site Environmental Report Preparation

The *Site Environmental Report* is prepared by the Environmental Operations Department and is approved by DOE/AL. Its preparation is an ongoing process.

3.2.3 Site Environmental Report Format

DOE Order 5400.1, Attachment II-1, "Suggested Content and Format for Annual Environmental Reports," establishes the scope and format for the site environmental report.[1] SNL/California's *Site Environmental Report* conforms to this format.

3.2.4 Organizations Involved in Report Production

Preparation of the *Site Environmental Report* is a cooperative effort among several organizations. The Environmental Operations Department holds overall responsibility for documenting all relevant environmental protection activities in the calendar year and using that information to produce the report. The final draft of the report is delivered to DOE/KAO according to a negotiated production schedule.

Off-site monitoring in the vicinity of SNL/California is conducted by LLNL's Environmental Monitoring Section (EMS). The EMS transmits monitoring data to the SNL/California Environmental Operations Department for review and inclusion in the *Site Environmental Report*. The arrangement for environmental monitoring between SNL/California and LLNL is discussed further in Section 5.0.

After the Environmental Operations Department has completed the report, it is reviewed by SNL/California management. It is forwarded to DOE/KAO for further review and approval and then to DOE/HQ for final review and approval.

3.3 OMB Circular A-106

The Environmental Operations Department updates the OMB Circular A-106 report semiannually as required by Executive Order 12088.[6,12] It is submitted to DOE/HQ on December 15 and June 1 of each year. Environmental corrective actions and associated budgetary requirements are incorporated into the A-106 report using the guidance provided. Each discipline in the Environmental Operations Department gathers and analyzes the data required for the A-106 report. As appropriate, other SNL/California organizations are consulted for additional input. The information in this report correlates with the information in the DOE's *Five-Year Plan*.[11]

4.0 SPECIAL PROGRAMS AND PLANS

4.1 Groundwater Protection Management Program

Under DOE Order 5400.1, SNL/California is required to establish a program for groundwater protection management.[1] The Environmental Operations Department maintains a *Groundwater Protection Management Program Plan* (GPMPP),[13] which is reviewed annually and updated at a minimum of once every three years.

The Environmental Restoration Group is responsible for implementing the GPMPP. The DOE Office of Environmental Restoration and Waste Management provides funding for the Groundwater Protection Program, which is projected into a five-year, DOE-approved baseline budget. When programmatic requirements increase or deviate from the baseline, SNL/California submits requests for funding changes to the DOE for approval.

To avoid duplication of effort, SNL/California may use existing plans, permits, and other technical compliance documents, in whole or in part, to satisfy GPMPP requirements. These may include documents prepared to ensure compliance with environmental protection acts, to include the Safe Drinking Water Act (SDWA), the Resource Conservation and Recovery Act (RCRA), CERCLA, CWA, and local regulatory acts, such as the Porter-Cologne Water Quality Control Act and Safe Drinking Water and Toxic Enforcement Act (Prop. 65).

DOE Order 5400.1 requires completion of a groundwater monitoring plan to be included as part of the GPMPP. SNL/California's groundwater monitoring plan incorporates elements of the ongoing groundwater monitoring program developed to meet the requirements of the Environmental Restoration Program. This program is ongoing at SNL/California, in compliance with RWQCB Compliance Order 89-184.[14]

4.2 Waste Minimization and Pollution Prevention Awareness Program

SNL/California's Waste Minimization and Pollution Prevention Awareness Program is an organized, comprehensive, and continual effort to reduce waste generation and to eliminate or minimize pollutant releases to all environmental media from all aspects of site operations. These efforts offer increased protection of public health and the environment. They also yield the following benefits:

1. reduce waste management and compliance costs,
2. reduce resource usage,
3. improve product yields,
4. reduce or eliminate inventories and the potential for release of hazardous chemicals reportable under the *Emergency Planning and Community Right-to-Know Act*, and
5. reduce or eliminate the potential for civil and criminal liabilities under environmental laws.

