General

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Independent Oversight Inspection of Emergency Management at the

Los Alamos Site Office and Los Alamos National Laboratory

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Abbreviations Used in This Report

BEP	Building Emergency Plan
CPT	Composite Performance Test
DOE	U.S. Department of Energy
EAL	Emergency Action Level
ED	Emergency Director
EMP	Emergency Management Plan
EM&R	Emergency Management and Response
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
EPI	Emergency Public Information
EPZ	Emergency Planning Zone
ERD	Emergency Response Division
ERG	Emergency Response Guidebook
ERO	Emergency Response Organization
ERPG	Emergency Response Planning Guideline
ETSC	Emergency Technical Support Center
FROG	Field Response Operating Guidelines
FY	Fiscal Year
IC	Incident Commander
ICP	Incident Command Post
JIC	Joint Information Center
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LAPD	Los Alamos County Police Department
LASO	Los Alamos Site Office
LSPT	Limited-Scope Performance Test
MIDAS	Meteorological Information and Dispersion Assessment System

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OVERSIGHT

1.0 Introduction

The U.S. Department of Energy (DOE) Office of Independent Oversight inspected the emergency management program at DOE's Los Alamos Site Office (LASO) and Los Alamos National Laboratory (LANL) in October-November 2006. The inspection was performed as a joint effort by Independent Oversight's Office of Safeguards and Security Evaluations (HS-61), Office of Cyber Security (HS-62), and Office of Emergency Management Oversight (HS-63). Independent Oversight reports to the Chief, Office of Health, Safety and Security, who reports directly to the Secretary of Energy. This volume discusses the results of the review of the LASO and LANL emergency management programs. The results of the review of the LANL safeguards and security and cyber security programs are discussed in Volumes I and II, respectively, of this report, and the combined results are discussed in a separate summary report.

Within DOE, the National Nuclear Security Administration (NNSA) has line management responsibility for LANL. NNSA provides programmatic direction and funding for most nuclear weapons stockpile management, research and development, facility infrastructure activities, and emergency management program implementation at LANL. At the site level, line management responsibility for LANL operations and emergency management falls under the LASO manager. Under contract to DOE, LANL is managed and operated by Los Alamos National Security, LLC (LANS), which began to operate LANL on June 1, 2006.[1] The LANL Emergency Response Division (ERD), within the Infrastructure and Site Services Directorate, is the organizational entity tasked with implementing the site's emergency response program.

The primary mission of LANL is to provide scientific and engineering expertise in support of national security and the NNSA stockpile stewardship program. LANL also performs theoretical and applied research and development in such areas as materials science, physics, environmental science, energy, and health. To support these activities, LANL operates numerous laboratories, test facilities, and support facilities. LANL activities involve various potential hazards that need to be effectively controlled. These hazards include exposure to external radiation, radiological contamination, nuclear criticality, hazardous chemicals, and various physical hazards associated with facility operations (e.g., machine operations, high-voltage electrical equipment, pressurized systems, and noise). Significant quantities of fissile and radioactive materials and hazardous chemicals are present in various forms at LANL.

The purpose of this Independent Oversight inspection was to assess the effectiveness of emergency management programs at LANL as implemented by LANS under LASO line management oversight. The scope of the emergency management review at LANL considered the results of the April 2002 Independent Oversight inspection, which identified effective systems in several aspects of LANL's emergency management program, including the emergency preparedness program at the Chemical and Metallurgical Research facility, the conservative approach to chemical screening thresholds, and the strong interfaces with offsite responders and local emergency management committees. However, LANL had not effectively implemented the necessary program elements to ensure timely and accurate emergency response decisions and actions, particularly in the areas of procedures, training, drills, management expectations, notification systems, and emergency public information (EPI). Furthermore, LASO had not formally assigned responsibilities and dedicated resources to monitor the effectiveness of the LANL emergency management program and to fulfill site office emergency planning and response

[1] Consistent with common practice, the term "LANL" is used to refer to the physical facility and the onsite contractor management. The term "LANS" is used to refer to the management organization that provides corporate direction to the onsite LANL management team and that performs corporate line management and evaluation functions for LANS activities at LANL.

requirements. Finally, LASO and LANL feedback and improvement programs were not fully effective in ensuring that emergency management process and performance deficiencies were identified, resolved, and corrected in a timely manner.

This evaluation included an examination of selected elements of the emergency management program at LANL, primarily those that were determined to need improvement during the April 2002 Independent Oversight inspection. Independent Oversight used a selective sampling approach to assess a representative sample of facilities and emergency response organization (ERO) responders at LANL. Specifically, the sampling approach was used to evaluate:

- The effectiveness of the hazards surveys/building hazard run sheets and the emergency planning hazards assessment (EPHA) in serving as an appropriate foundation for the LANL emergency management program.

- The effectiveness of the LASO and LANL emergency responders in applying their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public. To evaluate response performance, Independent Oversight conducted performance tests for initial responders and decision-makers; these tests included a composite performance test (CPT), conducted by the combined safeguards/security and emergency management inspection team, that included emergency management objectives within a force-on-force testing environment.

These activities, as well as reviews of corrective actions in other assessment areas, provided insights into the effectiveness of LANL and LANS feedback and continuous improvement systems, as well as NNSA's emergency management oversight and operational awareness activities at LANL.

Section 2 of this report provides an overall discussion of the results of the review of the LANL emergency management program elements that were evaluated. Section 3 provides Independent Oversight's conclusions regarding the overall effectiveness of LASO and LANL management of the emergency management program. Section 4 presents the ratings assigned as a result of this inspection. Appendix A provides supplemental information, including team composition. Appendix B identifies the findings that require corrective action and follow-up. Appendices C through F detail the results of the reviews of individual emergency management program elements.

2.0 Results

2.1 Positive Program Attributes

LASO and LANL have established a mostly expert-based emergency management program that has improved in some respects since the 2002 Independent Oversight inspection and that includes an initial event response concept that can support a timely reaction to a release of hazardous materials. Positive attributes of the emergency management program are discussed below.

The LANL CPT was an effective vehicle for demonstrating integrated security and emergency response, and during all performance tests, LANL demonstrated its ability to quickly assemble a functioning emergency operations center (EOC). The CPT was well designed and enabled the LANL security and emergency management organizations to demonstrate key aspects of emergency response to a security event. These organizations devoted a considerable level of resources, both in terms of personnel and equipment, in planning for and conducting the CPT. From a performance perspective, the emergency management and response (EM&R) duty officers, acting as incident commanders, effectively demonstrated the capability to evaluate the event, lead the field response team, and activate the EOC. In each of the performance tests, including the after-hours CPT, the EOC was operational within one hour; this was facilitated by the proximity of key ERD staff, primarily the EM&R emergency managers, to the EOC communications room and radio capabilities during and after normal working hours. During EOC operations, LANL emergency directors demonstrated familiarity with most EOC functions. Public information officers were well integrated into EOC operations, understood protocols relevant to the EPI function, and with one exception, completed news releases in a timely manner.

LASO and the NNSA Office of Emergency Management Implementation (NA-43) are committed to improving the LANL emergency management program, and NA-43, LASO, and LANL have taken actions to address some of the program weaknesses identified in the 2002 Independent Oversight inspection. LASO has recently become engaged in oversight of the LANL emergency management program and is well supported by NA-43. A technical assistance visit and program review conducted by NA-43 in 2004 and 2005, respectively, resulted in numerous important issues being identified. NA-43 also provided exercise development training for LANL in 2005 and 2006, evaluators for the 2005 LANL annual exercise, and informal observations for the recently completed 2006 LANL annual exercise. The LASO manager recently assigned a new LASO emergency management program manager who has aggressively begun to implement LASO's emergency management line oversight responsibilities and has formed an effective working relationship with NA-43 staff to speed the process for understanding the content and structure of a site program that would effectively meet DOE expectations. LASO has also developed a performance incentive for improving the accuracy of the LANL building hazard run sheets, which historically has been a weakness and which was identified during this inspection as a significant concern. Finally, LANL has improved several aspects of the EPI program, including developing an integrated EPI plan and supporting procedures that incorporate most DOE expectations, and has initiated efforts to upgrade emergency response procedures and the ERO training and qualification program.

With some exceptions, the LANL EPHA provides an appropriate analytical approach for developing required emergency response tools and capabilities. LANL has continued to use a conservative set of site-specific screening threshold limits for all hazardous chemicals to determine which materials need to be analyzed in the EPHA. The EPHA generally contains the appropriate methodology and level of analytical detail, although the accuracy of the EPHA is diminished by some internal technical discrepancies and the absence of some hazardous material facilities, located in one LANL Technical Area, from the EPHA. The emergency action levels

(EALs) and the timely initial assessment tool, which are key response documents that LANL developed based on the current EPHA material and scenario analyses, are clearly written and are well organized to effectively support categorization/classification and protective action decision-making in a time-urgent situation. However, as discussed in the first weakness below, inadequacies in hazardous material inventory control and screening processes, which serve as inputs to the EPHA, impair the completeness of these response documents.

2.2 Program Weaknesses and Items Requiring Attention

The Independent Oversight team identified numerous weaknesses throughout the inspected elements; many of these weaknesses were identified during the 2002 inspection. Of particular concern are continuing weaknesses in the site's ability to accurately track the movement of hazardous materials throughout the site, and consequently, to maintain the EPHA. Specific weaknesses are discussed below.

Significant weaknesses in processes for tracking and controlling hazardous materials and maintaining the EPHA compromise the basis for the site's emergency management program. Based on the results of walkdowns conducted at four facilities, the LANL processes for tracking and controlling hazardous materials do not ensure that the EPHA accurately reflects facility hazards for which emergency planning is necessary. As occurred during the 2002 Independent Oversight inspection, the walkdowns identified multiple instances of building run sheets (which LANL uses in lieu of an emergency planning hazards survey) that were inaccurate or found hazardous chemicals that should have been evaluated in the EPHA but that had apparently been missed or inappropriately screened from further consideration. Likely contributing factors include the absence of detailed instructions for preparing and maintaining building hazard run sheets and the lack of a formal process description or procedure for conducting the hazardous material screening process. Furthermore, although improved since the April 2002 Independent Oversight inspection, the LANL processes intended to ensure that ERD personnel are notified prior to significant changes in hazardous material inventories or operations still lack rigor. For example, ERD is to be notified of any facility changes that would cause an unreviewed safety question or a change to authorization basis documents, but this does not take into consideration the majority of the facilities containing hazardous chemicals. The LANL chemical management database has been programmed to compare hazardous chemicals against the site-specific threshold screening values, but as illustrated by the walkthrough results, hazardous chemicals continue to be brought on site without ERD notification, and the database is not always updated when empty containers are removed.

The structure and content of emergency response plans, procedures, systems, and the ERO training and qualification program do not adequately support implementation of a reliable emergency response system. Numerous inconsistencies or ambiguities in the delineation of key responsibilities and response functions exist within and among the LANL emergency management plan, implementing procedures, applicable response guides, and the LASO emergency plan. Furthermore, as demonstrated during performance tests, these documents do not consistently reflect current practices, and the status of some implementing procedures is unclear to responders because the ongoing procedure update project did not invoke any formal document control provisions to ensure that response personnel could easily determine individual procedure status, understand how to handle references to withdrawn procedures, and find all appropriate response guidance and direction. LANL has no current offsite notification procedure, and critical elements of the notification process, such as notification approval, are not specified anywhere or are obscured in the bodies of several different response documents. Furthermore, the absence of such offsite notification technologies as a single ring-down phone (linking multiple offsite agencies) makes the offsite notification process prone to errors and challenges the ability of responders to make timely notifications, a weakness that was self-identified during the LANL 2006 full participation exercise. Additionally, a few aspects of the site's EPI program remain undefined, mechanisms to notify employees of general event information do not ensure timeliness, and some EPI-related provisions regarding the approval and coordination of news releases appear to be in conflict with Departmental expectations. Finally, although an effort is underway to institute a series of suitably detailed ERO qualification standards, training for nearly all ERO members is not currently based on an analysis of the tasks necessary to perform the required duties, and the qualification process in place does not ensure that training is completed and that

the individual's ability to perform key tasks associated with the position is verified prior to being placed on the recall list. The net result is that, as discussed further below, there is little assurance that different sets of emergency responders will produce similarly appropriate responses to the same set of initiating conditions.

During performance tests, key EOC decision-makers and supporting staff had difficulty in demonstrating responses that were consistent, accurate, and in accordance with stated LANL and DOE expectations. Although incident commanders effectively managed the field response, actions and decision-making from the EOC did not typically follow the approach stipulated by some response protocols, which resulted in inappropriate alterations of some incident commander decisions. This often produced event classifications and resulting protective actions that had no technical basis and were inaccurate. In almost all cases, the misclassifications and corresponding protective actions were conservative, usually overly so, but decision-makers were not sensitive to the risks associated with the implementation of unnecessary protective actions by affected populations. In most instances, the classification and protective action formulation problems were a result of personnel involved in making these decisions using EALs incorrectly (or not at all) and not pursuing information available from facility operations representatives and the EPHA. Furthermore, emergency technical support center staff did not demonstrate proficiency in utilizing the many available informational and analytical resources. Offsite notifications for the events were not accurate and inappropriately excluded tribal entities, and during the CPT, the ERO did not implement site actions required by the applicable security condition.

LASO and LANL feedback and improvement systems are not sufficiently developed or implemented to ensure that programmatic weaknesses are promptly self-identified and effectively corrected. Although a positive development, LASO's assignment of a new emergency management program manager is only one of many actions that will be required to implement effective LASO line management oversight of emergency management at LANL. LASO has not conducted formal assessments of the LANL emergency management program, LASO plans and procedures provide minimal guidance on conducting line management oversight, and few mechanisms are in place for LASO to provide formal, routine feedback to LANL on emergency management program performance. Furthermore, LASO has specified only one emergency management performance incentive, in the area of building run sheet accuracy, for driving program improvements. LANL's implementation of its emergency management assessment program is immature, and although LANL has self-identified several important program weaknesses, including some identified during this Independent Oversight inspection, numerous weaknesses exist in emergency management assessment plans and the handling of corrective actions for findings and observations identified in self-assessments, external program assessments, and exercises. A process to formally track and close identified actions from drills and exercises has not been established, and some weaknesses in conducting, evaluating, and following up on exercise performance limit exercise effectiveness in identifying opportunities for improvement. A deficient LANL corrective action management process is illustrated by the fact that of the five LANL emergency management findings identified during the 2002 Independent Oversight inspection, all of which have been closed, four remain essentially uncorrected, including weaknesses in tracking hazardous material inventories; response procedures and notification systems; training program construction and implementation; and program assessments.

3.0 Conclusions

Independent Oversight's previous inspection of emergency management at LANL, conducted in April 2002, concluded that despite several program strengths, LASO and LANL had not implemented an emergency management program that was fully capable of effectively protecting site workers and the public from events involving a significant release of hazardous materials. In part, this was due to an erroneous belief among LANL managers that the Laboratory's expert-based emergency response system was sufficient to handle all Laboratory emergencies, even rapidly-evolving events involving an airborne hazardous material release. This 2006 inspection found that LANL's efforts to move to a systematic response system based on a comprehensive, well-integrated set of procedures, job aids, responder training, and reliable mechanisms for identifying and addressing program weaknesses have had very limited success to date. Consequently, the LANL emergency response program remains largely expert-based, and most of the weaknesses identified in 2002 remain essentially unchanged.

One noteworthy positive identified during this emergency management inspection is LANL's demonstration of its ability to plan and conduct an integrated test of security and emergency response capabilities for an after-hours malevolent act involving a postulated release of a hazardous material. The success of this endeavor, the most complex test to date observed by Independent Oversight, is a tribute to the efforts of LASO and LANL managers and staff. This test, along with other emergency management performance tests, generally validated LANL's ability to quickly respond to significant events irrespective of when they occur.

Other positives were noted as well. In recognition of past line management oversight weaknesses and concerns regarding the condition of the LANL emergency management program, the newly assigned LASO emergency management program manager and NA-43 are effectively partnering to develop and implement a LASO emergency management oversight model that will facilitate program improvements. Additionally, the EPHA structure and methodology are well suited for developing effective key response tools, such as the EALs, although some technical discrepancies and instances where facilities may have been inappropriately excluded were identified. Lastly, improvements in LANL's exercise planning, conduct, and evaluation process are strengthening LANL's ability to self-identify program weaknesses.

