

**Office of Enterprise Assessments Review of the  
Fire Protection Program at the  
Los Alamos National Laboratory**



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## Acronyms

|       |  |
|-------|--|
| AHJ   | Authority Having Jurisdiction                        |
| AP    | Administrative Procedure                             |
| BNA   | Baseline Needs Assessment                            |
| CDNS  | NNSA Chief, Defense Nuclear Safety                   |
| CFR   | Code of Federal Regulations                          |
| CMR   | Chemistry and Metallurgy Research Facility           |
| CRAD  | Criteria, Review, and Approach Document              |
| CRD   | Contractor Requirements Document                     |
| DOE   | U.S. Department of Energy                            |
| DSA   | Documented Safety Analysis                           |
| EA    | DOE Office of Enterprise Assessments                 |
| FHA   | Fire Hazards Analysis                                |
| FOD   | Facility Operation Director                          |
| FP-DO | Fire Protection Division Office                      |
| FPE   | Fire Protection Engineer                             |
| FPP   | Fire Protection Program                              |
| FPPM  | Fire Protection Program Manager                      |
| FSS   | Fire Suppression System                              |
| FY    | Fiscal Year  |
| HSS   | DOE Office of Health, Safety and Security            |
| ICAM  | Issues and Corrective Action Management              |
| ITM   | Inspection, Testing, and Maintenance                 |
| LAC   | Los Alamos County                                    |
| LACFD | Los Alamos County Fire Department                    |
| LANL  | Los Alamos National Laboratory                       |
| LANS  | Los Alamos National Security, LLC                    |
| LASO  | Los Alamos Site Office                               |
| MP    | Management Procedure                                 |
| MSS   | Maintenance and Site Services                        |
| NA-LA | Los Alamos Field Office                              |
| NA-SH | NNSA Associate Administrator for Safety and Health   |
| NFPA  | National Fire Protection Association                 |
| NNSA  | National Nuclear Security Administration             |
| NSSB  | National Security Sciences Building                  |
| OFI   | Opportunity for Improvement                          |
| P     | Procedure  |
| PD    | Program Description                                  |
| PFITS | Performance Feedback and Improvement Tracking System |
| PIP   | Pre-Incident Plan                                    |
| PVC   | Polyvinyl Chloride                                   |
| SSC   | Structures, Systems, and Components                  |
| SSO   | Safety System Oversight                              |
| STO   | Science Technology and Operations                    |
| TA    | Technical Area                                       |
| UI    | LANS Utilities and Infrastructure                    |
| WI    | Work Instruction                                     |

# **Office of Enterprise Assessments Review of the Fire Protection Program at the Los Alamos National Laboratory**

## **1.0 PURPOSE**

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) assumed responsibility for managing the Department's independent oversight program from the former Office of Health, Safety and Security (HSS) in May 2014. This report addresses an HSS independent review of the fire protection program (FPP) conducted October 28 – November 1, 2013, at the Los Alamos National Laboratory (LANL), concurrent with a scheduled Los Alamos Field Office (NA-LA) fire protection triennial assessment. The review was one part of a series of targeted assessments of fire protection at nuclear facilities across the DOE complex, including National Nuclear Security Administration (NNSA) sites.

The purpose of the NA-LA triennial assessment was to conduct a comprehensive assessment of the LANL FPP as required by DOE Order 420.1B, *Facility Safety*. Issuance of this EA report was deferred until completion of the related NA-LA report, *Independent Assessment Report for the LANL Fire Protection Program Triennial Assessment*, which was issued on April 28, 2014.

The purpose of the EA targeted assessment was to evaluate the implementation of program requirements for ensuring the adequacy of controls to reduce the risk resulting from a fire or explosion at nuclear facilities. Existing EA criteria, review, and approach documents (CRADs) were adapted to establish a focused set of inspection criteria, activities, and lines of inquiry for the targeted assessment. This independent review of LANL was designed to evaluate the selected core fire protection elements and to provide information to the site and responsible NNSA line management organizations for benchmarking their program's effectiveness.

This report discusses the background, scope, methodology, results, and conclusions of the review. In cases where the observations and findings of the NA-LA review reflect EA's perspectives, EA summarizes and refers to the NA-LA results. In addition, EA independently identified one additional finding and additional two opportunities for improvement (OFIs) during the review.

## **2.0 BACKGROUND**

NA-LA oversees LANL and is responsible for administering the performance-based contract, executing assigned NNSA and DOE programs, and conducting oversight of work performed at LANL in support of NNSA requirements and priorities.

LANL's primary mission is to develop and apply science and technology to ensure the safety, security, and reliability of the U.S. nuclear deterrent; reduce global threats; and solve other emerging national security challenges. For more than 60 years, LANL has served as a research center in the world of science, technology, and engineering, and has made achievements that focus on safety, security, environmental stewardship, nuclear deterrence, threat reduction, operations, communications, and community involvement. Since June 2006, Los Alamos National Security, LLC (LANS), a partnership that includes the University of California, the Babcock and Wilcox Company, Bechtel National, Inc., and URS Corporation, has held the contract for managing and operating LANL.

The DOE independent oversight program is designed to enhance DOE safety and security programs by providing DOE and contractor managers, Congress, and other stakeholders with an independent

evaluation of the adequacy of DOE policy and requirements, and the effectiveness of DOE and contractor line management performance in safety and security and other critical functions, as directed by the Secretary of Energy. The independent oversight program is described in and governed by DOE Order 227.1, *Independent Oversight Program*, and a comprehensive set of internal protocols and CRADs.

Fire protection was identified as an independent oversight program targeted review area for 2013 in a memorandum from the Chief Health, Safety and Security Officer to DOE senior line management, entitled *Independent Oversight of Nuclear Safety – Targeted Review Areas Starting in FY 2013*, dated November 6, 2012. As part of this series of targeted reviews, HSS previously conducted a review at the LANL Technical Area (TA)-55 Plutonium Facility to evaluate key engineering elements of a safety class fire suppression system (FSS), including engineering design features; technical surveillance requirements testing; and system configuration management.

The earlier independent oversight review of the TA-55 FSS concluded that the TA-55 safety basis documents generally identified and described the system safety functions and the safety functions of essential supporting systems. The facility risks associated with fire were well defined, and appropriate controls were generally identified. However, independent oversight, in conjunction with a NA-LA assessment team, identified some concerns that could challenge the ability of the FSS to perform its credited safety functions as documented in the safety basis. The results of that review are reported in a report, *Independent Oversight Review of the Technical Area 55 Safety Class Fire Suppression System at the Los Alamos National Laboratory*, dated December 2013.

