

# Volume III

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Inspection of  
Emergency Management  
at the

## Sandia Site Office and Sandia National Laboratories – New Mexico

May 2005



Office of Independent Oversight and Performance Assurance  
Office of Security and Safety Performance Assurance  
Office of the Secretary of Energy

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## Abbreviations Used in This Report

CY	Calendar Year
DOE	U.S. Department of Energy
EAL	Emergency Action Level
ED	Emergency Director
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
EPI	Emergency Public Information
EPIP	Emergency Plan Implementing Procedure
ERDO	Emergency Response Duty Officer
ERO	Emergency Response Organization
ES&H	Environment, Safety, and Health
IC	Incident Commander
JIC	Joint Information Center
KAFB	Kirtland Air Force Base
LSPT	Limited-Scope Performance Test
MOU	Memorandum of Understanding
MRC	Media Relations Center
NA-43	NNSA Office of Emergency Management Implementation
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
PAR	Protective Action Recommendation
PEP	Performance Evaluation Plan
SNL/NM	Sandia National Laboratories – New Mexico
SPAN	Sandia Protective Action Notification
SPR	Sandia Pulsed Reactor
SSO	Sandia Site Office
TEDS	Training and Employee Development System

# OVERSIGHT

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA), within the Office of Security and Safety Performance Assurance, inspected safeguards and security, cyber security, and emergency management programs at the U.S. Department of Energy (DOE) Sandia National Laboratories – New Mexico (SNL/NM) site in March and April 2005. The inspection was performed as a joint effort by the OA Office of Safeguards and Security Evaluations; Office of Cyber Security and Special Reviews; and Office of Emergency Management Oversight. This volume discusses the results of the review of the SNL/NM emergency management program. The results of the inspection of the SNL/NM safeguards and security and cyber security programs are discussed in Volumes I and II of this report, and the results of the concurrent OA inspection of SNL/NM environment, safety, and health programs by the Office of Environment, Safety and Health Evaluations are discussed in a separate report.

Within DOE, the National Nuclear Security Administration (NNSA) Office of the Deputy Administrator for Defense Programs is the cognizant secretarial office for SNL/NM. As such, it has overall Headquarters responsibility for programmatic direction and funding of most activities at the site. The NNSA Office of Emergency Management Implementation (NA-43) has specific line management responsibility at the Headquarters level for the site's emergency management program. At the site level, the NNSA Sandia Site Office (SSO) has line management responsibility for SNL/NM operations and security. SNL/NM is managed and operated by Sandia Corporation, a Lockheed Martin Corporation entity, under contract to DOE.

SNL/NM's current mission includes support for the NNSA stockpile stewardship program and the Department's efforts to reduce the proliferation of weapons of mass destruction and the threat of nuclear accidents. SNL/NM also performs research and development to enhance the reliability of energy and critical infrastructures and to address emerging military and terrorism threats to national

security. SNL/NM activities, which include research and testing, industrial operations, facility maintenance, waste management, and environmental restoration, involve various potential hazards that need to be effectively controlled. SNL/NM activities involve significant quantities of hazardous materials in various forms, including radiological materials, explosive materials, and chemicals. The SNL/NM site is located on a portion of the 118-square-mile Kirtland Air Force Base (KAFB) military reservation. In addition, SNL/NM and KAFB share a 20,000-acre land withdrawal area that is used for remote testing activities.

Throughout the evaluation of emergency management programs, OA reviews the role of DOE/NNSA organizations in providing direction to contractors and conducting line management oversight of contractor activities. OA is placing more emphasis on the effectiveness of DOE/NNSA line management oversight of emergency management programs. In reviewing NNSA line management oversight, OA focused on the effectiveness of SSO in managing the SNL/NM contractor, including such management functions as setting expectations, providing implementation guidance, monitoring and assessing contractor performance, and monitoring and evaluating contractor self-assessments.

In addition to the OA review of NNSA's emergency management oversight and operational awareness activities, this inspection evaluated the site's progress in addressing weaknesses identified during the February 2003 OA inspection, particularly in the area of emergency management program plans and implementing procedures. The inspection team also conducted limited-scope performance tests (LSPTs) with a sample of the site's key decision-makers to evaluate their ability to employ available procedures, data sets, equipment, and skills when responding to postulated emergency conditions. Furthermore, the combined safeguards/security and emergency management inspection team conducted one force-on-force performance test that included emergency management objectives.