The most significant weakness in program implementation is that the LANL hazardous material control and screening processes do not comprehensively identify all of the hazardous chemicals that need to be assessed in the EPHA for potential impact on site workers and the public. Similar to those identified in 2002, the Independent Oversight inspection team identified significant discrepancies in hazardous chemical quantities among the building hazard run sheets, the LANL chemical management database, and those present at several facilities. Furthermore, in several instances, hazardous materials in excess of screening thresholds appear to have been inappropriately excluded from consideration in the EPHA, but no bases exist for these determinations because the hazardous material screening process is not adequately documented. This places the validity of the EPHA results in question, and may have resulted in decision-makers not having all of the classification and protective-action formulation tools needed to effectively perform these tasks.

Other weaknesses were noted as well. The existing set of emergency response plans, procedures, and guidance documents does not adequately support emergency responders due to weaknesses in consistency and content. In part, this is due to a procedure upgrade effort whose current status and endpoint are poorly understood by responders. Furthermore, the offsite notification process lacks the equipment and structure necessary to ensure that offsite notifications are accurate and timely and include all appropriate recipients. Additionally, although

an effort is underway to institute a series of suitably detailed ERO qualification standards, training for nearly all ERO members is not currently based on an analysis of the tasks necessary to perform the required duties, and the qualification process in place does not ensure that training is completed and that the individual's ability to perform key tasks associated with the position is verified prior to being placed on the recall list. Collectively, the current status of response procedures, systems, and ERO training largely explains most of the observed performance test weaknesses, including inaccurate event classifications, inappropriate protective actions, and inaccurate or incomplete offsite notifications for postulated emergency conditions. Lastly, the processes used by LASO and LANL to identify areas for improving the LANL emergency management program are not sufficiently developed or implemented to ensure that programmatic and performance weaknesses are systematically and consistently identified and effectively addressed.

While LANL has several initiatives underway to improve the site's emergency management program, overall there has been little substantive progress since the 2002 Independent Oversight inspection. Furthermore, the deficiencies in hazardous material identification and control processes, when combined with weaknesses in procedure content and use, contribute to the risk that initial response decisions may be inaccurate or incomplete. Immediate LANL line management attention is warranted to ensure that hazardous materials are accurately tracked across the site and rigorously screened for consideration in the EPHA. LASO and LANL line management attention is also needed to focus and sustain improvement efforts related to response procedures, notification systems, and the ERO training and qualification program, as well as to strengthen mechanisms applicable to issues identification and corrective action development and implementation.

4.0 Ratings

This inspection focused on a detailed assessment of six key emergency management programmatic elements, as well as the performance of key emergency response decision-makers and support functions during performance tests. No overall program rating has been assigned. The individual element ratings reflect the status of each LANL emergency management program element at the time of the inspection. The ratings assigned below to the readiness assurance category are specific to those assessment, corrective action, and performance monitoring mechanisms applicable to the emergency management area.

The ratings for the individual program elements evaluated during this inspection are:

Emergency Planning

Hazards Surveys and EPHA.....SIGNIFICANT WEAKNESS
Program Plans and Procedures..... NEEDS IMPROVEMENT

Emergency Preparedness

Training, Drill, and Exercise Program.....NEEDS IMPROVEMENT
Emergency Public Information.....NEEDS IMPROVEMENT

Emergency Response

LANL Incident Command Team and EOC Decision-Making..... NEEDS IMPROVEMENT

Readiness Assurance

NNSA Line Program Management..... NEEDS IMPROVEMENT
LANL Feedback and Improvement ..... NEEDS IMPROVEMENT

APPENDIX A
SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Scoping/Planning Visit	October 2 – 5, 2006
Performance Test Visit	October 30 – November 1, 2006
Onsite Inspection Visit	November 7 – 15, 2006
Report Validation and Closeout	December 12 – 14, 2006

A.2 Review Team Composition

A.2.1 Management

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Michael A. Kilpatrick, Deputy Chief for Operations, Office of Health, Safety and Security
Bradley A. Peterson, Director, Office of Independent Oversight
Steven C. Simonson, Acting Director, Office of Emergency Management Oversight

A.2.2 Quality Review Board

Michael A. Kilpatrick
Bradley A. Peterson
Dean C. Hickman
William T. Sanders
Robert M. Nelson
Douglas P. Trout

A.2.3 Review Team

Steven Simonson (Team Leader)

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JR Dillenback
Deborah Johnson
Teri Lachman
David Odland
Brian Robinson
Tom Rogers

A.2.4 Administrative Support

Leisa Weidner
Steve Roshon

APPENDIX B
SITE-SPECIFIC FINDINGS

Table B-1. Site-Specific Findings Requiring Corrective Action Plans

FINDING STATEMENTS	REFER TO PAGES
1. The LANL processes for developing hazards surveys and building hazard run sheets do not ensure that hazardous materials are appropriately evaluated in the EPHA, as required by DOE Order 151.1B, *Comprehensive Emergency Management System.*	14
2. The LANL processes for acquiring and controlling hazardous materials do not ensure that the site EPHA appropriately reflects the impact of potential hazardous material releases on site workers and the public, as required by DOE Order 151.1B.	14
3. LANL has not established a set of response procedures and supporting processes that ensures that ERO responders can accurately and rapidly categorize and classify emergency events, formulate protective actions, and notify all appropriate offsite agencies, as required by DOE Order 151.1B.	17
4. The LANL training and qualification program does not ensure that ERO members are capable and proficient in fulfilling their assigned response functions prior to assignment to the activation roster, as required by DOE Order 151.1B and the LANL Emergency Management Plan.	23
5. LANL has not established and implemented a comprehensive program of evaluated exercises for the site and its hazardous material facilities, as required by DOE Order 151.1B.	24
6. LASO has not established the necessary mechanisms to ensure successful execution of its responsibilities for approving emergency news releases and coordinating EPI-related activities with DOE Headquarters, as required by DOE Order 151.1B.	26
7. LASO and LANL have not established an EPI training program that ensures that the EPI cadre can develop and disseminate timely and accurate emergency public information to the media and public, as required by the LANL EPI plan and by DOE Order 151.1B.	27
8. During LSPTs, ETSC staff did not use available references and dispersion plume predictive tools to provide accurate assessments of event consequences, as required by DOE Order 151.1B and LANL Performance Requirement LPR 403-00-00.0, *Emergency Management.*	35
9. During LSPTs, ERO responders did not effectively determine event information and communicate that information among the emergency response venues to ensure accurate, consistent understanding of event status, as required by DOE Order 151.1B and LANL Performance Requirement LPR 403-00-00.0.	36
10. During the composite performance test, LANL emergency responders did not ensure that all required SECON response actions were taken, as required by the LANL SECON implementation plan and DOE Manual 470.4-1, *Safeguards and Security Program Planning and Management.*	37
11. LASO is not conducting formal, documented assessments of the LANL emergency management program, as required by DOE Order 151.1B.	42
12. The LASO issues management process does not ensure that adequate reviews of LASO and LANL issues and corrective actions are performed to prevent recurrence of issues, as required by DOE Order 151.1B and DOE Order 414.1C, *Quality Assurance.*	43

Table B-1. Site-Specific Findings Requiring Corrective Action Plans (Continued)

FINDING STATEMENTS	REFER TO PAGES
13. LANL is not conducting annual comprehensive emergency management program assessments, as required by the LANL Emergency Management Plan and DOE Order 151.1B.	44
14. The LANL issues management process does not ensure that corrective actions are tracked, validated as completed, or verified as effective in preventing recurrence of issues, as required by the LANL ERD integrated management plan, the LANL corporate issues management process, and DOE Order 151.1B.	45

APPENDIX C
EMERGENCY PLANNING

C.1 Introduction

Two key elements of emergency planning are developing a hazards survey and emergency planning hazards assessments (EPHAs) to identify and assess the impact of site- and facility-specific hazards and threats, and establishing an emergency planning zone (EPZ). U.S. Department of Energy (DOE) and National Nuclear Security Administration (NNSA) sites and facilities use the results of these assessments to establish emergency management programs that are commensurate with the identified hazards. The site emergency management plan defines and conveys the management philosophy, organizational structure, administrative controls, decision-making authorities, and resources necessary to maintain the site's comprehensive emergency management program. Specific implementing procedures are then developed that conform to the plan and provide the necessary detail, including decision-making thresholds, for effectively executing the response to an emergency, irrespective of its magnitude. These plans and procedures must be closely coordinated and integrated with offsite authorities that support the response effort and receive NNSA emergency response recommendations.

This evaluation included a review of the Los Alamos National Laboratory (LANL) hazards surveys and EPHA and their treatment of hazards associated with several LANL facilities and transportation activities. Also reviewed were sitewide and facility-specific emergency plans and associated implementing procedures.

C.2 Status and Results

C.2.1 Hazards Surveys and Emergency Planning Hazards Assessment

The hazards surveys and EPHA are the foundation of the emergency management program; consequently, their rigor and accuracy are keys to developing effective emergency response procedures and other elements of the program. The degree to which the EPHA effectively serves this function is primarily dependent upon the completeness of the institutional processes for developing the hazards surveys and EPHA, the effectiveness of the screening process by which hazardous materials are initially considered, and the rigor and accuracy of the analyses contained within the EPHA.

The April 2002 inspection determined that LANL had established very conservative thresholds for screening hazardous chemicals and had developed a generally comprehensive EPHA. However, the screening process and results were not documented, and the screening process had not been fully implemented. In addition, LANL had not implemented an adequate set of mechanisms to maintain the EPHA with respect to significant changes in facility operations or quantities of hazardous materials. This 2006 inspection found that LANL has resolved some of the issues identified in the 2002 inspection. However, significant concerns persist regarding two key EPHA inputs: performance of the hazardous material screening process and implementation of the hazardous material inventory control in LANL facilities; consequently, the response tools produced by the EPHA may be inaccurate or incomplete.

LANL has maintained an EPHA that generally meets Los Alamos Site Office (LASO) and Departmental expectations regarding analytical methodology and detail. The EPHA contains a wide spectrum of events for radiological and chemical release scenarios for the identified LANL facilities containing hazardous materials. The EPHA also contains descriptive emergency action level (EAL) statements that provide the quantitative relationships between postulated emergency events and their consequences as well as the event descriptions and indications of barrier challenge and failure. LANL has also maintained their conservative, site-specific screening threshold limits for all hazardous chemicals and has recently implemented a Web link for ease of access to the database for screening of hazardous chemicals. To address issues identified in the April 2002 inspection, LANL has revised the EPHA to address the significant reduction in hazards at the Radioactive Materials Research Operations Demonstration Facility (now known as Actinide Research and Technology Instructional Complex), and the determination of the LANL composite EPZ is now technically supported

by the facility-level EPZs documented in the EPHA. Additionally, LANL has recently developed a draft implementing procedure for preparing their EPHA. Although not yet in use, this procedure provides a site-specific reference that is reflective of the DOE *Emergency Management Guide*, provides a good basis for preparing the EPHA, ensures development of a technically based site EPZ and facility-specific EALs, and identifies contractor roles and responsibilities for EPHA review and approval.

Although the EPHA has some noteworthy attributes, technical discrepancies and exclusions of multiple hazardous material facilities at Technical Area (TA)-53 detract from the accuracy of the EPHA. For example, EPHA authors sometimes used incorrect Emergency Response Planning Guideline (ERPG)-2/ Temporary Emergency Exposure Limit (TEEL)-2 values when performing consequence analysis, as described below.

- Nitric acid was analyzed using an incorrect ERPG-2 value of 15 parts per million (ppm) when the correct value is 6 ppm. This error resulted in less conservative pre-identified protective action distances (e.g., 112 meters vs. 160 meters) and depending on site boundary distances from each affected facility, less conservative emergency classifications (e.g., Site Area Emergency vs. General Emergency).

- Nickel carbonyl was analyzed at TA-03-476 using an incorrect TEEL-2 value of 0.25 ppm, when the correct value is 0.05 ppm. This error resulted in less conservative protective action distances (e.g., 42 meters vs. 160 meters) and emergency classifications (e.g., Alert vs. Site Area Emergency).

- Vinyl fluoride was analyzed using an incorrect TEEL-2 value of 5 ppm, when the correct value is 500 ppm. This error resulted in over-conservative protective action distances (e.g., 605 meters vs. 37 meters) and emergency classifications (e.g., Site Area/General Emergency vs. Alert).

The EPHA also does not contain quantitative consequence analyses for the TA-53 facilities. Independent Oversight's review of the TA-53 safety analysis document and walkdowns of some of the TA-53 facilities identified several facilities that have quantities of hazardous materials that exceed screening thresholds and require further quantitative analyses. As discussed further below, a contributing factor to this condition is the absence of a rigorous documented screening process. Lastly, although LANL has included generic security event scenarios in the EPHA (because the actual security scenarios are classified), significant quantities of hazardous materials located in LANL facilities have not been considered in the EPHA as potential targets of a malevolent act. Consequently, facility-specific malevolent event EALs and their accompanying predetermined protective actions have not been developed for all of the hazardous materials that may be involved for this event initiator.

LANL has not developed a formal hazards survey process or a procedure for preparing a hazards survey that meets the requirements set forth in DOE Order 151.1B. LANL uses two documents to meet the intent of the DOE hazards survey requirements: a "hazards survey" for buildings that have below screening threshold quantities or no hazardous materials and a "building hazard run sheet" for the remaining buildings. Although the building hazard run sheets are an excellent tool for first responders, they do not meet many of the hazards survey requirements because they do not describe the potential health, safety, or environmental impacts of postulated events, summarize the planning and preparedness requirements that apply (e.g., indicate the need for further analyses of hazardous materials in an EPHA based on the results of the hazardous material screening process), or identify contractor roles and responsibilities for review and approval. Contributing to these weaknesses is the absence of a procedure to provide guidance in developing and maintaining hazards survey documents.

After hazardous materials are identified, the next step in the hazards survey and EPHA process is the screening of materials to determine whether the types and quantities of hazardous materials at each identified facility warrant further evaluation. However, the LANL hazardous materials review process does not include a record of screening decisions. A major contributor to this weakness is the absence of a procedure to provide expectations for performing and documenting screening activities. Although LANL has an excellent written set of screening threshold limits for hazardous chemicals, the overall process does not specify the acceptable sources of hazardous material data, how hazardous materials exceeding screening thresholds are to be further evaluated, and what decisions are to be recorded. The impact of this weakness can be seen at TA-53, where walkdowns revealed many hazardous materials that exceeded threshold limits but did not have a quantitative analysis

prepared or have a record of explanation for screening these materials out. The absence of a documented screening process was previously identified during the April 2002 Independent Oversight inspection.

The concerns with the screening process are carried forward into the building hazard run sheets, which are also used by responders to aid in responder safety. LANL has implemented a guidance document for preparing building hazard run sheets, but this document does not describe a screening process or provide a concise description of how to fill out the run sheet. Emergency Response Division (ERD) field personnel coordinate the annual revision/update of the building hazard run sheets with the responsible facility manager. However, LANL has nine such personnel deployed to ensure the accuracy of the building hazard run sheets for the approximately 3,000 buildings on the site. Each of these individuals is responsible for multiple (>150) buildings, and according to the ERD building run sheet coordinator, some of these personnel are funded part-time (20 to 30 percent) to perform this work. The accuracy of the building hazard run sheets is of concern because these documents serve as the basis for the hazardous material screening decisions, but as discussed below, walkdowns of four facilities determined that three building hazard run sheets were not accurate.

Finding #1: The LANL processes for developing hazards surveys and building hazard run sheets do not ensure that hazardous materials are appropriately evaluated in the EPHA, as required by DOE Order 151.1B, *Comprehensive Emergency Management System.*

In response to the April 2002 Independent Oversight inspection, LANL established new processes to ensure that ERD personnel are notified prior to significant changes in hazardous material inventories or operations involving hazardous materials; however, inconsistencies and developmental problems hinder the effective implementation of these processes. ERD is included on the authorization basis documentation mailing list and notified of any facility changes that result in an unreviewed safety question determination or change to authorization basis documents, but this process only considers facilities governed by authorization basis documents and does not consider most of LANL's chemical facilities. Facility personnel may also contact ERD of changes through a process called Project Review and Requirements Identification System whenever new construction and processes are being considered; however, this process does not take into account changes to current processes and facility managers are not procedurally required to contact ERD in such cases. ERD EPHA developers also have the capability to query the LANL chemical management database (CHEMLOG), which has been programmed to compare hazardous chemicals against the site-specific threshold screening values. However, mechanisms have not been established to ensure the accuracy of CHEMLOG, and discrepancies in CHEMLOG have been self-identified by the database manager. Furthermore, the database has not been accurate for over one year because hazardous material quantities are not always updated when empty containers are removed from the site. As indicated below, hazardous chemicals continue to be brought on site without ERD notification.