### **3.0 SCOPE**

For this review, EA reviewed selected elements of the FPP at LANL and independently assessed the effectiveness of the LANL FPP and its implementation by LANL. The review included evaluation of key elements of the FPP, including the FPP program documentation, the exemption and equivalency process, baseline needs assessments (BNAs), life safety assessments, pre-incident plans (PIPs), control of combustibles, and the fire system impairment process. The review also evaluated fire hazards analysis (FHA)/documented safety analysis (DSA) integration, and LANL and NA-LA self-assessments. The review selectively evaluated the program and documentation at the institutional level and its implementation at the TA-55 Plutonium Facility, Chemistry and Metallurgy Research (CMR) Facility, Sigma Building 66, and the National Security Sciences Building (NSSB). The review consisted of an evaluation of the fire protection procedures and interviews with personnel responsible for program implementation.

### **4.0 METHODOLOGY**

The EA review of the LANL FPP included reviews of documents and site walkdowns of selected LANL facilities and the fire suppression safety systems. The review considered the requirements of 10 CFR 851, *Worker Safety and Health Program*; DOE Order 420.1B, *Facility Safety*; and National Fire Protection Association (NFPA) codes and standards.

The LANL FPP was assessed using the objectives and criteria identified below. These criteria are based on program elements from DOE Orders 420.1B and 226.1B and were grouped together by similarity under an overall objective.

The following sections of HSS CRAD 45-34, Revision 1, were used for the targeted assessment:

- Section I, Programmatic Elements, FP-1, Program Documentation.
- Section I, Programmatic Elements, FP-2, Program Implementation - Fire and Related Safety Hazards.
- Section I, Programmatic Elements, FP-3, Program Implementation - Fire Prevention and Protection.
- Section II, FHA/DSA Integration, FP-4.

EA also utilized elements of HSS CRAD 45-21, Revision 1, Feedback and Continuous Improvement Inspection Criteria and Approach – DOE Field Element, to collect and analyze data on NA-LA oversight activities for the FPP.

## 5.0 RESULTS

### 5.1 NA-LA Field Office Laboratory Oversight

This portion of the review was intended to determine whether the following inspection criteria were satisfied:

**Inspection Criterion:** *DOE field element line management has established and implemented oversight processes that evaluate contractor and DOE programs and management systems, including site assurance systems, for effectiveness of performance (including compliance with requirements). (DOE Order 226.1B 4b (1))*

**Inspection Criterion:** *DOE field element line oversight program includes written plans and schedules for planned assessments, focus areas for operational oversight, and reviews of the contractor’s self-assessment of processes and systems. (DOE Order 226.1B 4b (2))*

**Inspection Criterion:** *Oversight processes are tailored according to the effectiveness of the laboratory assurance systems, the hazards at the site/activity, and the degree of risk, giving additional emphasis to potentially high consequence activities. (DOE Order 226.1B 4b (5))*

**Inspection Criterion:** *DOE field element staff are adequately trained and qualified to perform assigned oversight activities. (DOE Order 226.1B, DOE Order 360.1C, and DOE Order 426.1 chg 1)*

**Inspection Criterion:** *Continuous improvement mechanisms have been established to improve the effectiveness and efficiency of oversight programs and site operations. (DOE Order 226.1B 4a (2))*

NA-LA has documented and implemented processes and procedures to oversee the LANL FPP; however, several of these processes and procedures are outdated and need revision to reflect the current NA-LA organization and DOE Order 420.1C. NA-LA Plan 00.14, Revision 1, *The Los Alamos Site Office [LASO] Integrated Management Description Including LASO Functions, Responsibilities, and Authorities (FRAs)*, defines NNSA NA-LA management functions and implementing mechanisms for oversight of the LANL FPP. Management Procedure (MP) 06.07, Revision 1, *LASO Fire Protection Program*; MP 02.03, *LASO Emergency Management Program Oversight*; Work Instruction (WI) 06.01, Revision 4, *LASO Field Operations-Oversight/Surveillance Issues Reporting*; and WI 00.12, Revision 1, *Oversight Issues Reporting*, define the principal implementing mechanisms NA-LA uses for oversight of the LANL FPP. (See **OFI-NALA-1.**)

During this review, NA-LA could not provide any evidence that the roles and responsibilities of the authority having jurisdiction (AHJ) have been formally defined and documented between LANL and NA-LA. Although the NA-LA assessment report identified this discrepancy as an observation (SSO-FP-

FPPD-O-13-04), EA views it as a significant weakness because it contributes to LANL's inability to address longstanding concerns about the quality of Pre-Incident Plans (PIPs) content discussed further in Section 5.2. (See **Finding F-NALA-1**.)

NA-LA's implementation of oversight of the LANL FPP has been a challenge due a vacancy in the NA-LA Fire Protection Program Manager (FPPM) position, reassignment of the FPPM program oversight responsibilities and functions from NA-LA Safety Operations to Field Operations, and, in April 2014, the reorganization of NA-LA. During this time, the NA-LA Safety System Oversight (SSO) Fire Protection Engineer (FPE) and FPEs from the NNSA Associate Administrator for Safety and Health (NA-SH) and the NNSA Chief, Defense Nuclear Safety (CDNS) provided oversight support for reviewing safety basis documents, FHAs, and exemption and equivalency requests, and, to the extent possible, conducting assessments of FPP programmatic elements.

At the time of the EA review, with the FPPM position vacant, FPP oversight was reassigned to the FPE assigned to the NA-LA SSO program, who is a registered FPE and with qualifications including the DOE technical qualification program in fire protection and the NA-LA SSO qualification standard. The Facility Technical Capability Panel Workforce Analysis for NA-LA identified requirements for one FPE subject matter expert for FPPM oversight and five SSO staff (one being an FPE). NA-LA is in the process of identifying the vacant FPE position as a critical position that needs to be staffed due to the workload of oversight required to support the numerous LANL nuclear facilities with credited FSSs, review of safety basis and FHA documents, participation in ongoing nuclear project design reviews, and review of exemption and equivalency requests.

In addition to conducting numerous vital safety system assessments as an SSO on LANL nuclear facilities with credited FSSs, the NA-LA SSO FPE conducted several assessments of FPP programmatic elements, including the LANL fire system impairment process and the site water supply system for nuclear facility credited fire systems. The assessment reports indicate that these reviews were conducted with sufficient depth and rigor and typically resulted in substantive findings and observations requiring laboratory corrective action.