Section 2 of this report provides an overall discussion of the results of the review of the SNL/NM emergency management program elements that were evaluated. Section 3 provides OA's conclusions regarding the overall effectiveness of SSO and contractor 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

SSO and SNL/NM continue to work to implement an emergency management program that facilitates effective response to a wide range of potential initiating events. Positive attributes of the emergency management program are discussed below.

**SNL/NM has implemented improvements in several key areas since the February 2003 OA emergency management inspection.**

Although some weaknesses remain, the emergency planning hazards assessments (EPHAs) are technically accurate, and the facility hazardous material screening process uses a derived set of chemical threshold quantities, thus avoiding the problems typically associated with using a limited set of regulatory-based screening thresholds. With few exceptions, the emergency action levels (EALs) were appropriately based on EPA results, and the EALs support timely and accurate emergency classification and provide protective action distances for onsite and offsite populations. SNL/NM has implemented continuous staffing of the communications coordinator position and completed installing tone alert radios in SNL/NM facilities, thus facilitating rapid, sitewide communication of protective actions to site workers. Additionally, the emergency management staff now includes a highly experienced, full-time emergency management training coordinator, who has facilitated the development and partial implementation of a comprehensive emergency management training and drill program. SNL/NM has developed an exercise/drill guidelines document, and improvements in exercise planning, namely clear objectives and the selection of an appropriate scenario, were evident in the 2004 SNL/NM exercise report. SSO and SNL/NM also have developed and implemented an integrated emergency public information plan that adequately describes the responsibilities, interfaces, and operations for nearly all of the related venues.

**Incident command teams demonstrated effective decision-making during performance tests.** Incident commanders (ICs) demonstrated effective command and control of the emergency response at the postulated event scene. Using checklists, procedures, radios, maps, and other equipment, ICs rapidly assessed overall conditions and established incident command system organizations that were appropriately located and sized for the postulated events. Together with key support staff, the ICs ensured that field team responsibilities and responder protective equipment requirements were understood, responder accountability systems were implemented, and reentry backup teams were established. ICs appropriately considered meteorological conditions to establish traffic control points and staging areas using prepared response plans, and they relocated response assets as conditions changed. With one exception, ICs accurately categorized and classified the postulated events using the EALs and correctly selected protective actions that were based on prepared protective action response plans. Lastly, communication coordinators effectively used installed communication systems to transmit instructions to building evacuation team members by pager and provide protective actions to site workers in the affected area using the site's tone alert radio system.

**SSO is actively engaged in conducting line management oversight of the SNL/NM emergency management program, and is appropriately supported by NA-43.** Since the February 2003 OA inspection, SSO has developed an emergency plan and an implementing procedure that govern the roles, responsibilities, and processes for oversight and implementation of the emergency management program at SNL/NM. The SSO program manager, who was added as a permanent staff member shortly after the 2003 OA inspection, is knowledgeable of the program's status and communicates frequently with the SNL/NM emergency management program manager and staff on a wide variety of topics through such

mechanisms as quarterly performance plan updates and corrective action status meetings. NA-43 is actively engaged in such activities as monitoring the status of the program, determining SSO assistance needs, and evaluating the annual site exercise. SSO has been effective in identifying emergency management program weaknesses through structured assessment activities, and SSO emergency response roles, responsibilities, and duties are clearly defined in the SSO emergency management plan and supporting implementing procedure and checklists.

## 2.2 Program Weaknesses and Items Requiring Attention

The OA team identified several areas where programmatic weaknesses continue to hamper the performance of key emergency response actions by initial emergency management decision-makers. Concerns in SNL/NM's ability to develop and implement effective corrective actions were noted as well. Specific weaknesses are discussed below.