- Hazardous quantities of hydrochloric acid were identified on the run sheets for TA-55, but this material has not been screened or included in the EPHA for analysis.

- Hazardous quantities of tungsten hexafluoride were identified on the loading dock at TA-35-0213, but this material has not been identified on the run sheets, screened, or included in the EPHA for analysis.

- The building hazard run sheet for TA-03-0476 indicates 38 highly toxic/poisonous materials as the "worst players" in the hazardous materials section, but only 15 of these materials have been included in the EPHA for analysis.

- The building hazard run sheet for TA-53-015 indicates "numerous (25+) highly toxic materials" as the "worst players" in the hazardous materials section, but the identity and quantity of these materials are not listed on the run sheets, and they have not been screened out or included in the EPHA for analysis.

This issue was also identified as a finding during the April 2002 Independent Oversight inspection.

Finding #2: The LANL processes for acquiring and controlling hazardous materials do not ensure that the site EPHA appropriately reflects the impact of potential hazardous material releases on site workers and the public, as required by DOE Order 151.1B.

To summarize, the EPHA generally meets DOE's expectations regarding methodology and level of detail for the analyzed hazards. LANL has also developed a draft procedure for preparing the EPHA to help ensure that the EPHA is reflective of the DOE *Emergency Management Guide* and establishes an appropriate foundation for the LANL emergency management program. LANL has also maintained their conservative thresholds for screening hazardous materials. However, LANL has not developed a procedure for governing development of a formal hazards survey or completed a formal hazards survey that meets DOE requirements. Additionally, LANL has not documented the results of their screening process and has not implemented effective processes or tools for maintaining the EPHA by accurately tracking hazardous chemicals or developing rigorous processes by which facility managers communicate process and material changes to personnel responsible for EPHA maintenance. The impact of these significant, longstanding weaknesses in the key EPHA inputs, combined with discrepancies and exclusions in the EPHA that detract from the accuracy and completeness of the analyzed scenarios, is that emergency responders may not possess all of the procedures and tools necessary to effectively respond to an emergency event involving the release of hazardous materials.

C.2.2 Program Plans and Procedures

During the April 2002 inspection, the Independent Oversight team found that the emergency plan implementing procedures and operating guides provided generally adequate direction regarding generic roles and responsibilities and response functions. The building emergency planning program was well conceived and supported effective facility-level response activities. However, fundamental weaknesses in emergency plans, procedures, and response expectations, particularly in the areas of protective action identification and communication, event categorization/classification, and Emergency Operations Center (EOC) activation, significantly inhibited the capability for timely decision-making and response in an emergency. This 2006 inspection found that LANL has made improvements in some emergency management planning documents, specifically the LANL emergency management plan (EMP), the building emergency plans (BEPs), and the EALs. However, numerous weaknesses remain, primarily in the emergency plan implementing procedures and response guides.

The LANL EMP and LASO emergency plan collectively establish an adequate basis for the Laboratory's emergency management program, with the BEPs serving as an implementation mechanism at the facility level. The LASO emergency plan, which was developed since the 2002 Independent Oversight inspection, clearly identifies the responsibilities and functions for LASO emergency responders. The LANL EMP adequately describes the site's overall concept of emergency operations and has been updated to reflect the LASO response component described in the LASO emergency plan. Consequently, the roles and responsibilities regarding strategic management of an emergency event occurring at LANL and organizational functions are consistently described in both documents. The BEPs contain detailed, facility-specific information related to emergency planning and preparedness. Although BEP content varies somewhat by facility, the BEPs generally include such important details as muster areas and the assignment of responsibility for and the process of personnel accountability. The BEPs also include, as appendices, facility-level procedures that address local response to postulated building emergencies, response to events originating in adjacent facilities, and shutdown of equipment and operations. Additionally, BEPs are reviewed by a BEP coordinator, an individual from ERD who is tasked with ensuring that the BEPs, which are developed by facility personnel, are consistent with the sitewide emergency management program.

The EALs are well written to facilitate rapid and accurate decision-making by LANL emergency response organization (ERO) responders in the areas of event classification and protective action formulation for a wide spectrum of events. LANL EALs are consistent with the analyses and results presented in the EPHA and are well organized and easy to use, with columns that identify materials at risk, observable event indicators, and protective action areas. Additionally, LANL has developed a timely initial assessment tool, which is a supplementary source of event scenario information for use by ERO decision-makers and emergency technical support center staff in understanding the potential event consequences and EAL development bases.

Although the LANL EMP, LASO emergency plan, and BEPs are mostly satisfactory, Independent Oversight identified several weaknesses. For example, although the provisional EMP clearly describes the initial field response command and duties, it does not clearly indicate what responsibilities remain with the emergency management and response

(EM&R) duty officer after EOC activation and which responsibilities shift to the EOC. The LANL EMP and LASO emergency plan do not consistently or clearly describe the responsibilities of the LASO Emergency Director (ED) Representative, and although LASO has drafted a procedure and accompanying checklist that is consistent with the LASO emergency plan and adequately addresses the functions for this position, this checklist is inconsistent with the implementing procedure for the LANL ED position. Additionally, although BEPs generally contain the required elements, they have not been developed in accordance with a standardized approach, which has resulted in varying degrees of content, level of detail, and ease-of-use among the different facilities. Recently, LANL has recognized that specific, institutional guidance is necessary to establish a minimum set of standards for BEP format and content and to promote consistency. In response to this issue, LANL expects to initiate a project in 2007 to upgrade the BEPs.

More importantly, the emergency response procedures do not adequately identify responsibilities, requirements, and expectations for key, time-urgent emergency response decisions. There are numerous inconsistencies among the various emergency management program documents (i.e., the EMP, the EOC guide, emergency management plan implementing procedures, and the field response operating guidelines [FROG]) and, as observed during the performance tests conducted as part of this inspection, between the procedures and current practices. For example, the EMP and EOC guide indicate that the EM&R duty officer has sole responsibility for event categorization/classification; this is contradictory to the FROG, which assigns this duty to the ED, and the ED procedure, which requires that the ED "verify" that the event has been appropriately categorized/classified. Neither the EMP nor any other response procedure defines the terms "review," "verify," or "concur," which the EMP implementing procedures use to describe various ED responsibilities. Further, after the EOC is activated, the EMP directs that some roles and responsibilities shift to the EOC, but these roles and responsibilities are not reflected in the EOC guide or FROG. Also of concern is that some response procedures have been unofficially withdrawn, but not officially rescinded; consequently, these procedures (most notably the procedure addressing event categorization and classification) may still be used and could lead to potential emergency response confusion. The unofficially withdrawn implementing procedure for classifying emergency events clearly identifies that the ED is responsible for event categorization/classification, but as previously described, the EMP appears to leave this responsibility with the EM&R duty officer. In short, no single, active procedure clearly identifies, by event status (i.e., whether or not the EOC is activated), which decision-maker is responsible for event categorization and classification and site protective actions. During limited-scope performance tests, event categorization/classification was usually performed by an EM&R emergency manager not serving as the duty officer – a practice that is not supported by any of these documents.

Another area of weakness is the manpower-intensive offsite notification process, which lacks a ring-down phone capability to facilitate rapid and consistent communications with offsite entities. Instead, each offsite notification recipient is individually contacted by telephone. Furthermore, there is no broadcast fax capability; all offsite notifications are made through individual telephone calls. The form is faxed only to the DOE Headquarters watch office, and then only after the other required telephonic notifications have been completed. Consequently, as observed during the limited-scope performance tests, notification specialists are challenged to complete all of the required offsite notifications within the time requirements. Additionally, responsibility and the process for reviewing and approving the offsite notification form are unclear. For example, the FROG indicates that the EM&R duty officer is responsible for offsite notifications, but when the duty officer is at the event scene, he/she does not review or approve the offsite notification form. Response procedures and the EOC guide do not specifically mention reviewing or approving offsite notification forms, and do not assign this duty to anyone in the EOC. Furthermore, the EOC guide identifies two positions—ED and Radio Room Coordinator—each with the responsibility to "ensure" that notifications are made; neither is solely responsible for this task, which places completion of this task at risk in a chaotic, time-urgent environment. Additionally, the offsite notification form does not include an approval signature block or indicate any review expectations.

The offsite notification form has several other weaknesses as well:

- The form does not specifically include protective action recommendations, which is contrary to DOE expectations for the content of an initial offsite notification message.

- The form includes a section for protective actions, but the desired content is not specified on the form or in any response document.

- The response procedure that addresses EOC activation and operation identifies different notification recipients for Alerts/Site Area Emergencies and General Emergencies, but the offsite notification form identifies a uniform set of recipients.

- The offsite notification form has an area for indicating whether the incident commander (i.e., duty officer) or ED categorized and classified the event, but according to the EMP and EOC guide, this responsibility belongs solely to the incident commander.

- The offsite notification form identifies that tribal notifications should be made only if these entities are affected by the event (as determined by the incident commander, ED, Radio Room Coordinator, or an emergency manager). However, "affected by the event" is not formally defined, no memoranda of understanding exist to document this arrangement, and this provision is contrary to DOE Order 151.1B, which requires that local tribal authorities be notified for any Operational Emergency.

Lastly, LANL is not using a formal, clearly understood process for controlling the issuance and use of response procedures and forms. For example:

- The rescinded (or unofficially withdrawn) response procedure on event categorization and classification, which can be found in most position notebooks in use in the EOC, and the response procedure on EOC staffing are still referenced in the EMP and in other response procedures.

- Four different versions of the offsite notification form were found in the EOC, two with the same revision date.

- Several response procedures contain a note requiring the user to verify that they are working to the most current revision of the document, but no formal guidance exists describing how this task is to be accomplished.

Finding #3: LANL has not established a set of response procedures and supporting processes that ensures that ERO responders can accurately and rapidly categorize and classify emergency events, formulate protective actions, and notify all appropriate offsite agencies, as required by DOE Order 151.1B.

To summarize, the LANL EMP and LASO emergency plan together adequately describe the operational concepts around which the site's emergency management program is constructed, and the BEPs provide an acceptable implementation mechanism at the facility level. In addition, the EALs are well written and provide responders with an accurate, easy-to-use reference for event classification and protective action formulation. The timely initial assessment document also provides a good source of supplementary information for ERO decision-makers and support staff. Nonetheless, some weaknesses in defining roles and responsibilities exist in the emergencies plans, and a number of weaknesses were identified in the site's implementing guides and procedures. These documents exhibit a number of internal inconsistencies, and in many instances do not adequately address expectations for completing critical, time-sensitive tasks, such as classification and protective action formulation. Further, the process for approving and transmitting notifications is not well supported by procedures and forms, and is made more cumbersome by the lack of supporting equipment. Finally, weaknesses in the document control system introduce the potential to use outdated, incorrect documents during an emergency response.

C.3 Conclusions

LANL has resolved some of the issues in emergency planning identified during the 2002 inspection, although many weaknesses in this area persist. With few exceptions, LANL has established an appropriate EPHA analytical approach using a conservative set of screening thresholds, and the resulting EALs and the timely initial assessment document continue to provide effective tools for use by emergency responders. LANL's EMP describes an effective concept of emergency operations and is supported by a number of operating guides, implementing procedures, and checklists. Further, the Laboratory has made improvements in the BEPs and intends to initiate a program to standardize and upgrade

these facility response documents. Nevertheless, some significant weaknesses in emergency planning were identified during the inspection. Of principal importance is that the significant weaknesses in the processes used to identify, track, and screen hazardous materials for consideration in the EPHA substantially diminish the effectiveness of the EPHA in providing a foundation for the LANL emergency management program. The hazardous material screening process is not procedurally defined, and the Laboratory has not developed a formal hazards survey. Concerns with hazardous material inventory control were also identified during this inspection. In addition, several facilities were erroneously excluded from the EPHA, and malevolent act initiators have not been specifically addressed in the EPHA. These weaknesses collectively contribute to missing or erroneous analyses in the EPHA, and as a result, responders may not have all of the procedures and response tools necessary to effectively respond to a hazardous material event. Further, the implementing procedures and operating guides provide inadequate and inconsistent roles, responsibilities, and direction for key response functions, particularly regarding categorization and classification, protective action formulation, and notifications. As a result, there is reduced assurance that, following a significant site event, emergency responders can accurately classify the event, identify the most appropriate set of protective actions for site workers and the public, and effectively notify all required offsite agencies.

C.4 Ratings

A rating of SIGNIFICANT WEAKNESS is assigned to the area of hazards surveys and EPHA.

A rating of NEEDS IMPROVEMENT is assigned to the area of program plans and procedures.

C.5 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

Los Alamos Site Office

Consider implementing a mechanism for reviewing the EPHA and EPZ that ensures the timely involvement of the appropriate LASO disciplines (e.g., safety analysis experts and facility operations representatives).

Los Alamos National Laboratory

- Enhance the usefulness of the draft EMPIP-350, *Emergency Planning Hazard Assessment Process*, by providing additional specificity to the procedure. Specific actions to consider include:

  - Perform a detailed review of the hazards survey- and assessment-related sections of DOE's *Emergency Management Guide* (Guide 151.1-1) to identify provisions that should be incorporated into the EPHA development process (e.g., perform qualitative screening of accurate facility inventories and include results in the hazards survey/building hazard run sheet).

  - Provide instructions for reviewing the facility-level EPZs against the composite EPZ.

  - Provide instructions in the EPHA development procedure that require ERD staff to promptly notify facility managers of EPHA revisions that involve new classifiable emergencies and/or changes to protective action distances.

  - Revise security contingency EAL development criteria to ensure that all hazardous materials that may be involved as a result of a malevolent act have been considered in the formulation of protective action distances.

  - Establish institutional mechanisms to ensure that facility managers notify the EPHA developers of changes in facility hazardous material inventory or processes that may necessitate additional revisions to the hazards surveys/building hazard run sheets, and/or the EPHA.

- Enhance the quality of the facility hazards surveys/building hazard run sheets and, consequently, the site EPHA by documenting the hazardous material identification and screening process. Specific actions to consider include:

- Incorporate into the process all of the attributes required by DOE Order 151.1B.

- Require reference to hazardous material database inventories in the hazards survey/ building hazard run sheet documentation.

- Document all hazardous materials undergoing the screening process in the hazards surveys/ building hazard run sheets or the EPHA.

- Consider reviewing the hazard surveys/building hazard run sheets, EPHA, and safety analysis reports to ensure that they are consistent or that the reasons for any inconsistencies are properly evaluated and documented.

- To improve the accuracy of inventories reflected in the CHEMLOG database system, for use in EPHA development and as an additional resource during actual emergency responses, consider establishing mechanisms (for example, e-mail notification) to ensure that ERD EPHA developers are notified when chemicals are ordered in quantities that exceed specified thresholds.

- Consider including malevolent acts as potential hazardous material release initiators within the scope of emergency management. Evaluate significant quantities of hazardous materials located in a facility as a potential target of malevolent acts in accordance with applicable DOE security policies and protocols. Malevolent act event planning may require the addition of a classified appendix to the EPHA; however, EALs should contain only unclassified information to avoid usage and storage concerns.

- To convey management expectations and promote consistently effective responder performance, enhance the specificity of and remove inconsistencies among the LANL EMP, implementing procedures, position checklists, and operating guidelines. Specific actions to consider include:

  - Perform a crosswalk of operational concepts and roles and responsibilities contained in emergency planning and response documents to identify inconsistencies. Revise documents as necessary to reflect the desired operational concepts and implementing mechanisms.

  - Review procedures to ensure that all critical tasks are clearly assigned to a specific ERO position, and that where there is an expectation for shared task responsibility, terms such as "review" and "concur" are clearly defined.

  - Formalize the approval process for information transmitted to offsite authorities by establishing and documenting the approval authority and process in a response procedure and revising the notification form to specifically include a signature section.

  - Ensure that checklists contain a level of detail that is appropriate to the task difficulty and importance and that considers the additional stress entailed by decision-making in a time-urgent environment.