SNL/California has a full-time waste minimization coordinator, who is responsible for site-wide waste minimization activities.

SNL/California's *Waste Minimization and Pollution Prevention Awareness Program Plan* contains the guidance and the regulatory requirements for waste minimization and pollution prevention for the site.[15] DOE, EPA, and Cal-EPA guidance was used in developing this plan.

The program reflects SNL/California's goals and policies for waste minimization and represents an ongoing effort to make pollution prevention part of Sandia's operating philosophy. In accordance with DOE policy, SNL/California applies a hierarchical approach to waste reduction of all types of waste.

The first principle of waste minimization is eliminating or minimizing waste generation through source reduction. If possible, waste materials that cannot be eliminated or minimized are reused and/or recycled (i.e., reclaimed). To the greatest extent possible, all waste is treated to reduce volume, toxicity, or mobility before storage or disposal.

4.2.1 Objectives

The Waste Minimization and Pollution Prevention Awareness Program's objectives are to:

- foster a philosophy of conserving resources and creating a minimum of waste and pollution in achieving strategic objectives;
- promote the use of nonhazardous materials in operations to minimize the potential risks to human health and the environment;
- reduce or eliminate waste generation through product substitution, product reformulation, process modification, improved housekeeping, and on-site closed-loop reuse and recycling, to minimize adverse effects on the air, water, and land;
- enhance communication of waste minimization objectives, goals, and ideas laterally and vertically among organizations;
- characterize nonhazardous waste streams and develop a baseline of waste generation data;
- identify and implement methods and technologies for waste minimization;
- target policies, procedures, or practices that may inhibit waste minimization;
- create incentives for pollution prevention;
- develop and implement employee pollution prevention awareness programs;
- collect and exchange waste minimization information through technology transfer, outreach, and educational networks;
- develop means for fully disseminating technological information to site users;
- increase employee awareness of pollution prevention goals, objectives, and methods;
- develop specific goals and schedules for waste minimization activities; and
- comply with Federal and State regulations and DOE requirements for minimization.

4.2.2 Strategy

Site-specific implementation procedures have been developed to obtain accurate and current information on waste stream generation and waste management costs. This information provides the basis for implementing specific waste minimization techniques and technologies. The procedures include ways to collect information, evaluate options, and identify cost-effective waste minimization techniques. The essential elements of SNL/California's waste minimization strategy are to:

1. create an organization that comprises line and staff representatives who will develop and administer the waste minimization program,
2. define targets of waste to reduce, and
3. develop a method for tracking the performance and progress of the program.

4.2.2 Organization and Staff Responsibilities

A Pollution Prevention Team (P2 Team) oversees the implementation of the Waste Minimization and Pollution Prevention Awareness Program. The P2 Team has a project structure, i.e., representatives remain members of their own line organizations in a matrix-management system. The P2 Team comprises two chairs, site coordinators, representatives from line organizations, and support representatives and contractors, as needed.

The P2 Team Chairs

The P2 Team chairs—one representative from SNL/New Mexico and one from SNL/California—are responsible for the corporate Waste Minimization and Pollution Prevention Awareness Program.

Program Site Coordinators

The site coordinators are responsible for developing, directing, implementing, and documenting the Waste Minimization and Pollution Prevention Awareness Program at each SNL site.

Line Organization P2 Team Representatives

Line P2 Team representatives help line organizations plan, organize, and direct activities that will help them fulfill their waste minimization responsibilities. The line representatives also examine proposed new projects (with the assistance of project staff) for pollution prevention opportunities. They provide the critical interface between the line organizations and the waste minimization site coordinators.

Support Representatives

Support representatives (from Purchasing, Property Management, Finance, Industrial Hygiene, Health Physics, Facilities, Public Information, Safety, Training, and various other line organizations) are available to help the P2 Team as needed. These support personnel represent a resource to which the line representatives can turn for advice and assistance.