**The SNL/NM emergency plan implementing procedures (EPIPs) and protective action plans do not adequately support key emergency management decision-making.** Many of the SNL/NM EPIPs do not provide the specificity necessary to ensure that the desired actions are effectively accomplished. For example, the EPIP for categorizing/classifying events directs the IC to complete a protective action plan, if necessary, but provides no guidance for choosing the most appropriate protective action or identifying the applicable geographic areas. The offsite notification form is not consistent with the format of the existing protective action recommendations (PARs), and the notification procedure does not describe how to portray the information in the protective action plans on the form. The collective impact of the various procedure inadequacies is that communication coordinators were generally unable to communicate accurate and timely offsite notifications during emergency management LSPTs. The EPIPs, position-specific checklists, and the SNL/NM emergency plan are inconsistent regarding the assignment of key decision-making roles, responsibilities, and authorities. In addition, SNL/NM has not developed a formal set of predetermined protective actions or PARs for high-consequence accident scenarios impacting site workers and populations beyond the KAFB outer boundary, nor has SNL/NM developed specific procedural guidance for ICs and emergency directors (EDs) to use in

formulating PARs for an event where a protective action plan has not been developed. SNL/NM appropriately prioritized the development of the protective action plans and is aware of the need to complete this important project. However, there is currently no corrective action tracking item, project plan, or set of milestones that addresses completion of the remaining protective action plans, although the site recently issued a request for outside support to complete this work.

**Weaknesses in SSO and SNL/NM processes for managing corrective actions have resulted in corrective actions being inappropriately closed and have significantly limited program improvement through the exercise program.** All of the DOE Corrective Action Tracking System action items from the February 2003 OA inspection have been completed by SNL/NM and accepted by SSO. However, in several cases, the corrective actions were either not effective in addressing the identified weakness or were prematurely closed. For example, although all of the corrective actions related to EALs, the notification process, and consequence assessment are complete, many of the EALs refer to nonexistent protective action plans. Additionally, as discussed elsewhere in this section, significant notification and consequence assessment problems were observed during LSPTs. Similarly, the EPHAs were not generated in strict accordance with the applicable development procedure, which was established in response to the 2003 OA inspection. Consequently, the protective action plans do not contain actions that are rigorously based on underlying EPHA analyses, and documentation weaknesses negatively impact EPHA ease-of-use and long-term maintainability. Furthermore, although the SNL/NM 2003 self-assessment was thorough and critical, a significant number of the planned corrective actions have not been completed and the status of corrective actions is not always current. As a result, some important weaknesses identified by either SNL/NM or SSO have not been addressed, integrated into the overall corrective action process, and corrected in a timely manner. Finally, although data gathered during the October 2004 annual exercise included numerous observations pointing to weaknesses or opportunities for improvement in the exercise response, findings and corrective actions have not been identified to address performance weaknesses, which is similar to an issue identified during the 2003 OA inspection.

**Emergency Operations Center (EOC) teams and consequence assessment staff did not demonstrate effective emergency response decision-making during LSPTs.** Following confirmation of a postulated bomb threat (that would disperse hazardous materials off site), SNL/NM EDs did not ensure that decisions were made regarding classification and formulation of protective actions and PARs when the IC, in accordance with the scenario, was reluctant to do so. EDs did not understand the differences between applying protective actions in a hot zone versus a protective action zone, and therefore could not verify that appropriate protective actions were implemented for site workers. In addition, one EOC team inappropriately directed the IC to reduce the size of an event hot zone perimeter based on inappropriate consequence assessment team information. The consequence assessment team was unable to produce analyses, plots, and recommendations that would be useful in emergency management decision-making. Difficulties included a computer program update that had not been verified operable prior to placing it in service for performing initial assessments; incorrect selection of a source term believed to be worst case from a hazardous mixture of chemicals; and lapses in the team's ability to both locate pertinent input data to develop a plume plot for an ongoing assessment and assess the adequacy of existing protective actions in a potential bomb blast zone. In addition, due in part to procedure weaknesses, no attempt was made to use an alternate available plume modeling program after a plume plot could not be developed using a modeling program preferred by team members.

**There continues to be serious concern that during a significant event, emergency public information personnel working in the Joint Information Center (JIC) would be unable to produce a coordinated, effective, accurate, and timely release of public information.** Although this concern was identified during the February 2003 OA inspection, the JIC location remains problematic because of its likely inaccessibility by media; local, state, and tribal organizations; and SNL/SSO emergency public information staff if KAFB shuts down following a significant event. Furthermore, no formal, long-term JIC access agreements with KAFB have been established. Additionally, JIC staff roles and responsibilities are not clearly delineated and documented, except for the JIC manager position, and previously published JIC checklists are only now being reviewed by the SSO public affairs specialist so that they can be updated and integrated with the current emergency public information plan requirements. Lastly, no criteria have been established to determine when, after JIC activation, the JIC can be declared "operational." Consequently, there are no criteria to ensure a smooth transition from the media relations center to the JIC. Except for a March 2004 drill involving the JIC, during which many performance issues were noted, SNL/NM has not conducted a drill or exercise that included JIC activation.