- Strengthen the procedure use and revision process to facilitate response in accordance with program expectations and to enhance the performance of ERO responders. Specific actions to consider include:

  - Review the recently-revised manuals and procedures for preparing policies, procedures, and related documents to ensure that these documents (or suitable substitutes) contain guidance on the handling of procedure revisions and the communication of revisions to responders.

  - Establish a routine review cycle for program documents to ensure that they are current.

  - Establish a controlled set of program documents that have unique identifiers to facilitate verification that the current version is being used. Ensure that all response forms, such as the offsite notification form, are included as an attachment or appendix to a controlled document.

  - Periodically audit all response notebooks in the EOC and in the possession of the EM&R duty officer to verify that response notebooks include only current copies of response procedures and forms.

- Develop formal guidance that provides requirements regarding the use of emergency management response procedures, guides, and checklists. Include expectations for the use of human error reduction practices (e.g., three-point communication and peer checking of critical steps). This would ensure a consistent application of both procedural requirements and human error reduction practices for critical procedure steps, such as classification and protective actions.

- As part of the procedure and response tool improvement process, consider requiring individuals with responsibility for procedure implementation to conduct procedure verification (for accuracy) and validation (for usability). Walk through and rigorously validate the procedures with users to determine whether there is an established method for implementing each step and how readily those steps can be implemented based on existing systems.

APPENDIX D
EMERGENCY PREPAREDNESS

D.1 Introduction

A coordinated program of training, drills, and exercises is necessary to ensure that emergency response personnel and organizations can effectively respond to emergencies impacting a specific facility or the site as a whole. This response includes the ability to make time-urgent decisions and take action to minimize the consequences of the emergency and to protect the health and safety of responders, workers, and the public. To be effective improvement tools, exercises should be used to validate all elements of an emergency management program over a multi-year period using realistic, simulated emergency events and conditions, and to provide emergency response organization (ERO) members an opportunity to practice their skills. An effective emergency public information (EPI) program provides the public, media, and U.S. Department of Energy (DOE) employees with accurate and timely information during an emergency event. In part, effectiveness is based on having in place a long-term, documented program to educate the public and the media about actions that may be required during an emergency response.

The Office of Independent Oversight team evaluated the training, drill, and exercise program used to support the Los Alamos National Laboratory (LANL) ERO at the institutional and facility levels. As part of the programmatic review of the training, drill, and exercise elements, the Independent Oversight team evaluated the plans and procedures that support these elements and reviewed training and proficiency records for key site emergency responders. Drill and exercise reports were also reviewed for indications that they are being used effectively to enhance responder proficiency and evaluate the level of the site's response preparedness. The team also evaluated EPI plans and applicable processes for an emergency at LANL.

D.2 Status and Results

D.2.1 Training, Drill, and Exercise Program

The April 2002 inspection determined that the institutional training and drill program was not sufficiently rigorous to provide the training and practice necessary to support effective responder performance. Formal, performance-based training and drills that test decision-making skills were not provided, and opportunities to demonstrate and maintain proficiency in responding to large-scale emergencies were limited. At the facility level, the training and drill programs effectively prepared emergency responders to perform their assigned duties. This 2006 inspection found that over the past two years the training and drill program has provided workshops and tabletop exercises focused on ensuring that ERO members can perform effectively in a restructured organization, and that the exercise program is improving in both scope and content. Nevertheless, some important weaknesses in the training, drill, and exercise program remain.

Training and Drills

Current Laboratory requirements for training (LIR 300-00-04.3, *Laboratory Training: Essential Requirements* and the LANL emergency management plan [EMP]) establish an acceptable set of objectives and requirements for training and qualification of emergency response personnel. The requirements address appropriate line manager responsibilities; expectations for developing initial and continuing training; performance requirements based on analysis of work tasks; and knowledge, skills, and abilities (for moderate or high hazard work). Draft policy and implementation documents (scheduled to be

effective in January 2007) currently include suitable requirements and guidance for developing and implementing training and qualification for emergency response activities. The EMP establishes primary goals for the program and for development of training in accordance with institutional requirements using a graded approach, and assigns responsibility for overall training and qualification to the Emergency Response Division. The EMP states that qualification is to be accomplished through a combination of training, field experience, and exercises (which are documented on the qualification card), and identified performance requirements must be satisfied for an individual to perform independently, although the EMP does allow performance under supervision during the six-month period following assignment to the position.

During this inspection, Independent Oversight examined the training and qualification for some of the key positions in the LANL ERO, including the Laboratory's emergency managers and the emergency directors. Training requirements for the Laboratory emergency managers are specified in the individual's employee development system training plan and also in an orientation and on-the-job training (OJT) checklist. Three of five current emergency managers, who have completed qualification since 2002, were trained and qualified primarily using an orientation and OJT checklist (which provides a generally acceptable qualifying process), and the remaining two emergency managers were "grandfathered" in the position. The orientation program and OJT checklist were developed in 2002 based on an analysis of the tasks that must be performed by the emergency managers, and have been updated and slightly revised each time they have been used. The process includes required reading, department and facility familiarization, and OJT. The OJT is supervised by an instructor and completed either through simulation/discussion or performance of specific tasks or functions, such as response to hazardous material and radiation emergencies, incident command, emergency operations center (EOC) operations, and notifications. The overall process progresses from trainee observation of qualified incumbents to performance under close supervision, and then to qualification and assignment to the activation roster. Although evaluations of trainee performance are conducted, the evaluations are performed by the OJT instructor as part of the training, rather than as a separate activity with standards for independent evaluation. In addition, in one instance, other emergency manager training requirements in an employee development system training plan have not been completed for an individual who is on the on-call roster.

In examining the training programs for other key ERO positions, particularly those positions in the EOC, Independent Oversight reviewed the training and drills that were conducted during the last two calendar years. In 2005, the Laboratory established interim training plans for most ERO positions at or above the section chief positions, such as operations or logistics, which were established to address the National Incident Management System (NIMS). The training plans required basic instruction in NIMS, the Los Alamos ERO, and ERO section activities. Training to support the interim training plans involved a series of training courses, workshops, and drills (evaluated tabletop exercises and functional exercises) that were designed principally to support the introduction of a new EOC organization based on the NIMS principles. The training courses were developed and conducted throughout 2005 and early 2006 and included a series of classes on NIMS design, as related to the newly organized Los Alamos ERO, and training for the individual EOC section chiefs. Section workshops, both individual and combined, were conducted to address section operations during a response and included appropriate training materials, such as slides and handouts. The workshops appropriately provided a training atmosphere in which section personnel could practice section activities, explore interfaces with other ERO sections, and identify improvements in the overall processes.

During 2006, LANL continued classroom training on the NIMS organization and conducted an effective series of functional and tabletop exercises to train ERO personnel and generate improvements to the program. Laboratory personnel conducted four tabletop exercises (three involved combined sections) and one functional exercise for the ERO. These "no fault" exercises were the principal training tool for ERO personnel, including those supporting the EPI program. Each of the tabletop and functional exercises was followed by a critique to identify both strengths and improvement opportunities and to develop lessons learned. Notably, after-action reports were prepared to summarize the exercise activities, and each report addresses issues and recommendations and contains a matrix that repeats the recommendations as action items, including responsible party and expected date of completion. Corrective actions are being addressed and have resulted in improvements to ERO performance, although the extent of the completed corrective actions is difficult to judge because actions are not entered into

an issues management or corrective action system to track the actions and their closure (a corrective action tracking system is being developed).

Since the last quarter of 2005, newly assigned Emergency Response Division training personnel began analyzing and designing a training and qualification program for the ERO that would provide an acceptable process for training and qualification. Team members analyzed ERO positions and prepared qualification standards for eight LANL ERO positions, including the emergency manager, emergency director, and section chief positions. Further, the team developed qualification cards for three of those positions, including emergency director and section chief. The qualification standards and cards provide a suitable level of analysis for each of the positions and appropriately require demonstration and maintenance of proficiency in the ERO position. Nevertheless, the qualification standards and cards are interim pending release of the new Laboratory standards on training and qualification, have not been completed for all appropriate positions, and have not been assigned to ERO personnel.

The ERO training and drill program has helped prepare LANL ERO personnel to respond to an emergency; however, a number of weaknesses in the training and qualification of ERO personnel, including EPI personnel (see further discussion in Section D.2.2), were identified. With the exception of the Laboratory emergency managers, the interim training plans (entered into the employee development system) for ERO members are not based on an analysis of the tasks necessary to perform the required duties, and several ERO members have been assigned to the EOC activation roster without fully completing their training plan. The interim training plan also does not include a process to evaluate individual ability to perform key tasks associated with the position (other than emergency managers) prior to being placed on the recall list. Further, the system of qualification standards and qualification cards is not complete and has not been implemented. A number of positions (for example, notification specialists, emergency technical support center staff, and EPI personnel) remain to be analyzed, and qualification standards and cards for those positions have not been developed. In addition, the qualification cards for those positions that have been approved have not been assigned or completed. Finally, the training analysis and design process has not identified or developed classroom training for critical tasks performed by key ERO positions, such as categorization and classification or use of emergency action levels.

Finding #4: The LANL training and qualification program does not ensure that ERO members are capable and proficient in fulfilling their assigned response functions prior to assignment to the activation roster, as required by DOE Order 151.1B and the LANL Emergency Management Plan.

Exercises

Several upper-tier Laboratory documents (although in transition) establish generally acceptable expectations and responsibilities for conducting exercises at the facilities and the site, but the documents do not specifically identify the hazardous material facilities that should conduct annual exercises. The Laboratory performance requirement on emergency management (LPR 403-00-00.0), which is intended to be incorporated in the new EMP, establishes the responsibility for line managers and supervisors to participate in emergency preparedness activities and to ensure the readiness of emergency response personnel assigned to them. It also contains a set of high-level expectations for the conduct of drills and exercises. The Laboratory implementing requirement on emergency management assigns line managers with responsibility for training in evacuation, sheltering, and accountability.

The EMP suitably assigns line managers the responsibility to periodically conduct and document exercises for those personnel who are required to take protective actions during an emergency. It also correctly establishes a requirement for the conduct of annual evacuation drills for those facilities that are required to have building emergency plans. The EMP is supplemented by a comprehensive exercise program plan (an institutional support document approved earlier this year) that establishes appropriate processes to design, develop, conduct, evaluate, and document exercises, with the goal of establishing a standard sitewide approach to exercises. The exercise program plan, along with the EMP, provides for a set of progressive exercises that build from simple orientation workshops through progressively more complex and difficult exercises culminating with full-scale exercises. The exercise plan stipulates further that formal exercises are to be evaluated, although it does not specify what constitutes a formal exercise. It also contains a list of those facilities conducting

"scenario-driven" evacuation exercises, but does not provide further details or expectations. Notably, neither the EMP nor the exercise program plan distinguish between base program facilities and hazardous material facilities and provide specific requirements for the conduct and follow-up of exercises at the hazardous material facilities.

As required by the EMP, facilities meeting the requirements for the building emergency plan program must have local emergency plans and conduct annual evacuation drills. In addition, a recently issued shelter-in-place standard adequately addresses the planning and execution of annual shelter-in-place drills. At most of these facilities, evacuation drills are scheduled and conducted in conjunction with maintenance testing of the fire alarm systems and coordinated with the Emergency Response Division. Completion of evacuation drills is appropriately documented by the facilities in a record/after-action report that contains a number of information items, such as location, date, and time of the drill; time to evacuate the building; and specific problems encountered. Completed drill records are provided to the Emergency Response Division, which tracks their completion as a performance indicator. A few hazardous material facilities, such as the plutonium facility (PF-4 at TA-55), utilize these evacuation drills as an opportunity to conduct full facility exercises; however, the majority of the facilities do not conduct full facility exercises, and the scope and content of the evacuation drills do not adequately demonstrate the facility's emergency response capability.

The comprehensive exercise program plan establishes both annual and five-year exercise plans for a comprehensive site exercise program at the Laboratory. This year's annual schedule included a full-scale bioscience exercise (first quarter), six tabletop exercises, one functional exercise, and the site full-scale exercise, all of which were appropriately executed. The five-year plan also provides for a series of progressive exercises. Past exercises have addressed a number of important functions, including: involvement of EPI and occupational medicine staff, the Los Alamos Medical Center, and various offsite authorities. Nevertheless, the completed exercises and the exercise plans did not include many of the hazardous material facilities at the Laboratory or a planned schedule of integrated facility/site exercises over a period of time. Laboratory staff have prepared an updated exercise program plan with more detailed schedules that will move further toward a comprehensive schedule and address facility exercises for next year.

Finding #5: LANL has not established and implemented a comprehensive program of evaluated exercises for the site and its hazardous material facilities, as required by DOE Order 151.1B.

Independent Oversight reviewed the annual site exercises that were performed in 2005 and 2006. These annual exercises were successfully planned, conducted, and evaluated, and the 2006 full participation exercise shows improvements from the previous exercise. The 2005 annual site exercise, which involved a transportation accident, was conducted by LANL and evaluated by the Los Alamos Site Office (LASO) with the assistance of the National Nuclear Security Administration (NNSA) Office of Emergency Management Implementation (NA-43). The 2006 annual site exercise (which involved two sequential events and included facility participation) was extensive and challenging, involved participation by a significant number of players, and was promptly and critically evaluated. The final 2006 exercise package is comprehensive and demonstrates an acceptable level of planning for the conduct and evaluation of the exercise. Homeland Security Exercise Evaluation Guidelines for Operations Based Exercises, which provide general information for the evaluator, including task information and data analysis questions and measures, were used for evaluating the exercise, and were modified to reference the applicable site procedure, where appropriate. Follow-up activities included player and evaluator critiques, comments from individuals, and evaluator inputs. The exercise is documented in an after-action report that included nineteen issues with accompanying recommendations for corrective actions. Notwithstanding the above, some noted weaknesses may detract from the effectiveness of the exercises in achieving the desired program improvements. Review of the documentation for the recently completed 2006 exercise revealed a number of weaknesses in the planning, conduct, and evaluation of the exercise. These include, for example, missing or insufficiently detailed items (such as plume plots for the anticipated release) in the exercise plan, a lack of controllers or evaluators for some key positions, missing or incomplete evaluations for some key positions or critical (key) tasks, no summary of the performance against the exercise objectives, and lack of prioritization of identified issues. Finally, although it is too soon for corrective actions from the 2006 exercise to have been included in a corrective action management system, a number of the issues

and recommendations that were identified in the 2005 exercise evaluation were not entered into a corrective action system for tracking and closure.

To summarize, in 2005 LANL reorganized the ERO, particularly in the EOC, and adopted the structure that addresses NIMS requirements. In 2006, a series of tabletop exercises provided training for both individual and combined ERO sections and gave ERO members a number of opportunities to practice in their assigned positions. In addition, the Emergency Response Division training support team analyzed a number of key ERO positions and prepared interim qualification standards and cards for those positions. LANL has successfully conducted and evaluated exercises in the last two years, and the most recent, challenging exercise was critically evaluated. The Laboratory has also established an initial, integrated plan for scheduling and conducting exercises at the Laboratory and its hazardous material facilities. Although the training and drill program has enhanced the performance of the re-designed ERO, the program does not adequately address training and demonstrated proficiency on critical tasks for a number of the key ERO positions. The design and implementation of the qualification program is incomplete, and the qualification process allows personnel to be assigned to the recall roster without completing an evaluation of their ability to perform their job duties. Finally, while the exercise program is improving, the program does not yet ensure that all hazardous material facilities conduct annual exercises or that all important emergency response functions are included in a comprehensive schedule.

D.2.2 Emergency Public Information

The April 2002 inspection determined that the draft LANL EPI plan adequately described most aspects of the process for providing emergency information to the public, and effective mechanisms for educating the public were either in place or planned. However, there were no implementing procedures for joint information center (JIC) activation and operation, and uncertainties existed in the timeliness of and approval process for news releases. Furthermore, LASO involvement in this program had not been sufficient to ensure that DOE public information expectations had been established and were effectively fulfilled. This 2006 inspection found that LANL has made significant improvements in their EPI program, and that many aspects of the EPI plan are well conceived and comprehensive. However, weaknesses were noted in the process for reviewing and approving press releases and training the EPI cadre.