Line Organizations

Responsibility for waste minimization and pollution prevention ultimately rests with line organizations (waste generators). Line organizations are responsible for developing and maintaining detailed waste assessments, identifying pollution prevention opportunities, providing necessary information for waste characterization and certification, obtaining guidance on regulatory and waste management requirements from Environmental Operations Department personnel, and implementing pollution prevention strategies and technologies.

Individuals

All SNL employees are responsible for:

- understanding the Waste Minimization and Pollution Prevention Awareness Program;
- practicing the concepts of pollution prevention in their activities; and
- informing the P2 Team of any anticipated new waste streams or changes in existing waste streams.

5.0 ENVIRONMENTAL MONITORING PROGRAM

The Environmental Operations Department is responsible for the Environmental Monitoring Program. This program ensures that site operations comply with all Federal, State, and local regulations and DOE orders regarding emissions to the environment. The Environmental Surveillance Group is responsible for monitoring the general environment of SNL/California and vicinity. The monitoring data are used to verify compliance with established environmental standards, to assess potential impacts to the public and the environment from site operations, and to ensure that site operations do not degrade the environment.

Environmental monitoring at SNL/California consists of three major parts:

- airborne and liquid effluent monitoring,
- meteorological monitoring, and
- environmental surveillance.

Because the two DOE sites in Livermore (LLNL and SNL/California) are adjacent to each other, distinguishing between their environmental impacts is frequently impossible. Therefore, SNL/California and LLNL have established a cooperative arrangement for environmental monitoring. (Note: LLNL is also a prime contractor, but is operated by the University of California and reports to the DOE Oakland Operations Office.) The two facilities have prepared and signed a "Joint Statement of Responsibilities for Environmental Monitoring at Livermore."[16] This statement documents each facility's roles and responsibilities for environmental monitoring. Each site monitors its own effluents and performs on-site surveillance. Because LLNL has facilities available for analyzing extremely low-level radiological samples, LLNL collects and processes most of the off-site environmental samples, and subsequently transmits the data to SNL/California. SNL/California supplements the LLNL surveillance system by doing site-specific surveillance (sewer monitoring, stack monitoring, groundwater monitoring, and perimeter external radiation surveillance).

5.1 Effluent Monitoring

SNL/California monitors airborne and liquid effluents to ensure compliance with established limits for release of pollutants into the atmosphere or into bodies of water. Environmental Operations personnel monitor effluents by collecting and analyzing samples or directly measuring liquid and gaseous effluents so that they can characterize and quantify any contaminants released to the environment.

In the past, the only pollutant requiring continuous emission monitoring to the atmosphere from SNL/California was tritium from the Tritium Research Laboratory (TRL). Accordingly, the TRL stack has been monitored continuously. However, the TRL's mission has been terminated, and the tritium inventory has been removed. SNL/California completed cleanup of the facility in October 1995. The DOE has reclassified it as a Non-nuclear, Low-hazard facility. To verify the successfulness of the cleanup, Environmental Operations personnel will continue to monitor the stack emissions until October 1996. At that time, SNL/California will report the results to the Federal EPA and

the California Department of Health Services. If appropriate, SNL/California will request that radiological monitoring at the facility be discontinued.

The only liquid effluents are discharges to the sanitary sewer system and surface runoff to the storm sewer system. The sanitary sewer effluent from SNL/California merges with the LLNL sewer effluent at the LLNL sewer outfall before they both are discharged to the city sewer system. These pathways are monitored for pollutants that could be released from site activities. Besides ensuring that release limits are not exceeded, SNL/California uses these data as a warning system to ensure that pollutants are not released in concentrations sufficient to affect operations at the LWRP. In case of such discharges, SNL/California notifies both LLNL and the LWRP. SNL/California does not discharge any process wastewater directly to the ground, arroyo, or any other surface water body.

5.2 Meteorological Monitoring

Meteorological information is needed to assess the transport, diffusion, and deposition of materials released to the atmosphere. It also provides the information necessary to determine the best locations for collecting environmental samples.