NA-LA's oversight of the LANL FPP was last reviewed by the Office of the CDNS in June 2012. That review found that NA-LA had documented and implemented an FPP that generally complied with DOE requirements, with appropriate flowdown to NA-LA oversight processes and procedures; however, the CDNS review noted that there has been no complete, comprehensive review of the laboratory's FPP since 2006. A partial NA-LA review was conducted in 2010, along with NA-LA oversight activities by the SSO and emergency management programs, and identified many findings and weaknesses. The CDNS review concluded that the number and significance of identified issues indicated that the overall health of the LANL FPP had not been sufficiently evaluated through a complete and comprehensive review and recommended a comprehensive review be conducted.

Because of the lack of continuity in NA-LA FPPM oversight, and in response to corrective actions from the NNSA CDNS June 2012 biennial review of NA-LA nuclear safety performance, NA-LA committed to conduct a comprehensive triennial assessment of LANL FPP in accordance with DOE Order 420.1B, and also to conduct a self-assessment of NA-LA FPP oversight performance with respect to the provisions of NA-LA MP 06.07, *LASO Fire Protection Program*. The NA-LA Safety Engineering Team Leader intends that the results from the NA-LA triennial assessment of LANL FPP implementation will establish a program baseline for developing an FPP program oversight strategy for NA-LA. A follow-on NA-LA self-assessment is scheduled to be conducted after completion and issuance of the NA-LA triennial assessment report.

During the current review, EA found that NA-LA's assessment was competently performed by knowledgeable NA-LA personnel using appropriate review criteria. The NA-LA team members were technically qualified and demonstrated a high degree of familiarity with the site. The assessment scope was well defined in the NA-LA assessment plan and included follow-up activities for prior assessment findings, including the NNSA 2010 triennial review of the LANL FPP. The assessment included appropriate performance-based elements, such as walkdowns of portions of facilities for combustibles, observations of LANL facility inspections, comparisons of identified fire hazards and adequacy of PIPs from walkdowns of facilities and existing FHAs, and interviews with FPEs, the Los Alamos County Fire Department (LACFD), and project personnel. The NA-LA triennial assessment was conducted with sufficient rigor and depth and identified numerous substantive findings and observations that were appropriately characterized and documented in the NA-LA final assessment report.

The NA-LA triennial FPP assessment, in conjunction with this EA assessment, identified 15 findings and 20 observations that are described in detail in the NA-LA assessment report. The NA-LA report concluded that only three of the six NA-LA assessment objectives were met. The NA-LA assessment team concluded that the collective significance of the FPP issues identified during the triennial assessment challenges the overall program effectiveness and that a higher level of review and attention from laboratory management was warranted. Furthermore, the EA and NA-LA assessment teams recommended that the laboratory conduct an extent-of-condition review of the identified issues for applicability at other LANL facilities and projects that were not evaluated in the triennial assessment, and also complete an evaluation of FPP roles and responsibilities and required staffing needed to implement an effective and compliant program. The following sections describe the results of EA's review and reflect a number of concerns identified by the EA team, in conjunction with the NA-LA assessment team, that challenge overall FPP effectiveness.

## **5.2 LANL Fire Protection Program**

This portion of the review was to determine whether the following inspection criteria were satisfied:

***Inspection Criterion:*** *A documented fire safety program exists as required by applicable safety criteria. (DOE Order 420.1B, DOE-STD-1066-99)*

***Inspection Criterion:*** *A baseline needs assessment (BNA) of the fire protection emergency response organization has been documented and updated every 3 years. The plan should describe in sufficient detail fire-fighting operations for the respective facilities. (10 CFR 851, DOE Order 420.1B, DOE-STD-1066-99)*

### **Program Documentation**

The LANL Fire Protection Program Manual, FPPM-1220-100 consists of a series of documents that describe how to implement various aspects of the laboratory FPP to meet the requirements of DOE Order 420.1B, *Facility Safety*. The roles and responsibilities are consistent with those described in LANL Procedure (P) 313, *Roles, Responsibilities, Authorities, and Accountability*.

LANL Program Description (PD) 1220, *Fire Protection Program*, documents the mission, policies, and procedures necessary to meet DOE Order 420.1B requirements. The LANL FPP's policy is to implement 10 CFR 851, DOE Order 420.1B, and other DOE-prescribed fire protection codes and standards that are applicable to the laboratory. The process for promulgating these program elements down to the facility level is described in FPPM-1220-100.



LANL has developed and approved institutional policies and procedures that contribute to minimizing the risk associated with fire. LANL PD 1220 incorporates the necessary requirements related to DOE and NFPA codes and standards.

A comprehensive FPP depends upon effective programs that document administrative controls designed to reduce the risk and minimize the consequences of a fire. EA evaluated selected elements of the FPP, including the exemption and equivalency process, baseline needs assessments, life safety evaluations, PIPs, control of combustibles, and the fire system impairment process, as described in the following subsections. Also, FHAs were reviewed and are discussed in Section 5.3.

### **Exemption and Equivalency Process**

EA determined that improvements are needed in evaluating the effectiveness of approved compensatory measures for equivalencies and exemptions. For example, the equivalency LANL-DOE-ORDER-420.1B – EQ 2010-003 had a sunset clause of November 30, 2013, and has been resubmitted by LANL, but the compensatory actions from the initial agreement were never fully implemented or evaluated for effectiveness. In addition, the procedure for initial first aid response cited in the equivalency was never developed or approved. Due to these deficiencies and similar concerns identified during the LANL 2013 fire program self-assessment, NA-LA issued an observation (SSO-FP-FPPD-O-13-04), as documented in the NA-LA assessment report.

### **Baseline Needs Assessment**

The deficiencies identified in the BNA that was issued and approved in fiscal year (FY) 2009 included 15 recommendations to improve LACFD emergency services to LANL. An implementation plan was written by the LANL Fire Protection Division Office (FP-DO), but most of the items have not been fully addressed and LANL has not implemented equivalent compensatory measures. In addition, the BNA has not been revised in over three years. Due to these deficiencies and similar concerns identified during the LANL 2013 fire program self-assessment, NA-LA issued a finding (SSO-FP-FPPD-F-13-07), as documented in the NA-LA assessment report.