This has been OA's fifth assessment of the SNL/NM emergency management program since the April 1998 review of site emergency management programs across the DOE complex, which identified several fundamental deficiencies in the SNL/NM program. Subsequent appraisals in 1999, 2001, and 2003 each identified some improvements in the program, but many of the critical shortfalls remained and continued to limit the overall effectiveness of the program. This inspection found that SNL/NM has completed or is in the process of implementing several key improvements in the infrastructure of the emergency management program, namely, the staffing, equipment, program plans, and event analyses around which the site's response is built. In some cases, the progress in planning, preparedness, and response is clearly evident, particularly regarding provisions for protective actions for site workers and the proficiency of at-scene responders. However, some significant weaknesses persist, and until they are successfully addressed, the site's ability to adequately protect site workers and the public in the event of a serious incident will continue to be challenged.

A key positive from this inspection is that SNL/NM followed through on three vital initiatives that had been identified during the 2003 inspection. To address numerous weaknesses in the emergency management training and drill program, SNL/NM committed to hiring a knowledgeable, experienced training coordinator. To address key weaknesses in the incident command and notification systems, SNL/NM committed to complete the staffing of a 24/7 communication coordinator position. Finally, the Sandia Protective Action Notification system, a critical link in protecting site workers, is fully implemented, and facility evacuation teams have been appropriately trained and drilled. Because these initiatives were completed, the associated elements of the program have improved.

Other strengths were noted as well. The EPHAs are much improved, including consideration of an appropriately wide spectrum of potential initiating events and a thorough screening process that uses a comprehensive,

analysis-based list of screening threshold quantities. In the planning and procedure area, SNL/NM has completed a significant percentage of the protective action plans, which contain preplanned, building-specific incident command post and traffic control point locations and protective actions, and tone alert radios have been installed in all SNL/NM facilities. In the training area, SNL/NM has developed and partially implemented a comprehensive, rigorous training plan that, when fully implemented, will provide assurance that emergency response organization members are fully prepared at all times to assume their emergency response functions. Furthermore, SSO and SNL/NM have implemented an integrated emergency public information plan, and ICs demonstrated effective decision-making during LSPTs. Lastly, SSO is maintaining an appropriate degree of operational awareness, and except for inappropriately concurring with SNL/NM on closeout of some corrective actions, is effectively exercising line management oversight.

However, program improvements have had mixed success in facilitating improved performance in emergency response. Most notably, although the resources, equipment, and overall process associated with offsite notification have been upgraded, communication coordinators were generally unable during LSPTs to issue timely offsite notification messages that contained accurate PARs, which is largely attributable to EIPs that do not contain the necessary level of detail to ensure that this critical process is effectively performed. In addition, the protective action plans have not been completed for the most significant events that could affect populations outside of KAFB. Although ICs have the requisite knowledge to develop adequate PARs, ICs and EDs have not been provided with formal procedural direction regarding the process for formulating PARs. Furthermore, EDs have not been provided with the tools or training necessary to ensure appropriate formulation of PARs in the absence of written direction. Consequently, although the ED is ultimately responsible for their adequacy, EDs would have to defer to IC judgment.

The OA inspection team also identified weaknesses related to SSO and SNL/NM feedback and improvement processes, EOC teams and consequence assessment staff performance (noted during LSPTs), and the continued absence of a proven concept for handling the dissemination of information from the JIC. In several instances, SNL/NM prematurely or inappropriately closed out, with SSO concurrence, some corrective actions that were intended to address issues identified during the 2003 OA emergency management inspection. This has contributed to some of the weaknesses identified during this inspection, including protective action plans that are not rigorously based on underlying EPHA analyses because the EPHAs were not generated in strict accordance with a process that was established in response to the 2003 OA inspection. In addition, the results of drills and exercises are not being systematically documented, analyzed, and entered into an issues management system to facilitate programmatic improvements. EOC teams did not demonstrate conservative, anticipatory decision-making, due in part to training that had been focused on the ICs and support staff and procedures that do not clearly and consistently identify key initial and follow-on emergency response duties, responsibilities, and expectations. Finally, there has been little apparent progress since February 2003 in devising, implementing, and testing a JIC concept of operations that ensures that public information can be

released in a coordinated, accurate, and timely manner following a significant event having broad public interest.