SNL/California maintains a meteorological tower on the western portion of the site, from which meteorological data are continuously collected. These data represent the atmospheric conditions at the site. The SNL/California tower is equipped with HANDAR model 540 instruments (as required by the Atmospheric Release Advisory Capability system), which measure wind speed, wind direction, and temperature at heights of 10 m and 40 m, every 3 seconds. These data are compiled and stored as 15-minute averages. Rainfall is measured at ground level, and relative humidity is measured at the 10-meter level. The Environmental Surveillance Group is responsible for meteorological maintenance, calibration, and data archiving.

The meteorological monitoring system is part of the Atmospheric Release Advisory Capability, a DOE-operated network of monitoring stations designed to provide information to emergency response personnel. The Atmospheric Release Advisory Capability provides 24-hour access to trained assessors and computer models to evaluate atmospheric dispersion and calculate doses from accidental releases of radioactive or hazardous materials.

5.3 Environmental Surveillance

Environmental surveillance includes the collection and analysis of samples of environmental media (e.g., air, water, soil, foodstuffs). SNL/California conducts environmental surveillance to verify that emission controls are effective in preserving the local environs, and to check for possible buildup of pollutants in the environment. It also provides the information needed to perform dose assessment calculations, which verify that SNL/California operations do not adversely affect the public. The potential radiological air emissions from SNL/California are tritium and depleted uranium. Potential pollutant emissions to the sanitary sewer or storm-water runoff collection system include tritium, metals, various organic compounds, solids, and minerals.

5.4 Environmental Monitoring Plan

DOE Order 5400.1 requires each DOE site using hazardous materials to prepare a site-specific environmental monitoring plan.[1] This plan is to document all aspects of effluent monitoring and environmental surveillance. It must include a thorough description of the monitoring program, rationale, design criteria, and quality assurance.

The Environmental Operations Department has prepared SNL/California's *Environmental Monitoring Plan*.[17] This plan details all elements of the SNL/California Environmental Monitoring Program, as described above. It also summarizes the regulatory requirements (DOE, Federal, State, and local) for monitoring, as well as SNL/California's compliance with these requirements.

The *Environmental Monitoring Plan* addresses four essential elements:

1. *Radiological Monitoring*. The plan addresses the requirements for radiological effluent monitoring and environmental surveillance contained in DOE Orders 5400.5 and DOE/EH-0173T.[18,19] The plan also ensures compliance with the requirements of Title 40 CFR, Part 61 (NESHAPs),[8] including an assessment of radiological impact to the public, using EPA-approved methods.
2. *Nonradiological Monitoring*. The plan addresses environmental and effluent monitoring of nonradiological hazardous materials to ensure compliance with Federal, State, and local regulations.
3. *Meteorological Monitoring*. Accurate meteorological data serve many purposes, such as directing environmental monitoring activities, radiological assessment, and emergency response. The meteorological system is part of the Atmospheric Release Advisory Capability (ARAC), a DOE-run network of meteorological stations designed to provide information to emergency response personnel in case of a release of radioactive or toxic materials. Meteorological instruments and supporting equipment conform to ARAC specifications. The *Environmental Monitoring Plan* describes the existing program for meteorological data acquisition. It also addresses instrument maintenance and calibration, and data management.
4. *Groundwater Monitoring Program*. SNL/California has a Groundwater Monitoring Program, as described in Section 4.1, which is documented in the *Environmental Monitoring Plan*.

5.4.1 Environmental Data Management

SNL/California has a database for tracking and archiving environmental data. This system manages field and analytical information generated by environmental monitoring, environmental restoration, and groundwater protection activities. The database is backed up daily. In addition, the responsible program maintains hard copies of the data for about one year. The data are then transmitted to the ES&H Records Center for retention.

The Environmental Operations Department is responsible for managing environmental data. Each year, these data are summarized in the *Site Environmental Report* (see Section 3.2).[10] This report also summarizes SNL/California compliance with environmental laws and regulations.