With few exceptions, the EPI plan and supporting position checklists are comprehensive and effectively document the processes and mechanisms for providing site workers, the news media, and the public with accurate and timely information. The EPI plan appropriately calls for developing and releasing the initial news release within one hour of event classification and includes an approval flowchart, language for various emergency venues, and a news release template. The EPI plan also includes direction, most roles and responsibilities, rosters, equipment, and nearly all checklists for activating and operating the JIC. Due to limited resources within the LASO public affairs office, the LASO public information officer (PIO) has designated the LANL public affairs office to provide overall direction and control of the JIC. Current memoranda of understanding are in place to establish the JIC at the University of New Mexico at Los Alamos with a secondary location at the LANL training center at White Rock. While these facilities are capable of accommodating a JIC, they are not always available for LANL use. Therefore, a more suitable facility is being negotiated by LASO and LANL with Los Alamos County. The EPI plan, along with the LANL EMP, also lay out the fundamentals for an aggressive public education program that would include the publication and distribution of emergency preparedness education materials to the public and the media.

The EPI plan does not, however, adequately address LASO's responsibility for coordinating EPI activities, approving news releases and public statements, and coordinating public information with DOE Headquarters. For example, the response checklist for the LASO emergency directorate representative correctly tasks this individual with approving all releases of emergency information to the public. The EPI plan states that both the LANL emergency director and the senior LASO official must approve news releases and other emergency information. However, the EPI plan and the LANL response procedures for the emergency director and PIO positions indicate that if the LASO representative is absent from the EOC, the news release may be issued on the authority of the emergency director. Similarly, the LASO emergency plan and the EPI plan require that the LASO PIO coordinate public information activities directly with DOE Headquarters, but the EPI plan also indicates that, in the absence of a LASO representative in the EOC, the emergency director will notify NNSA Headquarters

public affairs. LASO staff indicated that delegation of this responsibility is necessary because there are several scenarios when a DOE representative may not be available in the EOC (e.g., long travel time by LASO PIO to the site, potential EOC access difficulty). Nonetheless, such delegation is inconsistent with DOE requirements that the cognizant field element (in this case, LASO) is responsible for news releases and other emergency-event-related public statements.

Finding #6: LASO has not established the necessary mechanisms to ensure successful execution of its responsibilities for approving emergency news releases and coordinating EPI-related activities with DOE Headquarters, as required by DOE Order 151.1B.

Several other aspects of the EPI elements are not clearly defined or have not been implemented. For example, the EPI plan and the LANL EMP contain confusing statements regarding employee notification, by the EPI cadre, of protective actions. Both the EPI plan and LANL EMP call for the LANL public affairs organization to be responsible for releasing emergency information and protective actions, such as evacuation routes and sheltering recommendations, for employees. However, this statement is contrary to the need to disseminate such information before public affairs staff can typically gather in the EOC, is potentially inconsistent with responsibilities assigned to the emergency management and response duty officer and emergency manager, and could not be effectively supported by many of the referenced employee notification methods (e-mails, news bulletins, and approved news releases). Additionally, the EPI plan states that the community alert network is used to communicate protective actions to offsite entities. This is inconsistent with Los Alamos County's sole prerogative regarding ordering protective actions for their constituents. Furthermore, there is considerable confusion within both LANL and Los Alamos County regarding ownership and maintenance of the community alert network system and whether this is suitable for time-urgent notifications. Other examples of weaknesses in defining or implementing various aspects of the EPI element include:

- Although the objectives of the public education program are well defined, neither the EPI plan nor the LANL EMP clearly identifies the materials to achieve the objectives or a complete set of responsibilities for the program. LASO personnel believe that the program should be a joint effort between LANL and LASO; however, there is no indication of such integration.

- The EPI plan and supporting checklists do not document LASO's designation of JIC operation and control solely to LANL or provide a method to obtain entry to this externally-owned facility.

- Despite provisions in the EPI plan for a JIC DOE spokesperson and associated LASO support staff, the plan lacks detail regarding how LASO and LANL will coordinate information within the JIC to ensure that the site speaks with one voice but includes the LASO perspective.

- The EPI plan and checklists lack detailed criteria regarding the transition from the LANL media center to the JIC, for determining when the JIC can be declared operational, and for effective turnover to the JIC.

- Position checklists included in the EPI plan are not the same position checklists included in the PIO implementing procedures, and checklists are missing for several position titles used in the EPI plan (i.e., Team Leader, Supervisory Information Officer, and Leader).

- Various LANL-conducted EOC and EPI tabletops identified that the EPI plan needs to be updated to reflect current JIC processes and, because routine checkups to ensure operational ability are not performed, such equipment as fax and copy machines, telephones, and computers do not always function.

Lastly, contrary to the requirements of the EPI plan, LASO and LANL have not developed a formal training program for the LASO PIO, the LANL Communications and Government Affairs organization, and Community Program Office emergency response staff. LANL has not developed qualification cards and role-specific training modules for the EPI cadre; instead, recent EOC and EPI functional and tabletop "exercises" have served as the sole training tool for the cadre. These tabletop exercises, while exposing the EPI cadre to some emergency expectations and role playing, do not provide sufficient in-depth exposure regarding time-urgent role expectations, ensuing responsibilities, or the inevitable coordination interface

issues the cadre will need to deal with during an emergency. Furthermore, two senior individuals have recently been transferred and are no longer available for EPI planning; and training for the new lead LANL PIO has only included serving as an observer during the functional and tabletop exercises and participating during the limited-scope performance tests. The availability of qualified LASO PIO staff is also a concern. The LASO emergency plan requires that two LASO PIOs be pre-selected to serve as PIOs and that both LASO PIOs are to report to the EOC following EOC activation. However, only one LASO PIO individual has participated in any EPI training and is considered qualified to fill that position.

Finding #7: LASO and LANL have not established an EPI training program that ensures that the EPI cadre can develop and disseminate timely and accurate emergency public information to the media and public, as required by the LANL EPI plan and by DOE Order 151.1B.

To summarize, LASO and LANL have implemented significant improvements in the EPI area, including an integrated, mostly comprehensive EPI plan, and supporting procedures and checklists. However, although many aspects of the EPI plan are well conceived and comprehensive, two fundamental programmatic weaknesses exist: LASO delegation of definitive responsibility to LANL for review, dissemination, and subsequent coordination with Headquarters of press releases; and lack of a formal training program for the EPI cadre. Consequently, while the plan has addressed most required fundamentals, assurance that LASO and LANL will be able to provide the public and the media with integrated accurate and timely information during a significant event is diminished. Additionally, some details in the EPI plan are not well defined, and a few implementing procedures do not fully implement the plan. Finally, although the public education program is well defined, lack of assigned responsibility has led to delay in implementation.

D.3 Conclusions

Since the last Independent Oversight inspection in 2002, LASO and LANL have made a number of changes intended to improve their emergency preparedness. LASO and LANL implemented significant improvements in their EPI program, including development of an integrated, mostly comprehensive EPI plan. In 2005, LANL reorganized the ERO, particularly in the EOC, to conform to NIMS requirements, and commenced a series of classroom training sessions, workshops, and tabletop exercises to facilitate its implementation. The tabletop exercises addressed both individual and combined ERO sections, including EOC and EPI sections, and provided valuable training and lessons learned. In addition, LANL has improved its exercise program over the last two years by establishing a more rigorous, integrated plan for scheduling and conducting exercises at the hazardous material facilities, and conducting and critically evaluating a challenging annual site exercise. Nevertheless, a number of weaknesses in emergency preparedness activities were identified. Analysis and design of the training and qualification program for the ERO, which began in fall 2005, is incomplete. The program does not adequately address training on critical tasks for a number of the key ERO positions (including EPI personnel), and the qualification process allows personnel to be assigned to the activation roster without confirming their ability to perform their job duties. Although the exercise program has improved recently, a comprehensive exercise schedule involving all hazardous material facilities and important response functions remains to be implemented. Further, the EPI plan does not definitively implement LASO responsibilities for review and approval of public information prior to release and subsequent coordination with Headquarters public information office staff. Although the overall level of preparedness is acceptable, these weaknesses should be corrected in order to maintain and improve the ability of the ERO to respond to an emergency.

D.4 Ratings

A rating of NEEDS IMPROVEMENT is assigned to the area of training, drills, and exercises.

A rating of NEEDS IMPROVEMENT is assigned to the area of EPI.

D.5 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as

appropriate, in accordance with site-specific emergency management program objectives and priorities.

Los Alamos Site Office

- Strengthen the mechanism to recall the LASO PIO to the EOC. Specific actions to consider include:
  - Review the appropriate LANL and LASO checklists to ensure that they contain an action to recall the LASO PIO when the EOC is activated.
  - Identify the responsible position that recalls the LASO PIO, and describe the implementing mechanisms in the EPI plan.
- Improve public awareness of LASO/LANL emergency management concepts and practices by developing and implementing an integrated public education program, as described in the EPI plan. Consider the following actions:
  - Identify the individual(s) responsible for implementing the program.
  - Coordinate the design and implementation process with LANL and Los Alamos County.
  - Develop a path forward for identifying, developing, and disseminating public education materials to the public and media.
  - Establish a schedule with milestones and due dates for program implementation.

Los Alamos Site Office and Los Alamos National Laboratory

- Develop clear and concise methodologies for all regulatory and best practice EPI roles, responsibilities, and ensuing activities for varying emergency conditions. Once determined, update the EPI plan, LASO EMP, LANL EMP, and position checklists accordingly. Specific actions to consider include:
  - Describe in the EPI plan the approval process of all emergency information when a LASO representative and/or PIO is not in the EOC. Consider coordinating information via phone, fax, or alternate means of communication with the NNSA Service Center and/or using the Service Center to augment the LASO PIO.
  - Describe in the EPI plan the coordination of approved information when the on-scene PIO is releasing information to the media at the scene while the EOC is developing approved news releases in the EOC.
  - Develop a LANL initial news release, pre-approved by LASO, to enable rapid dissemination of initial information.
  - Describe in the EPI plan and supporting checklists the initial and ongoing coordination of public information between LASO and DOE/NNSA Headquarters.
  - Describe in the EPI plan the responsibility for the operation and control of the JIC.
  - Describe JIC manager responsibilities in the EPI plan implementing procedures and checklists; specifically include responsibilities for identifying rumors and misinformation, interfacing with the EOC cadre, and correcting news releases. Consider adding another JIC position, such as JIC Director, to support execution of JIC manager responsibilities.
  - Provide criteria in the EPI plan and implementing procedures that detail the transition of operations from the media center to the JIC, including declaration of JIC operability and transfer of responsibilities between the two facilities.
  - Describe in a procedure the integration and coordination of information at the JIC among LASO, LANL, and Los Alamos County representatives.
  - Provide details in procedures regarding the physical activation of the JIC location(s) (for example, University of New Mexico). Include such key elements as around-the-clock contact points and methods to gain entry to the facility, and mechanisms to activate the LASO subcontractor responsible for JIC equipment and setup.

- Clarify in procedures the role of the EPI cadre for providing employee notifications, including expectations for timeliness and content.

Los Alamos National Laboratory

- Consider enhancing the ERO (including EPI cadre) training and qualification program by developing an internal procedure that clearly addresses the process for determining an individual's readiness for placement on the ERO roster, including:
  - A requirement that all EOC responders demonstrate proficiency through evaluated participation in a drill or exercise prior to being added to the ERO roster.
  - A description of the types of proficiency demonstrations that can be used to satisfy this requirement and requirements regarding the documentation and retention of the proficiency evaluations.
  - Requirements regarding removal of an individual from the ERO roster when annual proficiency requirements are not satisfied.
- Consider developing and implementing a formal project plan to govern the analysis and design of the ERO (including EPI cadre) training and qualification program. Specific elements to consider include:
  - Use other sites with multiple facilities and equivalent complexity to benchmark the resources needed to develop and maintain the necessary training materials and deliver the training.
  - Prioritize ERO positions requiring analysis and development of qualification standards and cards.
  - Ensure that the analysis and design teams include an appropriate mix of training and subject matter experts.
  - Schedule early development of classroom training materials for those tasks that are most likely to require this training setting, such as categorization and classification and use of the emergency action levels.
  - Prepare a resource-loaded schedule that addresses specific completion milestones for near- and mid-term activities.
  - Include a process for roll-out and implementation of the new qualification standards and cards as part of the project plan.
- Consider developing a process and procedure that describes how the non-drill/exercise component of annual refresher training is developed, delivered, and tracked.
- Strengthen the processes and procedures that define the drill and exercise program. Specific actions to consider include:
  - Ensure that the five-year drill and exercise plan includes all facilities required to have an emergency planning hazards assessment.
  - Complete the drill and exercise planning process to ensure that all program elements are validated over a five-year period.
  - Verify that the scope and content of the facility and site exercise programs demonstrate the ability of the facility and site to respond effectively to the full range of expected emergency events.
- Clarify drill/exercise program requirements through a procedure or institutional support document. Specific actions to consider include the following:
  - Clarify "formal" regarding facilities that require formal, annual facility-level exercises.
  - Provide specific exercise evaluation criteria tailored to the specific procedures, venue, and exercise objectives rather than the commonly used criteria of "in accordance with procedure."
  - Require an evaluation of observed performance that links exercise core objectives to the evaluation of the exercise mission and the overall exercise rating.

- Require identification and follow-up of lessons learned and corrective actions identified through the drill and exercise program.

- Require a review of facility and drill after-action reports by Emergency Response Division personnel to identify sitewide, crosscutting issues.

- Enhance the design and usefulness of sitewide exercises. Specific actions to consider include:

  - Expand the diversity in the involvement of facility hazards and response personnel by including different facilities within each of the exercises that comprise an annual full participation exercise cycle.

  - To the maximum extent practicable, ensure that participation by key decision-makers, especially the emergency director, is rotated during the full participation exercise cycle.

- To strengthen interfaces with the public, consider the following specific actions:

  - Discuss the offsite protective action communication process with the Los Alamos County emergency manager and revise the EPI plan to accurately reflect the desired process.

  - Coordinate with LASO a path forward to implement a process for identifying, developing, and disseminating public education materials to the public and the media.

- To ensure availability and reliability of JIC equipment, consider enumerating equipment needs, identifying equipment availability and locations, and developing an equipment maintenance program.

APPENDIX E
EMERGENCY RESPONSE

E.1 Introduction

The ultimate objective of emergency planning and preparedness is to prepare emergency responders so that they can apply their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public. Critical elements of the initial response include formulating protective actions, categorizing and classifying the emergency, and notifying onsite personnel and offsite authorities. Concurrent response actions include reentry and rescue, provision of medical care, and ongoing assessment of event consequences using additional data and/or field monitoring results.

The information provided in this section is based on observations from two types of performance tests; two sets of emergency management limited-scope performance tests (LSPTs) and a combined safeguards/security and emergency management force-on-force composite performance test (CPT) evaluated by the Office of Independent Oversight. The first set of LSPTs involved a combined emergency operations center (EOC) and field incident command team responding to a daytime postulated event. The EOC teams consisted of a Los Alamos National Laboratory (LANL) emergency director (ED); a Los Alamos Site Office (LASO) emergency directorate representative and his assistant; and selected EOC support staff, including public information officers (PIOs) and personnel in the emergency technical support center (ETSC) who performed the consequence assessment function. The second set of LSPTs involved the same staffing, except the field response team was simulated and the LASO emergency directorate representatives did not participate. The LANL incident command decision-making team participating in the LSPTs consisted of the emergency management and response (EM&R) group duty officer, who assumed the role of the incident commander (IC), and selected support staff. The emergency management component of the CPT, which was a nighttime postulated event, involved the EM&R duty officer and support personnel recalled by the duty officer to the incident command post (ICP) and to the EOC. A facility operations director, who is responsible for the affected facility's response and typically becomes a part of the incident command staff to serve as a resource for facility-specific information, participated during the CPT and was represented by a trusted agent during the LSPTs.

Two operational emergency scenarios were developed for the LSPTs: a facility operational event resulting in release of a hazardous radiological material and personnel exposures; and a facility operational event involving release of a hazardous chemical (chlorine trifluoride) and injured personnel, coincident with a security event involving the potential release of a second hazardous chemical (hydrogen sulfide) after discovery of a nearby suspicious package. The LSPT scenarios, which were developed by Independent Oversight in conjunction with LANL trusted agents, were presented to the participants by the LANL trusted agents to ensure scenario validity and delivery of accurate event cues. The trusted agents also played the roles of several positions that were not otherwise staffed.