Overall, SNL/NM continues to make progress towards full implementation of a site emergency management program that adequately protects site workers and the public from a serious incident involving the release of hazardous materials. SNL/NM has made several substantive improvements since the last OA inspection, and the site is moving forward appropriately, but the ratings of this inspection reflect the current incomplete status of the program elements that were evaluated. Most importantly, most measures to protect site workers from events that could significantly impact their health are in place, and SNL/NM is aware of the remaining elements necessary to provide adequate assurance for protection of the public. Immediate SNL/NM line management attention is necessary to ensure that emergency management staff can develop, approve, and transmit accurate and timely notifications to offsite agencies. It should be noted that during this inspection, SNL/NM promptly implemented compensatory actions to begin addressing notification deficiencies observed during LSPTs and to provide interim written guidance for formulating PARs. SSO and SNL/NM line management attention is also needed to strengthen corrective action mechanisms applicable to the emergency management program to better facilitate programmatic improvement and prevent problem recurrence.

This inspection focused on a detailed assessment of five key emergency management programmatic elements, as well as the performance of selected emergency response decision-makers and support functions. No overall program rating has been assigned. The individual element ratings reflect the status of each SNL/NM emergency management program element at the time of the inspection. The rating assigned below to the readiness assurance category is 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 Survey and Hazards Assessments ..... NEEDS IMPROVEMENT  
 Program Plans and Procedures ..... SIGNIFICANT WEAKNESS

#### **Emergency Preparedness**

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

#### **Emergency Response**

SSO and SNL/NM Emergency Response Decision-Making ..... NEEDS IMPROVEMENT

#### **Readiness Assurance**

NNSA Line Program Management ..... NEEDS IMPROVEMENT

# APPENDIX A

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## SUPPLEMENTAL INFORMATION

### A.1 Dates of Review

Planning Visit	February 28–March 3, 2005
Onsite Inspection Visit	March 14–22 and April 15–16, 2005
Report Validation and Closeout	April 18–22, 2005

### A.2 Review Team Composition

#### A.2.1 Management

Glenn S. Podonsky, Director, Office of Security and Safety Performance Assurance  
Michael A. Kilpatrick, Director, Office of Independent Oversight and Performance Assurance  
Charles B. Lewis, Director, Office of Emergency Management Oversight

#### A.2.2 Quality Review Board

Michael A. Kilpatrick  
Dean C. Hickman  
Robert M. Nelson  
Bradley Peterson  
Douglas Trout

#### A.2.3 Review Team

Bradley Peterson, Director, Office of Cyber Security and Special Reviews (Team Leader)  
Steven Simonson (Topic Lead)  
JR Dillenback  
Deborah Johnson  
John Nichols  
David Odland  
Jeffrey Robertson  
Tom Rogers

#### A.2.4 Administrative Support

Anna Lucero

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## APPENDIX B

### SITE-SPECIFIC FINDINGS

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

FINDING STATEMENTS	REFER TO PAGES:
1. SNL/NM EPHAs do not provide the technical basis for protective actions and PARs; do not comprehensively evaluate the potential consequences of onsite transportation hazards; and are not consistent in content, arrangement, and methodology with that specified in the EPHA development procedure, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	15
2. The SNL/NM process for developing, approving, and maintaining the EPHA does not establish a clear, documented understanding (between the emergency management department and facility line management) of the hazardous material inventory limits necessary to ensure that facility hazardous material inventories do not exceed material-at-risk assumptions used in the EPHAs, as required by DOE Order 151.1B.	15
3. SNL/NM EPIPs do not provide the specific instructions necessary to ensure that the desired actions are effectively accomplished, as required by DOE Order 151.1B.	17
4. The SNL/NM emergency plan, EPIPs, and position-specific checklists do not consistently define and implement the roles and responsibilities of the IC and ED for determining and executing protective actions and protective action recommendations, as required by DOE Order 151.1B.	18
5. SNL/NM has not developed predetermined protective actions or PARs for nearly all of the high-consequence accident scenarios for which the concentration of hazardous materials would exceed protective action criteria beyond the KAFB outer boundary, as required by DOE Order 151.1B.	19
6. SNL/NM has not implemented a process to ensure that only qualified individuals are placed on the emergency response organization watch bill, as required by DOE Order 151.1B.	23
7. The SNL/NM exercise program is not effective in identifying and correcting programmatic weaknesses, as required by DOE Order 151.1B.	24
8. SNL/NM and SSO have not developed and implemented Joint Information Center processes that provide adequate assurance that emergency public information personnel can produce and disseminate coordinated, effective, accurate, and timely public information during a significant event, as required by DOE Order 151.1B.	25
9. The EOC teams did not ensure that critical decisions were made and implemented to facilitate an effective emergency response, as required by DOE Order 151.1B.	34