### **Life Safety Evaluations**

LANL FPPM-1220-100 identifies FP-DO as responsible for maintaining and performing the institutional fire protection and life safety assessments for the LANL buildings, structures, facilities, and programmatic activities to ascertain adherence to LANS contractual commitments. An FPP that identifies the applicable requirements for life safety assessments has been documented, but the life safety inspections at LANL facilities have not been completed on schedule. Program improvements have recently been initiated to ensure an adequate level of technical oversight for the completion of life safety inspections and requiring the respective FPEs to perform the inspections. Due to these deficiencies and similar concerns identified during the LANL 2013 fire program self-assessment, NA-LA issued a finding (SSO-FP-FPPD-F-13-03), as documented in the NA-LA assessment report.

### **Pre-Incident Plans**

Detailed pre-incident planning is a specific expectation of LANL and DOE Order 420.B. Because of LANL's large number of nuclear facilities and diversity of scientific activities and operations, it is particularly important that LANL PIPs be tailored to the specific hazards of each LANL facility. The LACFD is responsible for the implementation of PIPs for LANL. The LACFD procedure *Pre-Incident Plan (PIP) Program, Division 300 Article 1* describes how the LACFD implements and oversees the development and maintenance of these documents, and also specifies the information that should be

included PIPs. None of the PIPs that EA reviewed contained the specific facility information required by this procedure, such as floor plans showing the location of fire walls, fire alarm panels, fire detection systems, and locations of flammable liquid storage cabinets.

Deficiencies in PIPs were also identified during prior NA-LA assessments and the LANL 2013 fire program self-assessment. Recommended improvements for PIPs date back to the 2009 BNA, which described the PIPs as having a low level of specific detail to support the LACFD response. The Cooperative Agreement (which is the agreement between NA-LA, LANL, and LACFD for performing fire protection functions) does not delegate any AHJ responsibilities to LANL for approval of PIP content, format, or strategies for inclusion in LACFD PIPs. Due to these deficiencies and similar concerns identified during the LANL 2013 fire program self-assessment, NA-LA issued a finding (SSO-FP-FPPE-F-13-15) and an observation (SSO-FP-FPPD-O-13-05), as documented in the NA-LA assessment report.

### **Control of Combustibles**

DOE Order 420.1B, *Facility Safety*, requires an FPP to include comprehensive, written fire protection criteria or procedures that include use and storage of combustible, flammable, radioactive, and hazardous materials to minimize risk from fire. DOE-STD-1066 reinforces this requirement, stating that a combustible control program is a required element for all FPPs and that the general housekeeping practices, control of transient combustibles, and control of flammable and combustible liquids and gases must be documented.

EA found that the nuclear facilities have formalized procedures that adequately control the risk associated with fire. However, such procedures are not as evident for the non-nuclear facilities that were reviewed. Some of the formal procedures were found to be insufficient to identify existing fire hazards, such as combustible loading. For example, during the Sigma facility tour, EA found the Science Technology and Operations (STO) procedure *STO Combustible Control Program, STO-OP-051* to be inadequate for identifying significant quantities of lubrication oil located in the northeast corner of Room D5; although the procedure requires that only combustible and/or flammable liquids currently in use shall be stored outside an approved flammable liquids cabinet, the most recent Facility Combustible Control Checklist did not identify this area as unsatisfactory or implement any compensatory actions. The procedure also has no acceptance criteria for the acceptable quantities of combustible materials and does not define the residence time for transient combustibles. In addition, the STO combustible loading procedure was reviewed and approved by FP-DO, but the inspections are performed by Operations personnel who are not trained to understand the limitations for combustible fuels. NA-LA identified additional examples of inappropriate combustible loading issues during a tour of the NSSB. Due to these deficiencies, NA-LA issued a finding (SSO-FP-FPPD-F-13-01), as documented in the NA-LA assessment report.

### **System Impairment Process**

The LANL 2013 fire program self-assessment identified that fire protection and life safety structures, systems, and components (SSCs) impairment performance was less than adequate. The number, type, and duration of impairments constitute a longstanding issue, and LANL cited this as a pre-existing condition as part of the LANS contract transition in 2006. Since then, progress has been insufficient for NA-LA to accept closure. Corrective maintenance for fire systems is not always completed in a timely manner, partly because LANL lacks a consistent methodology for prioritizing repairs for fire systems not classified as vital safety systems. Fire protection system impairment control and management was also identified as a finding in the 2010 NA-LA triennial assessment report. Due to the duration of this issue and the lack of sufficient progress, NA-LA issued a repeat finding (SSO-FP-FPPD-F-13-04), as documented in the NA-LA assessment report.

### 5.3 Fire and Related Safety Hazards Analyses

This portion of the review was intended to determine whether the following inspection criteria were satisfied:

**Inspection Criterion:** *Fire Hazard Analyses (FHA) have been prepared for each nuclear facility and the results coordinated and integrated into the Documented Safety Analysis as required. (DOE Order 420.1B, DOE STD-1066-99, DOE-HDBK-1163, NFPA 801)*

**Inspection Criterion:** *Fire and related safety hazards on site (or within the facility) have been identified and evaluated in conjunction with a current and comprehensive FHA. (DOE Order 420.1B)*

**Inspection Criterion:** *The FHA and self-assessments address all essential elements for a complete analysis as delineated in DOE Order 420.1 and its implementation guide. (DOE Order 420.1B and DOE Guide 420.1-3)*

**Inspection Criterion:** *The information contained in the FHA and assessment is accurate, as required by applicable fire safety criteria. (DOE Order 420.1B)*

DOE Order 420.1B requires the establishment of a comprehensive fire protection program that includes in part the preparation of an FHA using a graded approach for all hazard category 1, 2, and 3 nuclear facilities, significant new facilities, and facilities that represent unique fire safety risks. The *LANL Fire Protection Program Manual*, FPPM-1220-100 provides the functional criteria to implement the various aspects of the LANL FPP. The program manual provides a detailed summary for the development of the FHA and is consistent with the requirements of DOE Order 420.1B. The program manual is further augmented by FP-DO Administrative Procedure (AP)-FPDO-FHA, *Fire Protection Fire Hazard Analysis Development*, and a separate comprehensive FHA report template for use in the preparation and revision of facility FHAs compliant with the order. The report template is a separate draft document used by FHA authors, but its lack of a linked reference to the FP-DO AP could lead to inconsistencies. This informality led NA-LA to issue an observation (SSO-FP-FHA-O-13-08), as documented in the NA-LA assessment report.