The scenario for the force-on-force CPT involved armed adversaries whose primary objective was the theft or sabotage of special nuclear material from a LANL facility. Specific CPT objectives that the Independent Oversight team evaluated included those related to the roles of LANL EM&R, protective force, and Los Alamos County emergency responders in a unified command structure and focused on the performance of the emergency management functions that would be needed in an emergency involving the potential for release of a hazardous material and personnel injuries. Participating organizations who were evaluated from an emergency management perspective included the LANL EOC, LANL Emergency Response Division, LANL Security Division, Los Alamos County Fire Department, LASO, Protection Technology Los Alamos (PTLA), and affected facility operations center personnel. Observations related to accomplishment of the test's emergency management objectives are discussed in Section E.2.3 below; observations regarding the performance of site security forces are discussed in Volume I of this report.

E.2 Status and Results

According to the LANL field response operating guidelines, in the event of an emergency at LANL, the

first arriving responder at the scene assumes the role of IC until such time that the nature of the event is known and other responders arrive. The LSPT scenarios were designed for the EM&R duty officer to assume the IC role. The IC is responsible for command and control at the event scene and for making key initial decisions regarding the safety of emergency responders, event categorization and classification, identifying areas to be placed under protective actions, and activation of the EOC. After the EOC is operational, the LANL ED assumes responsibility for the overall response, including subsequent classifications and protective action decisions. Another key ED responsibility, shared with the LASO emergency directorate representative, is to review and approve emergency event press releases. Plume modelers and other personnel in the ETSC support the IC and the ED by identifying areas that could be affected by a hazardous material release and recommending or concurring with event classifications and protective actions. A team of communication specialists, located in an EOC communication room, serves as a communications link between the ICP and the EOC cadre and executes offsite notifications. For daytime events, the EM&R group response is by personnel on site. For nighttime events, the EM&R group response is from off site, led by a duty officer who recalls additional responders using resident telephone/cell phone numbers. For all General Emergency responses, the Los Alamos County emergency manager, who has the authority to execute LANL-formulated protective action recommendations, as well as other representatives from Los Alamos County, relocate to the LANL EOC as part of the EOC cadre.

During the April 2002 inspection, the individuals evaluated during the LSPTs demonstrated widely-varying levels of performance. Most of the EDs and facility operations representatives performed well. However, most LANL ICs exhibited significant performance deficiencies in virtually all critical areas, and Office of Los Alamos Site Operations duty officers were unprepared for their role in monitoring the performance of contractor response personnel. In the consequence assessment area, the supporting tools were useful, but consequence assessment teams were not trained to consistently recognize errors in initial decision-making or refine dispersion calculations. This 2006 inspection identified some performance strengths, particularly those related to IC performance in the field and in LANL's demonstrated ability to quickly staff the EOC, even after normal working hours. However, during the performance tests, decision-makers deviated from the roles and responsibilities described in LANL response procedures for classifying events and formulating protective actions and did not use available emergency action levels (EALs) in performing these functions. Furthermore, ETSC staff did not effectively use site-specific emergency planning documents and tools to evaluate event consequences. Several of these performance observations were similar to those from the 2002 Independent Oversight inspection.

E.2.1 LANL Incident Commander Team Decision-Making

EM&R ICs effectively demonstrated their ability to implement the incident command system and activate the EOC. During all performance tests, the EM&R duty officers took prompt actions to gather such important information as the event location, weather conditions, and involvement of hazardous material. This information was appropriately used for determining safe locations for the ICP, identifying needed support organizations, determining safe routes for responders traveling to the ICP, and deciding whether the EOC should be activated. After arriving at the ICP, the ICs led the field response, making effective use of such support organizations as the Hazardous Material Group, Los Alamos County Fire Department, the LANL protective force, the hazardous device team, and radiological control technicians, as appropriate for the scenario, and provided event information to the EOC communication room. The ICs effectively used preformatted forms to record such significant event information as injuries, event classification, and protective actions and to track the status of resources, and the ICs transmitted this information to the EOC communication room using repeat-back style communication protocols to minimize communication errors.

ICs also demonstrated appropriate sensitivity to the protection of field responders. ICs established ICPs upwind of event scenes and requested two-hour forecasts to ensure that the ICP would not have to be abruptly relocated. For ICPs located near a hazardous material release, the area was monitored to ensure that the atmosphere was safe. During the CPT, the IC appropriately located the ICP far from the affected facility until the area was secured. During all performance tests, the ICs routed and staged additional response units in a safe manner and established roadblocks at appropriate locations to ensure that only responder vehicles were allowed into the affected area. Additionally, the ICs demonstrated

concern for employee safety by consistently inquiring about personnel accountability status, planning rescue operations for injured personnel, seeking appropriate medical assistance for exposed personnel, and, during the CPT, by selecting a safe medical triage area and placing local hospitals on standby because of the potential for mass casualties.

However, IC performance was not consistently effective or in accordance with documented response expectations. Contrary to the approach outlined in the field response operating guidelines, ICs did not typically classify events and formulate protective actions. Instead, these decisions were usually made from the EOC communications room by another EM&R emergency manager, all of whom are trained as duty officers, and in several instances, involved changing a decision originally made by the IC but without consulting the IC. For example:

- Following a postulated release of chlorine trifluoride, the duty officer who assumed the IC role did not classify the event; instead, an emergency manager declared a Site Area Emergency initially and then later upgraded it to a General Emergency.

- After the potential for a release of hydrogen sulfide was identified during one LSPT, the IC did not classify or formulate protective actions; instead, these decisions were made by an emergency manager.

- During the CPT, the IC directed protective actions for a 112-meter downwind distance using the facility nitric acid release EAL. Later, an emergency manager increased the protective-action distance to 800 meters downwind using the U.S. Department of Transportation *Emergency Response Guidebook* (ERG) without discussing the basis or impact with the IC.

Many of the classification decisions and protective actions had no technical basis and were not accurate because personnel involved in making these decisions did not effectively use available EALs, did not make full use of information available from the facility operations representative or emergency planning hazards assessment (EPHA), and, in the case of a suspicious package, did not have a source of information to readily determine a safe distance. For example:

- During the tritium release event, the IC did not use EAL event indicators. Instead, the IC inappropriately used scenario data from the timely initial assessment document, which resulted in a General Emergency declaration for Alert conditions. Contributing to this error was the IC not using knowledgeable facility personnel to determine how much tritium had been available for release.

- During the chlorine trifluoride release event, the duty officer and an emergency manager appropriately reviewed the ERG after finding no applicable EAL. While the duty officer was en route to the scene, the emergency manager declared a Site Area Emergency, based on a 100-meter isolation zone stipulated in the applicable guide. After realizing that the chemical released was an inhalation toxin and that a different section of the ERG should have been used, the emergency manager incorrectly elected to use the large spill table even though consultation with knowledgeable facility personnel would have revealed small spill quantities. This error resulted in a protective action area that extended into the public domain, thus requiring an unnecessary classification upgrade to a General Emergency.

- During the reentry phase of the chlorine trifluoride release event, the IC had no bomb blast chart to determine safe standoff distances upon discovery of a suspicious package. Based on information presented during a training class, the IC indicated that increasing the standoff distance from 300 feet to approximately 500 feet from the package would be appropriate. However, bomb chart safe standoff distances widely used across the Department of Energy (DOE) complex stipulate 850 feet for a 5-pound bomb and 1,850 feet for a 50-pound bomb. Given that responders considered the suspicious package to be a 12-pound bomb, the ICP relocation would not have protected incident command personnel. Furthermore, a flammable storage shed was nearby and was not considered when establishing the standoff distance.

To summarize, ICs demonstrated the ability during performance tests to effectively lead incident command staff, activate the EOC, select safe ICP and staging locations, and in most instances, keep responders safe.

However, event classification and protective action decision-making conducted by duty officers (acting as ICs) and emergency managers was not in accordance with published response expectations, decision-makers did not make effective use of EALs and other available facility information resources to accurately classify events and formulate the necessary protective actions, and duty officers were not equipped with safe bomb stand-off distance information.

E.2.2 EOC Team Decision-Making

Following event notification by facility personnel or by a central alarm station operator, the duty officer musters all available emergency managers in the communication room to discuss known event information, and then decides whether to relocate to the field and/or to activate the EOC. During all of the LSPTs, LANL demonstrated the effectiveness of this approach (and the benefits of housing the emergency managers in close proximity to the EOC communication systems) in facilitating rapid event assessment and simultaneous activation of initial emergency response resources. During the performance tests, a pager system was effectively used to recall essential EM&R personnel, some of whom then initiated manual telephone calls to recall other EOC cadre members, and LANL consistently established an operational EOC within an hour of EOC activation.

LANL EDs demonstrated familiarity with their assigned responsibilities and most EOC operations, as described in the EOC guide, including the development and review of emergency press releases. With support from an EOC coordinator, the EDs verified that minimum staffing requirements were met, formally declared the EOC operational, kept log records of significant information, orchestrated periodic briefings, and effectively worked with other members of the emergency directorate. The emergency directorate held frequent discussions and demonstrated established protocols for the timely review and approval of news releases. Additionally, a LASO emergency directorate representative periodically telephoned DOE Headquarters to provide event information and to advise them to expect a DOE situation report. LANL, county, and LASO PIOs in the EOC worked as an effective team, and they were well versed in activation requirements and mechanisms for the Joint Information Center (JIC). Additionally, PIOs were aware of their responsibilities for developing press releases and informing site workers of the emergency event. Press releases were usually timely, except for one that required nearly an hour and a half to develop and obtain approval. However, general event information to site workers was unnecessarily delayed because this phase of the information release process occurs after the initial press release is approved.

As was observed for the ICs, the LANL EDs did not always execute the response actions that are described in response procedures and guides. For example, the EDs did not demonstrate formal assumption of command and control responsibility, such as an announcement and log entry; did not follow LANL criteria when terminating classified events; and did not seek approval from the ICs for emergency event terminations. Additionally, the techniques that were used to perform some ED actions did not promote accurate decision-making. For example, the EDs did not conduct direct discussions with the ICs to gather information relevant to the event; instead, EDs relied on third- and fourth-party information collected by other EOC staff members. This contributed to some of the communication weaknesses described later in this section. Furthermore, the EDs used their judgment and simple concurrence of other support members, such as the ETSC coordinator, to confirm the appropriateness of event classifications and protective action decisions rather than using EALs to execute this responsibility. During one LSPT, no discussions occurred among the emergency directorate on why an IC declared a General Emergency when there was no release in progress (or expected) and no associated protective action recommendations for the public.

During the performance tests, offsite notifications were completed in a timely manner; however, not all of the tribal authorities were notified when required, and many errors and omissions occurred while providing information to notified authorities. In several instances, notifications were executed by two notification specialists by reading from two separate offsite notification forms that contained somewhat different information. Additionally, the approval process for ensuring that the forms were complete and accurate was not applied rigorously or consistently. Important information that was not provided in some of the notifications included protective action recommendations for the events classified as General Emergencies and whether the LANL EOC was operational. During the CPT, notifications were not immediately made from the EOC to the Federal Bureau of Investigation, and the procedures for the security duty officer and emergency responders do not state who is responsible for this notification. Furthermore, DOE Headquarters was not informed of the declaration of

the Security Operational Emergency and the upgrade to a LANL Security Condition 1 status. LANL self-identified the problematic notification process during the site's recent full participation exercise and a corrective action plan is pending.

LANL has a large array of such references as the EPHA, EALs, the timely initial assessment document, and building hazard run sheets to serve as the basis for quantifying hazardous material releases and such dispersion modeling programs as Area Locations of Hazardous Atmospheres (ALOHA), EpiCode, Hotspot, Meteorological Information and Dispersion Assessment System (MIDAS), and National Atmospheric Release Advisory Capability (NARAC) for predicting potentially impacted areas following a hazardous material release. However, during LSPTs, the ETSC staff did not make use of these resources and did not demonstrate proficiency in developing plume plots. During the early stages of LSPT scenarios, when little was known of actual hazardous material release quantities, the ETSC staff did not make use of EALs to serve as a basis for concurring with event classification and protective action decisions; instead they used the timely initial assessment document for the tritium LSPT and a plume plot for the hydrogen sulfide (the chlorine trifluoride has not been analyzed in the EPHA and has no associated EAL or timely initial assessment document reference). When selecting a scenario from the timely initial assessment document, the ETSC did not first establish the quantity of tritium involved, which was information available from the facility operations representative. The ETSC also did not review the EPHA to determine the maximum amount of tritium in the leaking cylinder to serve as the basis of an analysis. Instead, the ETSC used an excessive quantity (250 pounds vs. 2 grams involved in the scenario) that resulted from a communication error discussed later in this section. Likewise, the ETSC staff also did not use the facility operations representative to ascertain the amount of chlorine trifluoride involved in the release, and instead used an overly conservative estimate (150 pounds vs. 100 grams involved in the scenario). Other examples of ETSC performance weaknesses include:

- The MIDAS program was inappropriately used for determining a safe blast distance.

- During the CPT, the liquid nitric acid release prediction was modeled using a complete airborne dispersion assumption, as if it was a gas, rather than treating the event as a large liquid spill.

- Difficulties were encountered in converting known material-at-risk units to units usable in a radiological dispersion modeling program.

- A NARAC request was submitted with an incorrect release point.

- Briefings to the EOC cadre were sometimes based on Emergency Response Planning Guideline (ERPG)-1 distances rather than the more appropriate ERPG-2 distances. Modelers did not rescale plume plots from ERPG-1 to ERPG-2 contours.

Finding #8: During LSPTs, ETSC staff did not use available references and dispersion plume predictive tools to provide accurate assessments of event consequences, as required by DOE Order 151.1B and LANL Performance Requirement LPR 403-00-00.0, *Emergency Management.*

Communication weaknesses hampered an effective response during the LSPTs. The most significant error occurred during the tritium release scenario, during which the identity of the damaged LP50 cylinder was incorrectly recorded and then displayed in the EOC as an "L250 cylinder." The EOC cadre and the ETSC staff used this information to support an erroneous assumption that a maximum of 250 pounds of material could be released (there are no cylinders known as L250 cylinders at LANL) and directed the response accordingly. Although one ETSC member did advise the ETSC team that the facility safety analysis report indicated a maximum quantity of 250 grams of tritium is allowed in the affected room, this information was not used. Furthermore, as previously mentioned, the ETSC did not call a facility operations representative to determine the amount of material involved in the event. Consequently, this Alert-level event was misclassified as a General Emergency. Other communication weaknesses of note include the following:

- An EOC coordinator mistakenly told the ED that concurrence had been obtained from the IC to terminate from a General Emergency. The ED consequently terminated the General Emergency, although the IC had, in fact, not concurred because of planned reentry activities that would require a significant hazardous material release to ventilate the affected facility.

- Because the notification specialists in the communication room cannot hear announcements

made by the ED in the EOC primary room, they were unaware that a General Emergency had been terminated and re-classified as an Alert and did not perform any associated notification updates to offsite authorities.

- A mid-shift relief occurred for the ETSC coordinator position without a formal turnover; this resulted in re-performance of tasks already completed, which delayed the availability of consequence assessment information.

- Although the emergency public information plan and notification instructions specify that the public information officer (PIO) be notified during an emergency, the LASO PIO was not notified during several of the LSPTs.

Finding #9: During LSPTs, ERO responders did not effectively determine event information and communicate that information among the emergency response venues to ensure accurate, consistent understanding of event status, as required by DOE Order 151.1B and LANL Performance Requirement LPR 403-00-00.0.

Lastly, weaknesses in practices for recording event activities impair LANL's ability to reconstruct an accurate chronology of an emergency event and to establish an auditable and supportable record of emergency response actions and offsite notifications for potential post-event litigation. For example:

- An entry reflecting an event classification change was deleted from electronic event files after it was determined that the classification change may have been in error.

- Notification forms reflected inappropriate methods of changing some notification record entries, such as write-overs, subsequent additions (i.e., use of same form for multiple notifications), and scratch-outs.

- Time displays on the EOC clocks, times indicated on telephones, and times displayed on computer screens are not synchronized.