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

FINDING STATEMENTS	REFER TO PAGES:
10. The consequence assessment team did not provide event assessments that were useful in decision-making, as required by DOE Order 151.1B.	34
<p data-bbox="159 457 1242 556">[This finding is applicable to the emergency management inspection, but is listed as Finding #12 in Volume II of the OA-40 report, <i>Independent Oversight Inspection of Environment, Safety, and Health Programs at the Sandia National Laboratories.</i>]</p> <p data-bbox="159 598 1242 730">SSO has made limited progress in establishing an effective issues management and commitment tracking system, and has not conducted adequate reviews of contractor corrective actions to verify closure and effectiveness in ensuring resolution of OA findings and preventing recurrence, as required by DOE Order 414.1B and DOE Order 470.2B.</p>	39

# APPENDIX C

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## EMERGENCY PLANNING

### C.1 Introduction

Emergency planning consists of identifying hazards, threats, and hazard mitigation mechanisms; developing and preparing emergency plans and procedures; and identifying personnel and resources needed to assure an effective emergency response. Key elements of emergency planning include developing a hazards survey and emergency planning hazards assessment (EPHA) to identify and assess the impact of site- and facility-specific hazards and threats, and establishing an emergency planning zone. Based upon the results of these assessments, U.S. Department of Energy (DOE) and National Nuclear Security Administration (NNSA) sites and facilities must establish an emergency management program that is commensurate with the identified hazards. The 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 Sandia National Laboratories – New Mexico (SNL/NM) hazards survey and EPHAs associated with the Microsystems and Engineering Sciences Applications East Facility, the Sandia Pulsed Reactor (SPR) facility, and transportation activities. OA also reviewed the SNL/NM emergency plan and associated implementing procedures. These reviews focused on improvements made in response to weaknesses identified during the inspection conducted by the Office of Independent Oversight and Performance Assurance (OA) in February 2003.

### C.2 Status and Results

#### C.2.1 Hazards Survey and Hazards Assessment

The hazards survey and EPHAs serve as the foundation of the emergency management program; consequently, their rigor and accuracy are key to developing effective emergency response procedures and other elements of the program. The degree to which these documents effectively serve this function is primarily dependent upon the completeness of the institutional processes for developing a hazards survey and EPHA, the effectiveness of the screening process by which hazardous materials are initially identified and evaluated, and the rigor and accuracy of the analyses contained within the EPHA.

The February 2003 inspection determined that SNL/NM had made progress in improving the rigor of the EPHA (formerly referred to as the hazards assessment document, or HAD) and better defining the potential risks to site workers and the public. However, an incomplete spectrum of analyzed accident scenarios and the use of source terms that did not necessarily reflect the maximum quantities of hazardous materials available for release, both longstanding issues, limited the effectiveness of the EPHAs in establishing an appropriate foundation for the site's emergency management program. In addition, SNL/NM had not implemented a formal process to ensure that the EPHAs were updated before significant changes occurred in facilities or hazardous material inventories. This 2005 OA inspection found that SNL/NM has significantly upgraded the EPHAs and the associated maintenance process, but some important weaknesses remain.

SNL/NM has made improvements in the processes that define how EPHAs are to be developed and maintained and in the content of the EPHAs themselves. Responding to recommendations from the 2003 OA inspection, SNL/NM has implemented a procedure for preparing their hazards survey, EPHAs, and emergency action levels (EALs). With few exceptions, the procedure appropriately incorporates

DOE requirements and expectations, and it facilitates standardization of EPHA content and format across multiple facilities. SNL/NM has improved the content and rigor of their hazards survey and now screens hazardous chemicals against threshold screening quantities obtained from a detailed analytical study conducted by the Los Alamos National Laboratory as part of that site's screening process. Consequently, SNL/NM is able to have much more confidence regarding the identification of facilities requiring EPHAs and hazardous materials needing further assessment.