Procedure AP-FPDO-FHA specifies that the FHA is to be authored by or completed under the direction of a person meeting the requirements stated in DOE-STD-1066. FP-DO organizational training requirements are defined in the Associate Directorate for Nuclear and High-Hazard Operations *Fire Protection Training Implementation Plan*, Revision 0, dated September 8, 2011, which establishes the minimum qualification requirements for management and staff positions based on the process described in LANL P 781-1, *Conduct of Training Manual*, Revision 8, dated November 6, 2013. This manual specifically identifies FPEs and fire protection technicians as requiring “qualification” to review plans and prepare FHAs. The FP-DO implementation plan reiterates the DOE-STD-1066-99 definition of a “Qualified FPE” that supports the LANL P 781-1 Attachment B and DOE Order 420.1B expectations for performing these activities. EA interviews with the FPEs who author or oversee preparation of FHAs indicated that these individuals are competent and knowledgeable of FHA required content and requirements.

DOE Order 420.1B requires facility FHAs to be reviewed every three years and revised when annual DSA updates impact the contents of the FHA, when significant new fire hazards are identified, and when the triennial review identifies a need for changes. AP-FPDO-FHA reiterates these requirements. Contrary to these requirements, many non-nuclear facility FHAs have not been updated every three years. Even though the FHA update status is tracked in the SharePoint database site, at the time of this

assessment the database and the FHA update due dates were incomplete. Because the non-nuclear facilities' FHAs have not been updated as required, NA-LA issued a finding (SSO-FP-FHA-F-13-13), as documented in the NA-LA assessment report.

FP-DO is responsible for preparing facility FHAs, which include a list of facility deficiencies with respect to DOE orders and standards, and NFPA requirements. Upon completion and issuance of an FHA, it is formally sent to the applicable facility operation directors (FODs). FP-DO enters the deficiencies identified in the FHA into the LANL Performance Feedback and Improvement Tracking System (PFITS) for corrective action. Discussions and interviews with the Fire Protection Group and FODs revealed that there is no formal process requiring FP-DO to follow up on or prioritize open issues in PFITS, and the FPEs often do not monitor these issues until the next FHA review. In addition, there is no process that includes FP-DO in the review and approval process for fire protection corrective actions, which are typically delegated to the FOD. Among the open PFITS issues, EA identified many longstanding open items; also, in some cases the absence of FP-DO review may have led to inappropriate closure of issues. The failure to monitor FHA issues until final resolution led NA-LA to issue a finding (SSO-FP-FPPD-F-13-04), as documented in the NA-LA assessment report (see Section 5.6 discussion on Issues Management Program).

#### **5.4 Fire Prevention and Protection SSCs and Controls**

This portion of the review was intended to determine whether the following inspection criteria were satisfied:

***Inspection Criterion:*** *A complete spectrum of fire prevention controls and procedures are in existence and have been implemented as required by applicable fire safety criteria. (DOE Order 420.1B, Site & Facility DSA)*

***Inspection Criterion:*** *All fixed fire protection features (appropriate construction types, fire barriers, fire alarm and signaling systems, manual and automatic fire suppression systems, etc.), that are required by authorization basis documents and fire hazards analyses, have been installed and are tested and maintained, as required by applicable fire safety criteria. (DOE Order 420.1B, Site & Facility DSA)*

#### **Infrastructure Water Supply**

The LANL water distribution system provides domestic, service, and fire protection water throughout the LANL infrastructure and is managed by multiple lines of responsibility. Los Alamos County (LAC) supplies water to primary storage tanks for distribution to LANL. The distribution network from the tanks, consisting of underground piping, valves, and hydrants, is managed, operated, and maintained by LANS Utilities and Infrastructure (UI). In general, the LANL distribution system piping lines start at the primary storage tanks maintained by LAC and end at the post indicator valve(s) at the facilities. The LACFD performs a system hydrant flow rate check and provides current flow test data to LANL. UI utilizes and invokes LANL Engineering Standards, LANL Master Specifications, LANL Utilities Operating and Maintenance Instructions, AWWA standards and manuals, and NFPA standards in managing and maintaining the water supply infrastructure.

The process for ensuring a reliable fire water supply for new construction is set out in the *LANL Fire Protection Program Manual*, FPPM-1220-100 and the Engineering Standards Manual and its implementing functional administrative procedures. For new projects, the adequacy and reliability of the fire protection water supply, including fire water flow, capacity, duration, layout, and redundancy of components and subsystems, are validated as part of the conceptual and final design development and approval processes. For new projects, these aspects are evaluated within the project's preliminary FHA

as the project design progresses. For existing facilities, the adequacy and reliability of the existing available fire protection water supply are evaluated during the facility FHA development and updating process using AP-FPDO-FHA. Despite this generally acceptable process and methodology, deficiencies were noted in the adequacy of some new and existing facility water supplies. NA-LA completed an SSO assessment of the LANL water supplies for nuclear facility credited fire systems in 2013 that resulted in six findings and nine observations warranting LANL action. These issues, some of them longstanding, have been entered into PFITS for resolution.

At LANL, the underground water supply infrastructure piping consists largely of cast iron pipe, with significantly less PVC, steel, and other piping materials. Because much of the cast iron piping and sectional control valves are significantly aged, UI has planned prioritized replacement projects. One high priority is the plan to replace a water main in TA-3, which will be the first phase of laboratory-wide replacement projects for water mains that have been in service for approximately twice their installed piping design life.

Despite generally acceptable management and maintenance of the water supply infrastructure, several deficiencies related to both design and inspection, testing, and maintenance (ITM) have been identified and not yet fully addressed. For example, the NA-LA assessment conducted in May 2012 identified such deficiencies as:

- Boundaries between the facilities and the utilities are unclear.
- Communication procedures between various responsible entities are not well defined.
- System vulnerabilities have not been fully evaluated.
- Freeze protection systems are lacking for the multiuse water storage tanks supplying fire suppression systems at CMR; the Radioassay and Nondestructive Testing (RANT) facility; the Waste Characterization, Reduction, and Repackaging (WCRR) facility; and the Weapons Engineering Tritium Facility (WETF).
- Several UI maintenance procedures do not fully comply with NFPA codes, as required.
- Most of the water supply components and maintenance activities for nuclear facilities are identified as Management Level 4 (ML-4), the lowest level of quality assurance.