To summarize, during performance tests, EOC teams were observed to be well equipped and demonstrated familiarity with many of the EOC protocols, such as offsite notification requirements, establishing an operational EOC, activating the JIC, preparing press releases, and providing event information to site workers. In addition, the LANL, LASO, and County PIOs worked together effectively in most instances to produce timely public information. However, as observed for the ICs, EOC teams did not make full use of EALs or verify facility conditions from available sources to arrive at accurate event classifications and commensurate protective actions. Although the ETSC staff has many references and tools available to support their consequence assessment function, they did not demonstrate proficiency in developing plume plots and providing event classification and protective action recommendations. The ETSC staff and the emergency managers oftentimes had a tendency to unnecessarily broaden protective action areas because they used less refined tools, such as the ERG or expert-based conservative assumptions, when more refined analysis should have been utilized to identify the most appropriate protective action areas. Offsite notifications were timely, but they contained errors or omitted information and were not made to all appropriate offsite agencies. Communication weaknesses further hindered responder performance; contributing factors included the absence of a rigorous process for confirming IC or emergency manager decision-making; physical separation of some EOC team elements; and the lack of direct contact between the IC and ED. Finally, record-keeping practices did not support the development of accurate historical records of event activities for use during the event or subsequent event reconstruction.

E.2.3 LANL Composite Performance Test

The CPT examined LANL's development of a comprehensive, all-hazards approach to emergency planning through the use of a malevolent act as the CPT initiating event because it represents the upper end of the consequence spectrum and therefore requires prompt recognition and response to mitigate the event and its health and safety consequences. The performance of incident command and EOC staff during the CPT in generally responding to and managing the event was consistent with that observed during the LSPTs and is discussed in the corresponding sections above. The remainder of the discussion in this section focuses on strengths and areas for improvement in CPT planning and integrating security-related provisions

into emergency response organization (ERO) response practices and protocols.

The LANL CPT was well designed and enabled the LANL ERO and PTLA to demonstrate key aspects of after-hours emergency response to a security event in an integrated force-on-force performance test and emergency management exercise. LANL, facility personnel, and PTLA devoted a considerable level of resources, both in terms of personnel and equipment, in planning for and conducting the CPT. These activities included the development of a consolidated exercise package and coordinated controller and player briefs to ensure a consistent understanding among all groups relative to the conduct of the CPT. However, some weaknesses were observed in conducting and controlling the CPT. In some cases, controllers for the CPT did not enforce the termination of player activities when holds were established. At the Technical Area (TA)-64 central alarm station, the emergency management controller radio network was monitored by the players for the duration of the exercise. Additionally, CPT controllers did not synchronize watches between the PTLA and emergency management controller groups, resulting in some difficulty reconstructing the response timeline. Participation of the Los Alamos County Police Department (LAPD) was simulated by an exercise controller in accordance with the exercise plan; however; the individual assigned to play the LAPD role did not have the law enforcement experience necessary to adequately simulate the response of LAPD or direct unified incident command for this type of event.

From a response planning perspective, the EPHA is intended to provide the analytical basis for developing necessary response procedures, including EALs. However, at the CPT facility of interest, although the EPHA evaluates the release of hazardous materials from a spectrum of natural phenomena and operational events, the EPHA does not consider significant quantities of hazardous materials as a potential target of malevolent action. Consequently, a facility-specific malevolent event EAL was not available for the hazardous material involved. This required the LANL duty officer to select an EAL applicable to a severe design basis event to promptly classify the event and formulate the necessary protective actions. However, protective actions for the two events may be different because of the security component of the event. This weakness is further discussed in Section C.2.1 of this report.

Overall, the CPT demonstrated that ERO members have not had sufficient practice in planning for and handling the security implications of a malevolent act. The security condition (SECON) implementation plan requires the EOC to coordinate efforts to establish communications, responsibilities, and authorities before, during, and after an attack. However, the plan is outdated and does not reflect current organization roles and responsibilities, notifications, or authorities. Additionally, there are two SECON 1 implementation checklists: one for an LANL/LASO-declared SECON 1, and the other for a National Nuclear Security Administration (NNSA)-directed SECON 1. Neither the plan nor the checklists recognize the actions of Los Alamos County or the responsibility of LAPD as the IC under the LANL unified incident command system. The site has recognized the need to improve emergency response planning for security-related events as evidenced by the recent development of a draft memorandum of understanding between LASO and the LAPD regarding mutual assistance, incident response, and incident resolution.

The TA-64 central alarm station maintained timely communications with the LANL duty officer and other ERO elements. However, incident command personnel did not utilize a checklist or response procedure to ensure that critical response actions were completed in a timely manner. For example, the incident command staff was not familiar with some expected response actions following communications with the central alarm station. Within the EOC, although a security posture of SECON 1 was posted on the EOC information management system, there was no discussion of the significance of this determination, and the LANL SECON implementation plan was not activated. Additionally, the SECON 1 determination was not timely and was reported directly to the DOE Headquarters watch office rather than through the NNSA Service Center EOC as required in the SECON implementation plan.

Finding #10: During the composite performance test, LANL emergency responders did not ensure that all required SECON response actions were taken, as required by the LANL SECON implementation plan and DOE Manual 470.4-1, *Safeguards and Security Program Planning and Management.*

To summarize, the CPT provided LANL and PTLA the opportunity to demonstrate readiness to respond to malevolent or terrorist events at the site. The integration of emergency management and security planning to conduct this type of exercise was noteworthy and should result in an overall

improved response posture for the site. However, the malevolent event initiator introduced a facet of emergency management for which ERO members were not sufficiently prepared, and consequently, LANL personnel did not implement appropriate actions in response to the change in the security condition caused by the event. To a large extent, this weakness can be attributed to the absence of practice with scenarios that integrate a complex security response with facility operations and emergency management assets.

E.3 Conclusions

The CPT demonstrated the ability of emergency management and security personnel to plan and conduct an integrated exercise of the site's response to a malevolent act involving hazardous materials. During the LSPT and CPT, ICs effectively led incident command staff, activated the EOC, and generally provided for the safety of responders. EOC teams demonstrated familiarity with the requirements for offsite notification, EOC operability, JIC activation, and dissemination of information to workers and the public. Collectively, the ICs, EDs, emergency managers, and ETSC staff adequately protected responders and site workers from hazardous material releases through very conservative assumptions and generic tools, although responders did not consider the negative implications of the implementation of unnecessary protective actions by affected populations. A number of weaknesses in response were observed. Roles and responsibilities of decision-makers determining event classification and formulating protective actions during the tests differed from those described in LANL plans and procedures. Personnel performing event classifications and subsequent concurrence reviews typically did not use available EALs or make full use of available resources to arrive at accurate event classifications and commensurate protective actions. Additionally, ETSC personnel did not demonstrate proficiency in using site-specific emergency preparedness documents, predictive dispersion modeling programs, and sources of facility status information to produce recommendations for protective actions commensurate with the hazards. Although timely, offsite notifications were not always accurate and complete and were not always provided to all offsite authorities as required. Finally, during the CPT, the incident command staff and EOC did not demonstrate proficiency in implementing SECON response provisions. Through conservative (sometimes, overly-conservative) actions, the ERO demonstrated the ability to protect emergency responders, site workers, and the public during an emergency response. However, the observed weaknesses diminish confidence that ERO responders can consistently and appropriately respond to significant site events. As mentioned in Appendix C, some of these weaknesses can be attributed to deficiencies in emergency response procedures.

E.4 Rating

A rating of NEEDS IMPROVEMENT is assigned to the area of LANL incident command team and EOC decision-making.

E.5 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

Los Alamos Site Office

- Consider strengthening the responsibility of the LASO emergency directorate representative for concurring on event classifications and protective actions by establishing written expectations that encourage using EALs while performing this function.

- Consider developing a mutual agreement among LASO, LANL, and the Federal Bureau of Investigation to improve emergency planning by clearly defining the roles, responsibilities, logistical requirements, and procedures that will be activated if an emergency occurs at the Laboratory that requires intervention by the Federal Bureau of Investigation.

- Consider enhancing the draft memorandum of understanding between LASO and LAPD by including additional planning for terrorist and malevolent events at the Laboratory. Establish a clear, integrated understanding of roles and responsibilities for incident management of events

that would require an integrated response involving other Federal, State, tribal, and local government organizations.

Los Alamos National Laboratory

- To enhance the command and control functions, consider the following actions:

  - Enforce the authority of ICs and EDs for categorization, classification, and protective action decision-making by placing emphasis on these areas during training drills and providing specific evaluation criteria during exercises.

  - Enforce established formalities for the ED assuming command and control through enhanced training and practice during drills and specific evaluation during exercises.

  - Extend the conditions for the EOC becoming operational by also requiring a prerequisite direct briefing by the IC to the ED on event conditions and the response status.

- When strengthening the ED's communication protocols, consider the following actions:

  - Require the ED to communicate directly with the IC for the purposes of gathering initial information and turning over classification and protective action responsibilities.

  - Provide responders with more experience in interfacing with facility operations representatives through design of drills and exercises.

  - Develop written guidance to communicate expectations on how to perform turnovers, and provide responders with appropriate opportunities to practice this evolution during drills.

  - Devise a method to ensure that ED announcements from the EOC primary room are directly communicated to the communications room without excessively interfering with communication room operations. For example, consider using a partially muted speaker with an ED announcement light, or assign specific responsibilities to the EOC coordinator to update the communicators.

- To improve the timeliness of the initial press release and to keep other EOC cadre members informed of response actions, consider projecting a map display that depicts the location of the affected facility, roadblocks, the ICP and staging areas, and the wind direction.

- Strengthen the process of informing site workers of event information by providing them information sooner. Specific actions to consider include:

  - Develop information for site workers separately from the initial press release and keep it more succinct. Limit initial information to the event classification and location and to warn workers to stay clear of the area.

  - Distribute site worker e-mail notifications directly from the EOC.

  - Assign responsibility to develop and approve warning messages to specific responders, and revise the appropriate procedures and position checklist(s) to improve the use of the scrolling warning signs located throughout the site.

- Enhance emergency planning for personnel responsible for implementing a heightened SECON at LANL. Specific actions to consider include:

  - Authorize the EM duty officer and/or ED to declare a SECON if the site becomes a target of a terrorist attack and to initiate implementation of the appropriate SECON response.

  - Develop facility/operational SECON response plans to assist responders in verifying that LANL operations are shut down or placed in a safe and stable configuration following a heightened SECON declaration.

  - Revise the field response operating guidelines to include an appropriate checklist that defines specific actions for the IC to initiate during a heightened SECON declaration.

- Consider formalizing the process for notifying the Federal Bureau of Investigation by incorporating the correct protocol in the emergency manager's notification checklist, thus ensuring prompt notification for any terrorist or malevolent act event.

- Consider including periodic exercise scenarios that integrate a complex security response with facility operations and emergency management assets as part of the LANL drill and exercise program.

APPENDIX F
READINESS ASSURANCE

F.1 Introduction

Emergency management program administration includes elements of readiness assurance as well as performance of some planning and response functions. Readiness assurance activities ensure that emergency management program plans, procedures, and resources of the Los Alamos Site Office (LASO) and Los Alamos National Laboratory (LANL) will facilitate an effective response to an emergency at the site. Readiness assurance activities include implementation of a coordinated schedule of program evaluations, appraisals, and assessments. Key elements of the readiness assurance program include the active involvement of National Nuclear Security Administration (NNSA) line organizations in monitoring program effectiveness, implementing self-assessment programs, and ensuring that timely corrective actions are taken for identified weaknesses. NNSA field elements also have direct responsibility for performing some emergency response activities, including oversight of the site's emergency response and activities related to the release of emergency public information to site workers and the public.

This U.S. Department of Energy (DOE) Office of Independent Oversight inspection examined the processes by which LASO provides guidance and direction to and maintains operational awareness of the LANL emergency management program. The inspection also included a review of LASO emergency management program assessment processes. Additionally, the inspection included reviews of the LANL emergency management self-assessment and issues management processes and the status of actions taken to address findings identified in the previous Independent Oversight inspection.

F.2 Status and Results

F.2.1 NNSA Line Program Management

The April 2002 Independent Oversight inspection determined that the former Albuquerque Operations Office (Emergency Management Branch), which shared responsibility with LASO for line management oversight of the site's emergency management program, had increased the frequency and rigor of its activities related to the site's emergency management program. However, the overall effectiveness of DOE line management oversight activities was being significantly impacted by severe Office of Los Alamos Site Operations resource constraints such that important emergency management functions for which DOE is responsible were not being adequately performed. This 2006 inspection found that while LASO has recently allocated more resources for line management oversight of the site's emergency management program and has received substantial assistance and resources from the NNSA Office of Emergency Management Implementation (NA-43), significant effort is still needed in order to fully implement LASO's emergency management oversight responsibilities.

The NNSA Deputy Administrator for Defense Programs (NA-10) has delegated line management oversight responsibilities to NA-43, which is supporting the LASO emergency management program effectively by providing assistance, oversight, and resources. A technical assistance visit by NA-43 in 2004 resulted in numerous issues being identified, including an inadequate level of staffing for LASO emergency management program oversight, lack of well-defined and clearly understood LASO emergency management roles and responsibilities, no designated owner of the emergency public information program, and absence of emergency management specific performance measures in the LANL contract. The technical assistance visit was followed by a program review in 2005 during which NA-43 identified additional issues, including lack of a LASO emergency management plan, the need to identify LASO staff for the emergency response organization (ERO), and the absence of checklists for LASO ERO positions. NA-43 also provided exercise development training for LANL in 2005 and 2006, evaluators for the 2005 LANL annual exercise, and informal observations for the recently completed 2006 LANL annual exercise. NA-43 is in weekly contact with the LASO emergency management program manager to share information on the status of the site's emergency management program and to provide program implementation guidance.

LASO has recently emphasized the emergency management program and is in the early stages

of implementing their oversight responsibilities. A new LASO emergency management program manager was assigned a few months ago and has started implementing LASO's emergency management oversight responsibilities, including recently conducting the first self-assessment of the LASO emergency response functions and program elements. The self-assessment included the criteria for three of the six Federal self-assessment topics included in the NA-43 self-assessment guide for site offices; however, not all lines of inquiry were included from the three self-assessment topics selected. The self-assessment was generally comprehensive, with twenty-two findings and three observations noted in the three areas evaluated. Most of the lines of inquiry that were not included in the self-assessment were incorporated into another recently completed self-assessment in preparation for a Chief of Defense Nuclear Safety review, which resulted in three additional findings. One line of inquiry not included in either self-assessment evaluated whether the activities of leased facilities were effectively integrated into the site emergency management program. The exclusion of this line of inquiry is of note due to the existence of a leased hazardous chemical facility at LANL that has not been clearly integrated into the LANL emergency management program.

Several institutional weaknesses are limiting the performance of LASO's line oversight of emergency management. LASO plans and procedures provide incomplete direction on LASO roles and responsibilities and management expectations. The DOE Order 151.1B requirements to transmit approved emergency plans, hazards surveys, emergency planning hazards assessments (EPHAs), and emergency planning zones (EPZs) to NNSA and for LASO to approve site exercise packages are not included in the draft LASO emergency plan. Further, LASO has not approved the current versions of the LANL emergency plan, hazards surveys, EPHA, or EPZ. The need to include DOE Order 151.1C in the LANL contract was identified by the LASO emergency management program manager several months ago, but LASO has not initiated this change. Finally, LASO does not have a lessons-learned program and does not participate in the DOE lessons-learned program. On a positive note, several of these issues were noted by the LASO emergency management program manager in the recently completed self-assessments.

Few mechanisms are in place for LASO to provide formal, routine feedback to LANL on emergency management program performance, and the existing mechanisms are not used effectively. Previous LANL annual performance reviews by LASO have either not mentioned the site emergency management program or rated the site emergency management program as good without mentioning the various weaknesses identified by NA-43. LASO has included one performance-based incentive for LANL for fiscal year (FY) 2007 related to improving the quality of their emergency management program, specifically aimed at improving the accuracy of the chemical inventory listed on the building run sheets. While this is a positive development, LASO senior management declined to include in the final set of FY 2007 performance-based incentives a more comprehensive set of performance incentives that had been drafted by the LASO emergency management program manager and agreed to by the LANL Emergency Response Division (ERD) and NA-43.

LASO's ability to adequately monitor the effectiveness of the LANL emergency management program through the performance of formal assessments remains a weakness from the 2002 Independent Oversight inspection. LASO also does not participate in the evaluation of LANL exercises, although the LASO emergency management program manager actively participated in planning and executing the 2006 LANL annual exercise. LASO recently approved a FY 2007 assessment plan for the LANL emergency management program that includes reviews of four emergency management program elements along with a review of LANL's annual self-assessment. However, LASO has not developed such assessment guidance as the process for conducting assessments, use of objective criteria and objective evidence of performance, provisions for response to findings, and approval and transmittal of assessment reports. Such guidance would facilitate assessment consistency and quality.