SNL/California has a *Quality Assurance Management Plan* for the ES&H, Facilities and Security Center (see Section 6.0),[20] as well as a *Quality Assurance Project Plan*[21] and operating procedures for data verification and management for the Environmental Surveillance Program.

Data management performed by LLNL is covered by the Surveillance Monitoring Group's *Quality Assurance Plan* and *Procedures Manual*.[22,23] These documents meet the requirements of ANSI/ASME NQA-1,[24] the DOE, and the EPA for data analysis.

5.4.2 Environmental Monitoring Plan Schedule

In accordance with DOE Order 5400.1, SNL/California implemented all environmental monitoring requirements within three years of the issuance of the order. The Environmental Operations Department submitted the plan to the DOE, and DOE approved it on April 7, 1992. Environmental Operations personnel review it annually and update it at least every three years. (DOE must approve the report every three years.) If needed to complete the report, additional budget and resources will be requested through the regular budgetary process.

5.5 Environmental Monitoring Activities

5.5.1 Implementation

Both LLNL personnel and SNL/California's Environmental Surveillance Group examine the significant pathways by which contaminants can enter the environment. These pathways, from which samples are taken, include ambient air, surface water, soil, sewage, groundwater, storm-water runoff, vegetation, and local foodstuffs. An extensive network of environmental dosimeters also measures external radiation levels. SNL/California also monitors all potentially contaminated airborne and liquid effluents by:

1. measuring airborne tritium,
2. sampling storm-water runoff from the site,
3. sampling sanitary sewer effluents, and
4. monitoring external radiation at the site perimeter.

5.5.2 Reporting

Environmental monitoring data and compliance activities are published in the *Site Environmental Report* (see Section 3.2).[10] It is sent to the DOE and appropriate regulatory agencies. It is also available to the general public in local public reading rooms.

Radiological emissions from SNL/California are summarized for the calendar year and are reported to the DOE Effluent Information System (see Section 2.4).

The Environmental Operations Department is responsible for managing the effluent monitoring and environmental surveillance data and preparing the summary reports.

6.0 QUALITY ASSURANCE AND DATA VERIFICATION

6.1 Quality Assurance Program

DOE Orders 5400.1[1] and 5400.5[18] require a quality assurance program for environmental monitoring that is consistent with DOE Order 5700.6C.[25] SNL/California implements these requirements through the ES&H, Facilities and Security Center's *Quality Assurance Management Plan*.[20] ES&H personnel used ANSI/ASME NQA-1 1989 as the primary guidance for preparing this plan.[24] The requirements of the *Quality Assurance Management Plan* are augmented by program plans and operating procedures, which provide task-specific instructions.

The SNL/California Environmental Surveillance Program's *Quality Assurance Project Plan* documents quality assurance elements of the program.[21] This plan provides implementation guidelines for the requirements of the Center's *Quality Assurance Management Plan*.[20] ES&H personnel used DOE Order 5700.6C and ANSI/ASQC-E4-19xx as the primary guidance for preparing the plan.[25,26] It also covers the quality assurance guidelines in DOE/EH-0173T.[19] The *Quality Assurance Project Plan* establishes program responsibilities to ensure that data are accurate, complete, precise, and representative.[21]

The collection of environmental samples by LLNL's Environmental Monitoring Group is covered by the Environmental Quality Verification Group's *Quality Assurance Plan*.[22] This plan meets the requirements of DOE/EH-0173T,[19] ANSI/ASME NQA-1,[24] and EPA guidelines for the preparation of quality assurance program plans. SNL/California implements the provisions of this plan through the *Environmental Monitoring Plan*, Appendix B—Procedures.[17]

The Radiological Analytical Services Laboratory *Quality Assurance Project Plan* covers environmental sample processing done by LLNL's Nuclear Chemistry Department.[27] This plan also meets the requirements of DOE/EH-0173T,[19] ANSI/ASME NQA-1,[24] and EPA guidelines for preparing quality assurance program plans.