## 5.5 FHA/DSA Integration

This portion of the review was intended to determine whether the following inspection criteria were satisfied:

***Inspection Criterion:*** *Within the scope of the review, the FHA conclusions shall be incorporated into the safety authorization (preliminary safety design review, preliminary DSA, or DSA, as appropriate) and demonstrate the adequacy of controls provided by the system to eliminate, limit, or mitigate identified hazards, and define the process for maintaining the controls and controlling their use.*

***Inspection Criterion:*** *The safety authorization basis is consistent with the fire hazards analysis; demonstrates the adequacy of controls provided by the system to eliminate, limit, or mitigate identified hazards; and defines the processes for maintaining the controls current at all times and controlling their use.*

The program for ensuring FHA and DSA integration and consistency relies on adherence to the institutional Conduct of Engineering program that is governed by Engineering Processes Manual P341. Administrative procedures, such as AP-341-627, *Design Coordination*; AP-341-621, *Design Authority Technical Review*; and AP-341-626, *Design Interface Control*, provide a process that includes FP-DO

review of facility changes. The FHA and DSA process relies on communication between the FHA author and the DSA author during the update process. FP-DO communicates, either formally or verbally the impacts of the fire hazards on the DSA, but sometimes, although infrequently, the facility interprets the FHA and other fire protection documents, without input from or due consideration of input from FP-DO, and implements controls accordingly. The integration and consistency of the DSA and FHA are largely addressed through informal periodic communication between the FPE and the facility safety basis and design engineering staff, augmented by the Institutional Engineering Functional Administrative procedures and periodic facility walkdowns (though the walkdowns are not a scheduled FPE activity). Although institutional processes exist and FP-DO and the facilities do communicate, FP-DO does not have a formal schedule of periodic facility reviews to adequately ensure consistency. As a result, NA-LA issued two observations (SSO-FP-FHA-O-13-09 and SSO-FP-FHA-O-13-10), as documented in the NA-LA assessment report.

## **5.6 Fire Protection Self-Assessment Program**

This portion of the review was intended to determine whether the following inspection criteria were satisfied:

***Inspection Criterion:** A documented comprehensive self-assessment of the fire protection program is performed by the DOE site office and the facility contractor at least every 3 years, or at a frequency with appropriate justification approved by the DOE head of field element. (DOE Order 420.1B)*

***Inspection Criterion:** Proper controls are incorporated to prioritize and monitor the status of the fire protection assessments and associated findings until final resolution.*

***Inspection Criterion:** Processes are developed and implemented that prioritizes and monitors the status of fire protection assessment findings, recommendations, and corrective actions until final resolution. [DOE Order 420.1B, CRD, Chapter II, 3.b(15)]*

***Inspection Criterion:** Program issues identified during previous assessments or program reviews have been appropriately resolved, corrective actions have been completed, and are adequate, or a clear path to completion is indicated. [DOE Order 226.1B]*

### **LANL Self-Assessment Program**

The FPP at LANL has not been fully self-assessed by all responsible parties for all areas of responsibility, as required by DOE Order 420.1B.

DOE Order 420.1B, Contractor Requirements Document (CRD), Chapter II, 3.b (13) requires that “A documented comprehensive fire protection self-assessment program performed every 3 years.” LANL FP-DO has recently completed an FPP self-assessment that also incorporated the results of an earlier assessment conducted by employees from Lawrence Livermore National Laboratory. These two assessments collectively evaluated many of the key fire programs that have been implemented at LANL. FPP roles and responsibilities are divided among multiple entities at LANL, many of which have not performed self-assessments of their areas of responsibility. In addition, FP-DO has not been involved in evaluating areas where others have been assigned defined roles and responsibilities, and some responsibilities not only overlap into other FODs, but also include interface with the LACFD, UI, and Maintenance and Site Services (MSS).

FPPM-1220-100 states that FODs are responsible for issuing and approving facility-specific procedures for the safe use, handling, and storage of combustible, flammable, explosive, radioactive, and hazardous

materials; control and fire safety associated with spark-/flame-producing operations (hot work) and smoking; safe operation of process equipment; and other fire prevention measures that contribute to minimizing the risk from fire. It is not evident that FODs have assessed this area of responsibility.

Another example of a shared FPP responsibility is that FP-DO is supposed to analyze trends in the test data from LACFD hydrant testing. FP-DO is not currently conducting such trend analysis, which is important in determining the adequacy of the fire water supplies to meet the facility sprinkler hydraulic demands documented in the FHAs.

PD 1220 describes the FPPM's role in monitoring the health of the FPP (through focused self-assessment) and requesting resources for making needed improvements. Interviews confirmed that the FPPM is not currently performing these tasks. EA found that although several program deficiencies existed, there was no evidence of an FP-DO evaluation that identified this concern or a need for additional resources.

These deficiencies led NA-LA to issue a finding (SSO-FP-FPPD-F-13-02), as documented in the NA-LA assessment report.

### **LANL Issues Management**

EA, in conjunction with the NA-LA assessment team, observed that many of the issues that were identified during the recent LANL 2013 triennial FPP self-assessment (and during this current review) are similar or identical to issues identified during previous FPP assessments at LANL. For example, NA-LA's FPP triennial assessment in 2010 identified 12 findings and 18 weaknesses for which corrective actions have been established and are closed or being tracked in PFITs. However, this EA and NA-LA review noted a number of weaknesses that are the same as, or similar to, the 2010 issues, such as fire protection and life safety assessments of buildings not conducted; self-assessments not conducted or comprehensive; fire protection issues not monitored to completion; continued weaknesses in PIPs; FHAs not updated in a timely manner; and continuing concerns in fire protection and life safety SSC impairment performance. Continued recurrence of weaknesses indicates that the corrective actions that have been taken have not been fully effective and/or sustained. Due to the identification of many repeat and/or similar issues, NA-LA issued a finding (SSO-FP-FPPD-F-13-7), as documented in the NA-LA assessment report.

In addition, EA observed that a significant number of key FPP elements are known to need improvement but have not been fully implemented. These include facility life safety inspections, the fire system impairment program, updating of facility FHAs, updating of the FPPM, completion of self-assessments, completion of compensatory measures for approved equivalencies, and evaluation of ITM program effectiveness. When evaluated individually, the elements observed by EA appear to be appropriate for the risk. However, viewed collectively, the weaknesses in these elements call into question the overall effectiveness of the FPP and thus warrant a higher level of management review and attention.