Finding #11: LASO is not conducting formal, documented assessments of the LANL emergency management program, as required by DOE Order 151.1B.

The LASO issues management process also does not adequately support LASO line oversight activities because it does not ensure that issues are adequately analyzed and that corrective actions are developed, formally tracked, validated as completed, and verified as effectively resolving the issue. For example, corrective actions were not developed for the six findings applicable to LASO resulting from the 2005 LANL annual exercise, although the LASO emergency

management program manager is informally tracking these findings. In addition, LASO only recently requested that the NNSA Service Center conduct an effectiveness review of the closure of findings from the 2002 Independent Oversight inspection, even though the last corrective action was closed in October 2003. Closure evidence was available solely through the NNSA Service Center as LASO does not have a records management system that maintains closure evidence for findings. The NNSA Service Center concluded that four findings had been adequately addressed, one finding had not been adequately addressed, and one finding had been superseded by new processes and that no further effectiveness review was needed. With the exception of the emergency public information area, this conclusion is contrary to the results of this inspection, as discussed in other sections of this report. Furthermore, a LASO procedure for verifying and validating corrective actions is pending, and no other guidance exists regarding the appropriate steps to take to validate completion of a corrective action and verify that the action was effective in resolving the issue.

Finding #12: The LASO issues management process does not ensure that adequate reviews of LASO and LANL issues and corrective actions are performed to prevent recurrence of issues, as required by DOE Order 151.1B and DOE Order 414.1C, *Quality Assurance.*

To summarize, LASO has started to implement their emergency management oversight responsibilities, most notably by appointing a new LASO emergency management program manager. With the assistance of NA-43, the LASO emergency management program manager conducted the first self-assessment of the LASO emergency management program and developed a schedule for conducting assessments of the LANL emergency management program in FY 2007. Several items noted in this inspection report were also identified by the LASO emergency management program manager during the recent self-assessments. However, LASO plans and procedures do not provide sufficient direction on roles, responsibilities, and management expectations for approving and transmitting key emergency management documents or providing feedback to LANL on emergency management program performance. In addition, LASO has not conducted formal assessments of the LANL emergency management program and has not formally defined how such assessments should be conducted. Moreover, the LASO issues management process is ineffective and was unsuccessful in ensuring effective resolution of all of the findings from the 2002 Independent Oversight inspection.

F.2.2 LANL Feedback and Improvement

The April 2002 Independent Oversight inspection determined that the absence of rigorous and systematic programmatic assessments was limiting the ability of the LANL emergency management and response group to improve the effectiveness of the LANL emergency management program. The LANL emergency management program internal assessment process was not meeting DOE requirements or those from the LANL emergency management plan. The required annual programmatic assessments had not been conducted for several years, and the assessments that had been conducted were not structured to identify new programmatic weaknesses or improvement items; instead, they were intended to use existing metrics and performance data to convey program status to senior Laboratory management. In addition, several of the weaknesses identified during the 1998 Independent Oversight evaluation of emergency management at LANL had not been effectively addressed. This 2006 Independent Oversight inspection found that rigorous and systematic programmatic assessments are still not being conducted, and most of the finding elements identified in the 2002 Independent Oversight inspection remain unresolved.

LANL has established a formal, corporate assessment program, although weaknesses exist in the corporate assessment processes and implementation of the emergency management assessment program remains immature. The LANL emergency management plan requires an annual emergency management assessment and is supported by self-assessment requirements in the LANL ERD integrated management plan and LANL corporate assessment procedures. However, none of the documents applicable to emergency management assessments require the use of specific, objective assessment criteria or objective evidence of performance. Additionally, the LANL emergency management assessment schedule for FY 2007 does not clearly include the fifteen elements of the emergency management program that are required to be assessed annually or specify the level of rigor that will be applied to each element.

Despite being identified as a weakness in the 2002 Independent Oversight inspection, LANL is not conducting annual, comprehensive assessments of its emergency management program. The assessments

that were conducted were only marginally effective in identifying programmatic weaknesses because not all programmatic elements were included, the objectives used to conduct the assessments were generally not specified, and objective evidence of performance was infrequently documented. For example, although an assessment conducted in 2004 by the LANL Internal Assessments Group on the emergency management and fire protection programs used criteria based on LANL requirements documents, only four out of fifteen elements of the emergency management program were included in the assessment. Further, the LANL self-assessment of the emergency management and response group conducted in 2005 used objective criteria for only three emergency management program elements, and objective evidence of performance was not discussed in the assessment report. Seven of the remaining twelve emergency management program elements were also assessed in the 2005 self-assessment, but the criteria used for the assessment were not specified, and objective evidence of performance was again not documented. No self-assessments of the emergency management program were conducted in 2006 due to LANL management's decision to place emphasis on other tasks, although a parent company functional review of the emergency management program was conducted by BWXT Nuclear Products Division and BWXT Pantex in September 2006. This review is of very limited value as the assessment report did not specify the emergency management program elements that were reviewed, did not identify the criteria that were used to determine adequacy of the program, did not document the objective evidence of performance, and did not identify any of the major program weaknesses discussed in this report.

Finding #13: LANL is not conducting annual comprehensive emergency management program assessments, as required by the LANL Emergency Management Plan and DOE Order 151.1B.

Comprehensive LANL corporate procedures specify the issues management process to be used by all LANL organizations. The corporate procedures appropriately include prioritization of corrective actions, identification of root causes for findings, corrective action development designed to prevent recurrence, formal approval of changes to corrective actions, tracking of corrective actions, validation of completion of corrective actions, and verification of effectiveness in resolving findings. The recently issued LANL ERD integrated management plan requires compliance with the LANL corporate issues management process. Nonetheless, although LANL has established a corporate issues management process, only a small portion of corrective actions for emergency management findings and observations identified in assessments and exercises are formally tracked, validated as completed, or verified as effective.

Corrective actions resulting from drills and exercises are leading to improvements in performance, as discussed in Section D.2.1 of this report. However, these corrective actions are not prioritized or formally tracked. Corrective actions resulting from the 2004 assessment by the LANL Internal Assessments Group were tracked in the LANL corporate corrective action tracking system and validated as completed. However, the corrective actions for the 2005 LANL self-assessment of the emergency management and response group were not tracked in the LANL corporate or the LANL ERD corrective action tracking systems and were not validated as completed. LANL ERD has initiated development of an internal tracking system to handle drill and exercise corrective actions, although this is contrary to the requirements of the LANL corporate procedures, which require that issues be entered into the LANL corporate corrective action tracking system.

Weaknesses in implementing and verifying the effectiveness of corrective actions have further limited improvement in the LANL emergency management program. For example, in a 2004 assessment that included a review of the effectiveness of corrective actions taken in response to two issues from their 2001 emergency management and fire protection assessment, LANL's Internal Assessments Group identified that both issues had been identified as closed in the LANL corporate corrective action tracking system. Nevertheless, the 2004 assessment determined that the corrective actions for both issues identified in 2001 were ineffective as indicated by problems that remained with safe egress and accounting of evacuated personnel and the fact that the corrective action regarding Cerro Grande Fire lessons learned was never implemented by the Facilities and Waste Operations Division Office. The 2004 assessment also identified a finding regarding inaccuracies in the building emergency plans. The corrective actions developed in response to this finding were not designed to prevent recurrence because the corrective action focused on attaining 90-percent completion of building emergency plans for all facilities rather than improving the accuracy of the building emergency plans, as noted in the finding.

Furthermore, although LANL completed corrective actions in March 2003 to address errors in hazardous material inventories identified during the 2002 Independent Oversight inspection, the 2004 Internal Assessment Group assessment also identified that the hazardous material inventories contained in building run sheets were inaccurate. Again, the corrective actions developed in response to this finding were not designed to prevent recurrence because the corrective action focused on completing 90 percent of the building run sheets for all facilities, rather than improving the accuracy of hazardous material inventories contained in the building run sheets. As discussed further in Section C.2.1 of this report, problems regarding the accuracy of the hazardous material inventories contained in the building run sheets continue to exist.

Finding #14: The LANL issues management process does not ensure that corrective actions are tracked, validated as completed, or verified as effective in preventing recurrence of issues, as required by the LANL ERD integrated management plan, the LANL corporate issues management process, and DOE Order 151.1B.

To summarize, LANL has established a formal assessment program and a comprehensive issues management process, and corrective actions resulting from drills and exercises are facilitating program improvements. In addition, LANL self-identified weaknesses in corrective actions taken for two issues identified during a 2001 assessment and took additional actions. However, weaknesses exist in the assessment processes, and LANL has not conducted annual comprehensive emergency management programmatic assessments as required. Two assessments of limited scope and effectiveness were conducted for the emergency management program, but these assessments were not effective in identifying all programmatic weaknesses. Further, LANL does not adequately track corrective actions or effectively validate the completion of most corrective actions, and contrary to procedures, corrective actions that are tracked are generally not included in the LANL corporate corrective action tracking system. Consequently, the LANL issues management process is of limited effectiveness in preventing recurrences of previously identified weaknesses.

F.3 Conclusions

LASO readiness assurance activities have improved recently following the assignment of an emergency management program manager, who with significant assistance from NA-43 has begun to provide oversight of the LANL emergency management program and conduct effective self-assessments of LASO program responsibilities. The LANL readiness assurance program includes a formal assessment program and a comprehensive issues management process, and feedback and improvement resulting from training drills and exercises have led to some improvements in ERO performance. Nevertheless, important weaknesses in the combined readiness assurance program remain. LASO plans and procedures do not provide sufficient direction for review, approval, and transmittal of key emergency management documents or provide procedural guidance for effective oversight of the LANL program. Although LASO has scheduled future assessments, the site office has not conducted formal assessments of the LANL emergency management program. LANL has not conducted comprehensive annual emergency management programmatic assessments as required, and two completed, limited-scope assessments were not effective in identifying programmatic weaknesses. Further, both LASO and LANL issues management and corrective action processes have been largely ineffective in addressing the underlying causes, tracking corrective actions to completion, and verifying effectiveness. As a result, a number of previously identified weaknesses have not been successfully addressed and resolved. Significant effort remains to fully implement LASO's emergency management oversight responsibilities, and to establish and implement an effective, combined readiness assurance program.

F.4 Ratings

A rating of NEEDS IMPROVEMENT is assigned to the area of NNSA line program management.

A rating of NEEDS IMPROVEMENT is assigned to the area of LANL feedback and improvement.

F.5 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be

prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

Los Alamos Site Office

- To improve management of the oversight program, consider developing a detailed project management plan to aid in implementing the elements described in the LASO emergency plan. Specific actions to consider include:
  - Identify tasks to implement individual requirements, such as developing assessment schedules, assessment plans, evaluation criteria, and reporting mechanisms.
  - Sequence tasks to ensure that an integrated approach is used. In addition to corrective actions, also include routine and annual activities that will require significant resources, such as the annual updates to the emergency readiness assurance plan and review of LANL assessments.
  - Coordinate with LANL to establish a schedule and process for reviewing such program documents as emergency plans, emergency planning hazards surveys, the EPHA, EPZs, and exercise packages.
  - Identify resources to complete each action, and for activities that may require outside expertise, identify how that expertise will be obtained.
- To ensure that all emergency management program elements are periodically reviewed, consider developing a resource-loaded assessment plan for a three-year cycle. Specific considerations should include:
  - Identify assessments by emergency management program functional areas over the three-year cycle.
  - Balance document reviews with assessments of field implementation of the documents.
  - Identify resources to implement the assessment plan, and for activities that require outside expertise, identify how that expertise will be obtained.
  - Review the training and experience of personnel conducting assessments to ensure that they have the appropriate background to enable them to identify the expected standards of performance in the areas being evaluated.
- To increase the involvement of LASO in the LANL exercise program, consider the following actions:
  - Assign LASO personnel as evaluators for LANL exercises.
  - Develop corrective actions for LASO exercise findings and track the status of corrective actions in the formal LASO corrective action tracking system to ensure that they are implemented.
  - Verify the implementation of corrective actions identified in exercise after-action reports.
- Consider additional actions to improve the LASO corrective action procedure. Specific actions to consider include:
  - Specify due dates for developing corrective actions for findings identified during self-assessments.
  - Improve the determination of the root causes of identified findings and recurring problems through implementation of existing procedures and/or training in root cause analysis.
  - Evaluate proposed corrective actions to ensure that they will address underlying causal factors.
  - Identify personnel responsible for tracking, approving changes, and following up on overdue corrective actions.
  - Issue a procedure providing expectations of activities for verification, validation, and closeout of corrective actions.

- Validate and verify corrective action completion as tasks are completed rather than waiting until the entire corrective action plan is completed.

- Ensure that discussions, agreements, or subject matter expert reviews, used as the bases for closing corrective actions, are documented.

- Maintain closure evidence files as a record for corrective action completion.

- To formalize and promote timely reviews and approvals of the emergency plan, emergency planning hazards surveys, EPHA, EPZs, and exercise packages, consider developing written protocols that contain the following information:

  - Technical disciplines (e.g., safety analysis experts and Facility Representatives) required within LASO for the review of the emergency plan, emergency planning hazards surveys, EPHAs, EPZ, and exercise packages documentation.

  - Establish an overall timeline and due dates for all reviews.

  - Develop a mechanism to transmit approved emergency plans, emergency planning hazards surveys, EPHAs, EPZs, and exercise packages to NA-43.

- Continue to enhance the ability of LASO ERO members to perform their roles during an emergency event. Specific actions to consider include:

  - Ensure that the EOC procedures and checklists reflect the desired roles and responsibilities and appropriately integrate LASO members into the response.

  - Develop training mechanisms for lessons learned from ERO training, drills, actual responses, and the LANL lessons-learned program.

  - Designate LASO personnel to fill the role of the on-scene coordinator in an emergency that falls within the scope of the National Contingency Plan.

- To enhance the effectiveness of the performance evaluation plan in encouraging improvements in the emergency management program, consider using objective performance measures that cover key aspects of the emergency management program and contain specific deliverables and fixed due dates.

- Consider expediting the inclusion of DOE Order 151.1C in the LANL contract.

Los Alamos National Laboratory

- Improve the effectiveness of the LANL assessment program by providing formal written expectations to appropriately trained evaluators. Specific activities to consider include the following:

  - Identify all emergency management program elements to be reviewed in annual assessment plans, emphasizing those program elements with approved, implemented procedures.

  - Conduct assessments using approved evaluation standards and criteria that are identified in assessment plans and/or reports.

  - Plan for targeted, in-depth assessments of critical portions of a functional area rather than broader, shallower assessments of an entire functional area.

  - Balance assessment plans between assessments of program document content and their field implementation.

  - Identify evaluators needed to perform scheduled assessments. Periodically use independent personnel, either internal or external to ERD, to plan and conduct assessments.

  - Provide written guidance and training to evaluators on the application of inspection criteria and the standards of acceptable performance.

  - When evaluation criteria are not met, but corrective actions are already in progress, ensure that the corrective actions are appropriately captured in the issues management system.

- To promote continuous program improvement through the emergency management issues management processes, consider the following actions:

  - Review ERD issues management procedures against the institutional issues management program procedures to ensure that emergency management related corrective actions implemented by organizations external to ERD undergo similar processes.

  - Require corrective actions for all deficiencies listed in exercise after-action reports.

  - Evaluate proposed corrective actions to ensure that they address the underlying causal factors.

  - Track all emergency management corrective actions using a single tracking system to facilitate retrieving data and managing implementation.

  - Verify and validate corrective actions for specific findings as they are completed (rather than waiting until the entire corrective action plan is completed) using independent personnel who have working knowledge of emergency management functional areas.

  - When validation activities identify continuing weaknesses, review the need to either re-open the issue or open a new issue associated with the original finding.

  - Periodically review past deficiencies to identify recurring weaknesses. Perform a causal analysis of recurring deficiencies to identify and further address root causes.

Abbreviations Used in This Report (Continued)

NA-43	NNSA Office of Emergency Management Implementation
NARAC	National Atmospheric Release Advisory Capability
NIMS	National Incident Management System
NNSA	National Nuclear Security Administration
OJT	On-the-Job Training
PAR	Protective Action Recommendation
PIO	Public Information Officer
PTLA	Protection Technology Los Alamos
SECON	Security Condition
SWANS	Sitewide Area Notification System
TA	Technical Area
TEEL	Temporary Emergency Exposure Limit