Contract laboratories doing analyses for LLNL and SNL/California's environmental monitoring program are accredited by the Cal-EPA. To receive accreditation, the laboratory must have an implemented quality assurance plan. Periodically, the Cal-EPA inspects accredited laboratories to make sure they are operating within quality assurance requirements.

6.2 Laboratory Certification

All environmental samples collected for regulatory compliance purposes are collected using guidance issued by the EPA. They are analyzed by off-site contract laboratories certified by the Cal-EPA. To assure that the laboratory is certified for the requested analysis, SNL/California uses the Cal-EPA semiannual report that lists the specific analyses each laboratory is certified to perform. SNL/California permanently retains the analytical data and associated quality assurance documentation.

6.3 DOE Laboratory Quality Assurance Program for Radioactive Materials

SNL/California performs in-house tritium analysis on a variety of samples, including some environmental samples. As an independent quality check, the on-site laboratory participates in a tritium analysis intercomparison study, which is conducted by the EPA Environmental Monitoring Systems Laboratory in Las Vegas.

LLNL conducts much of the off-site radiological environmental monitoring. LLNL's quality assurance procedures are documented in the Environmental Quality Verification Group *Quality Assurance Plan*.[22] As part of this program, LLNL participates in intercomparison laboratory assessments sponsored by the EPA's Environmental Radioactivity Laboratory and the DOE Environmental Measurements Laboratory.

6.4 Independent Data Verification

DOE Order 5400.1 requires that "EH-1, in consultation with the appropriate Program Senior Official and field organization, shall develop an independent data verification program as part of environmental monitoring programs at DOE facilities."[1]

The Laboratory Management Branch of the DOE Office of Technology Development was established to provide technical support to all environmental analytical laboratory operations throughout the DOE. The Branch also helps develop quality assurance programs and implement independent data validation programs. When the DOE has fully implemented this program, SNL will participate to ensure independent validation of environmental sampling data.

As noted, LLNL conducts the majority of the off-site environmental monitoring. LLNL addresses independent data verification in its quality assurance plan. At SNL/California, much of the environmental sampling and analysis is conducted by off-site contractors. These contractors are required to have a comprehensive quality assurance plan. The quality assurance/quality control portion of the environmental monitoring program ensures valid and verifiable data. Additionally, SNL/California's *Quality Assurance Project Plan* for environmental monitoring addresses validation of data from LLNL and contract laboratories.[21] It provides an integrated mechanism for implementing quality assurance for all facets of the environmental protection program. The *Quality Assurance Project Plan* uses guidance from the ES&H, Facilities and Security Center's *Quality Assurance Management Plan* and implementing procedures to establish data quality objectives.[20]

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ACRONYMS AND ABBREVIATIONS

ALARA	As low as reasonably achievable
ANSI	American National Standards Institute
ARAC	Atmospheric Release Advisory Capability
ASME	American Society of Mechanical Engineers
BAAQMD	Bay Area Air Quality Management District
Cal-EPA	California Environmental Protection Agency
CAS	Central Alarm System
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOE	Department of Energy
DOE/AL	DOE Albuquerque Operations Office
DOE/HQ	DOE Headquarters (EH-1)
DOE/KAO	DOE Albuquerque Operations Office, Kirtland Area Office
DOE/OAK	DOE Oakland Operations Office
EMS	Environmental Monitoring Section (LLNL)
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ES&H	Environment, Safety and Health
GPMPP	Groundwater Protection Management Program Plan
IDT	Interdisciplinary Team
LLNL	Lawrence Livermore National Laboratory
LWRP	Livermore Water Reclamation Plant
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
OM Rep.	Occurrence Management Representative
OR	Occurrence Report
POTWs	Publicly-owned Treatment Works
PPOA	Pollution Prevention Opportunity Assessment
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Quality Control Board
SCEC	SNL/California ES&H Council
SDWA	Safe Drinking Water Act
SNL	Sandia National Laboratories
SOPs	Safe Operating Procedures
TRL	Tritium Research Laboratory

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