LANL P 322-4, *Laboratory Performance Feedback and Improvement Process Procedure* (ref. P322-4, rev 9) provide a means for addressing program deficiencies. The Issues and Corrective Action Management (ICAM) process is required when the Management Review Board determines that performance feedback has reached the threshold for elevation to issue status for effective resolution; ICAM is used to elevate, correct, and close identified issues with a higher risk level. The Risk to Performance (ref. Table A-2, Risk Selection) suggests a Risk Level 1 designation for a significant risk to performance within a specific program. EA, in conjunction with NA-LA, observed that the number and significance of fire program deficiencies warrant, but have not been raised to, Risk Level 1 corrective action and management oversight. Similarly, the collective significance of the FPP deficiencies has not been evaluated. Because the existing processes are not fully effective in prioritizing, managing, and

monitoring the status of fire protection issues, NA-LA issued a finding (SSO-FP-FPPD-F-13-04) and an observation (SSO-FP-FPPD-O-13-01), as documented in the NA-LA assessment report. Currently, neither the Laboratory Performance Feedback and Improvement process or the Management Level Determination procedure evaluates risk in terms of fire protection, considering the critical factors of frequency and/or risk. (See **OFI-LANL-1**.)

## **6.0 CONCLUSIONS**

Overall, NA-LA has documented and implemented processes and procedures to oversee the LANL FPP. However, several of the processes and procedures that were reviewed need revision to reflect the current NA-LA organization and DOE Order 420.1C, and to formally define and document the AHJ roles and responsibilities between LANL and NA-LA. The NA-LA triennial FPP assessment was competently performed by knowledgeable, experienced personnel using appropriate criteria based on the NA-LA MP 00.12, Revision 1, *LASO Independent Assessment Process*, CRAD, and the final report accurately reflects the results of the assessment. EA concurs with the objectives and results of the NA-LA assessment.

LANL has over 1,000 structures with a total replacement value in excess of \$12 billion dollars, constituting significant safety and fire-loss liabilities. Fire is the dominant hazard for radiological release scenarios at LANL nuclear facilities. LANL's eleven nuclear facilities and approximately 230 radiological facilities frequently rely on the FPP as a safety management program and the fire related systems, structures and components (SSCs) to mitigate the consequences of a fire. Reviews conducted by NA-LA and EA have continued to identify significant findings and weaknesses that present a challenge to the ability of FPPs and fire SSCs to perform their credited safety functions as documented in safety analysis and fire hazards analysis reports.

EA concurs with NA-LA's assessment that the collective significance of the FPP issues identified during this assessment challenges the overall program's effectiveness, and that a higher level of laboratory management review and attention is therefore warranted. Furthermore, given the volume of issues identified in the FPP and credited fire SSCs as an indicator of the current overall health of the LANL FPP, sustained and strong oversight by NNSA and NA-LA is warranted. EA has concerns about the adequacy of current NA-LA resources available to support oversight of the numerous LANL nuclear facilities with credited fire systems, review of safety basis and FHA documents, participation in ongoing nuclear project design reviews, and review of exemption and equivalency requests.

## **7.0 FINDINGS**

As defined in DOE O227.1 Independent Oversight Program, *Findings* indicate significant deficiencies or safety issues that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public or national security. Findings may identify aspects of a program that do not meet the intent of DOE policy or Federal regulation. Corrective action plans must be developed and implemented for Independent Oversight appraisal findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE O 227.1 to manage these corrective action plans and track them to completion. Most of the concerns identified by EA were adequately captured as findings and/or observations reported in the NA-LA report, *Independent Assessment Report for the LANL Fire Protection Program Triennial Assessment*, March 2014, and thus, were not duplicated in this EA review report.



**Finding F-NALA-1: Contrary to DOE Order 420.1B c. (10), AHJ roles and responsibilities for fire protection matters have not been formally defined and documented between NA-LA and LANS.**

## **8.0 ITEMS FOR FOLLOW-UP**

Based on the significance of some of the findings, EA will monitor ongoing actions to resolve selected findings identified in the NA-LA report, including:

- Developing or revising processes to prioritize, manage, and monitor the status of fire protection issues.
- Performing periodic fire protection and life safety assessments of LANL buildings, structures, and facilities.
- Maintaining FHAs up to date on a three-year frequency as required by DOE Order 420.1.
- Prioritizing corrective maintenance for fire protection system impairments to get them back in service in a timely manner.
- Improving the quality of PIPs to provide the information needed to support timely and effective response.

In addition, an EA targeted review of the LANL Technical Area 55 ventilation system is scheduled in August 2014. The scope of that review is will also evaluate the effectiveness of NA-LA and LANL feedback and improvement processes associated with management of safety systems, including issues management.

## **9.0 OPPORTUNITIES FOR IMPROVEMENT**

This EA review identified the following OFIs. These potential enhancements are not intended to be prescriptive or mandatory. Rather, they are suggestions offered by the independent oversight review team that may assist site management in implementing best practices, or provide potential solutions to minor issues identified during the conduct of the review. In some cases, opportunities for improvement address areas where program or process improvements can be achieved through minimal effort. It is anticipated that these opportunities for improvement will be evaluated by the responsible line management organizations and either accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and priorities.

**OFI-NALA-1: Review and revise as appropriate NA-LA Plan 00.14 and MP 06.07 to reflect the current NA-LA organization; DOE Order 420.1C; AHJ roles, responsibilities, and authorities; and the results of the NA-LA self-assessment of FPP oversight.**

**OFI-LANL-1: Consider developing a methodology for evaluating and assigning severity classifications to newly discovered fire safety deficiencies that require corrective action.** Specific actions to consider include:

- Base severity classifications on the probability and likelihood that a fire will occur. The assessment of fire loss severity should address the expected loss due to a fire, the potential for offsite release consequences and personal injuries, mission impact, and possible property damage/monetary loss. Other factors to consider include, but are not limited to, facility contents,

arrangements of contents, occupancy, operations conducted in the area, construction type/classification, and hours of operation.

- Evaluate methodologies implemented at other DOE sites that use a Fire Safety Deficiency classification to help establish appropriate priority. Such a classification system could aid the FODs responsible for corrective actions in accurately and effectively prioritizing those actions. An accurate fire severity assessment would also ensure an appropriate level of management attention until the condition is adequately mitigated.



## Appendix B Documents Reviewed and Interviews

### Documents Reviewed

1. High Value Facility ITM list, Rev 3, 7-31-2013
2. Equivalency Log, 9-9-2013
3. UI-SD-001, Primary Water Distribution System, Rev 0, 1-3-2011
4. STO Combustible Control Program, STO-OP-051, R1, 12-6-2012
5. Facility Combustible Control Checklist, Building 03-0141, 9-11-2013
6. Life Safety Evaluation for TA-03 BLDG-0066/0451, 11-29-2008
7. LANL Fire Protection Triennial Assessment Plan-2013, 9-17-2013
8. LANL 2013 Triennial Fire Protection Program Self-Assessment,
9. UI-AGMT-001, Utility Interface Agreement, Rev 5, 12-4-2012
10. TA-8-22 Water Line, Design Review Record, ESR -17829, Submittal Date 4-19-2013
11. Plan of Action in Response to the LASO 2010 Triennial Assessment Report for the LANL Fire Protection Program, 4-12-2011
12. LASO Safety System Oversight (SSO) Assessment Report for the Water Supply for the Nuclear Facility Credited Fire Systems Assessment, 5-2012
13. CMR-AP-020, Fire Protection Program, R3.3, 12-19-2012
14. MSS Maintenance and Site Services Program Management Review, 7-2013
15. Conduct of Maintenance, (P950) Operations and Maintenance Manual, Operations and Maintenance Criterion Fire Protection Water Supply Systems, Criterion 722, R1, 3-11-2010
16. NNSA Triennial Assessment of the Fire Protection Program at the Los Alamos National Laboratory, 8-2010
17. LASO Safety Systems Oversight Independent Assessment Report for the Fire Systems Impairment Process, 4-2013, LANL PFITS 2011-6703
18. Chronic Long Term Fire Protection Impairments, UI-SO-002, Rev 3, 6-2-2013
19. SM-3- Standpipe Surveillances, UI-SO-005, Rev 2, 1-16-2013
20. Fire Watch Requirements Associated with SCC HSSD System Impairments and Compensatory Actions for SL-8500 Tape Storage Libraries, UI-SO-018, Rev0, 9-24-2013
21. TA-16-180 Fire Pump Compensatory Measures, UI-SO-007, Rev 2, 1-9-2013
22. Fire Protection Tanks, UI-SO-014, Rev 0, 4-9-2013
23. LANL Fire Protection Program Manual, FPPM-1220-100, Facility Specific Fire Protection Programs, Rev 1, 7-01-2-11
24. AP-Fire -001, Fire Protection Engineering Evaluations, Rev 0
25. AP-FPDO-INSP, Fire Protection Facility Inspection Procedure,
26. P101-26, Welding, Cutting, and Other Spark or Flame Producing Operations
27. PD1200 Emergency Management Program Description, Rev 2
28. Los Alamos National Laboratory, Baseline Needs Assessment, Rev 0, 4-23-2009
29. Operations and Maintenance Manual (O&M) Criterion 733 Document, Fire Protection System Impairment Control Program Management Level Determination, AP-341-502, Rev 3.2, 7-27-2013
30. Roles, Responsibilities, Authorities, and Accountability, Procedure 313, Rev 6, 2-19-2013
31. LANL PD340, R4, *Conduct of Engineering for Facility Work*, 2/27/13
32. LANL P341, R3, *Facility Engineering Processes Manual*, 2/27/13
33. LANL P342, R2, *Engineering Standards*, 2/27/13
34. TA-55-DSA-2011-R1.4, *TA-55 Documented Safety Analysis*, 2/7/13.
35. TA-55-TSR-2011-R1.4, *TA-55 Technical Safety Requirements (TSRs)*, 2/7/13.
36. TA-55-HA-2011-R1.4, *TA-55 Documented Safety Analysis 2012 Hazard Analysis*, 2/7/13.

37. TA55-FHA-001, R3, *Los Alamos National Laboratory, Technical Area 55, Building PF-4 Facility Fire Hazards Analysis*, 9/28/12.
38. FP-DO-11-004, R2, *Fire Hazard Analysis, Sigma Facility*, June 2011
39. CMR-FHA-001, Rev 7, *Fire Hazard Analysis, CMR Facility*, 6/2013.
40. ERD-FIRE-06-205, Rev 5, *Fire Hazard Analysis, National Security Science Building*, 10/2008
41. CMR-TSR-002, Rev 2.1, *CMR Technical Safety Requirements*, 8/2013
42. CMR-DSA-001, Rev 2.2, *CMR Documented Safety Analysis*, 9/2013.
43. STO-FSA-0348, Rev 1.1, *SIGMA Facility Safety Analysis*, 4/2012
44. UI-SD-001, Rev 0, *LANL Primary Water Distribution System Description*, 1/2011
45. AP-FPDO-FHA, Rev 0, *LANL Fire Hazards Analysis Development*, 4/2012
46. LASO Safety System Oversight Independent Assessment for the Weapons Engineering Tritium Facility (WETF) Facility Structure (FS) Safety System, 12/2012
47. LASO Safety System Oversight Independent Assessment Report for the TA-55 Fire Suppression System and Components Vital Safety System Assessment, 6/2013
48. LASO Safety System Oversight Independent Assessment Report for the TA-55 Fire Rated Containers, Fire-Rated Safes, 1/2013
49. LASO Safety System Oversight Independent Assessment Report for the TA-55 Flammable Gas Control System, 09/2012
50. LASO Safety System Oversight Assessment Report for the Radioassay and Nondestructive Testing (RANT) Facility Fire Suppression System (FSS), 7/2012
51. LASO Safety System Oversight Assessment Report for the Chemistry and Metallurgy Research Fire Suppression System, 9/2011
52. LASO Assessment Report for Los Alamos National Laboratory Nuclear Facility Drainage Maintenance, 8/2013
53. LASO Emergency Management Program Review for LANL Radiochemistry Complex (TA-48) Facilities, 11/2011

## Interviews

LANS Deputy Associate Director  
 LANS Fire Protection Division – Division Leader  
 LANS Fire Protection Group Leader  
 LANS Fire Protection Engineer  
 LANS Director, Utilities and Infrastructure FOD  
 LANS Director TA-55 Facility Operations FOD  
 LANS Operations manager, MSS-UI  
 LANS Operations manager, MSS-UI  
 LANS Engineering Manager, MSS-UI  
 LANS Maintenance Manager, MSS-UI  
 LACFD - Fire Chief  
 LACFD - Deputy Chief of Operations  
 LACFD - Division Chief  
 NA-LA, Emergency Program Manager  
 NA-LA, Safety System Oversight FPE  
 NA-LA, Safety Engineering Team, Team Leader  
 NA-LA, Assistant Manager, Field Operations