Furthermore, in response to previously identified concerns regarding EPHA maintenance, SNL/NM changed the primary hazards survey question set pertaining to facility hazardous material inventories to better reflect the potential impacts of facility process or hazardous material inventory changes on EPHA validity. For example, if the primary hazards survey identifies a new hazardous material, the facility manager is required to notify the EPHA coordinator, who then qualitatively screens chemical materials to determine whether an EPHA is required. In addition, SNL/NM has implemented a change to their environment, safety, and health (ES&H) manual that requires facilities to notify the emergency management department if inventories of hazardous materials increase above or decrease below "emergency planning threshold limits," although, as described in more detail below, this term is not clearly defined.

To determine the effectiveness of the hazardous material identification and screening process, the OA team performed walkdowns of multiple facilities under the cognizance of facility managers and facility ES&H representatives. Facility managers demonstrated good knowledge of their facilities and their hazardous materials. The facilities were clean and generally free of combustible material and other accident initiators. Chemical inventories in facilities, including the site warehouse, were minimal, in part due to the use of just-in-time procurement.

SNL/NM has also improved the content and rigor of the EPHAs and developed an analysis-based set of EALs. The analytical assumptions, input parameters, and consequence analyses are, with the exception of the SPR and transportation EPHAs, technically accurate, and the EPHAs include a complete spectrum of events. Event consequences presented in the EPHAs have been calculated and tabularized using both neutral and severe meteorology. In addition, adjustments to the stability class used for analyzed fires were made to ensure that worst-case consequences were included in the EPHA results. An analysis of the

toxicological effects of radiological materials has been performed, although the results of the analysis have not been incorporated into the radiological EPHAs. Furthermore, facility management is involved in developing, reviewing, and approving their respective EPHA. The completed hazards survey and EPHA documents have been submitted to the Sandia Site Office (SSO) for approval. The rationale for the emergency planning zone has been thoroughly documented, but it has not yet been approved by SSO. The SNL/NM EALs, which are essentially response procedures for converting EPHA results into classification and protective action formulation decisions, contain protective action criteria and distances to thresholds for early lethality. Protective actions have been developed and are documented for most of the event consequences presented in the EPHAs.

Although the EPHAs and the associated maintenance processes are much improved, some important weaknesses remain that collectively detract from the adequacy and effectiveness of the EPHAs as emergency planning tools and as response decision-making tools for consequence assessment personnel. The most significant weakness is that, contrary to guidance provided in the SNL/NM EPHA development procedure, the protective action plans do not contain actions (e.g., evacuate, shelter-in-place) that are based on underlying EPHA analyses. Protective actions, which are for onsite workers, and protective action recommendations (PARs), which are for use by offsite agencies, are contained in protective action plans that are correlated with the EALs by plan number. However, although the EPHAs contain technically accurate analytical assumptions, input parameters, and consequence analyses, protective actions based on such event-specific criteria as type of release (puff or continuous), weather conditions (clear vs. raining), and building integrity against air intrusion are not evaluated in the EPHA or documented in the protective action plans. This is because the EPHAs lack some important data, such as the identification of critical receptors of interest (nearby facilities, Kirtland Air Force Base [KAFB] housing, public facilities), the hazardous material dose concentration levels at the critical receptors of interest, and the elapsed time until plume arrival at the receptors of interest. For example, the protective action plans require sheltering personnel in place, even if personnel are sheltered within a "Hot Zone," which is representative of hazardous material concentrations that pose an immediate health threat. This weakness is discussed in more detail in Section C.2.2 of this report.

Weaknesses were also noted in the event consequence analyses in the SPR and transportation EPHAs. The SPR EPHA assumed an inappropriate value of zero for the release fractions for catastrophic event scenarios pertaining to the reactor core. The OA team noted that this deficiency has been adequately addressed in a new revision to the applicable documented safety analysis, which is intended to serve as the basis for an SPR EPHA revision. The transportation EPHA did not consider the maximum quantity of material that could normally be carried on a given truck. Rather, the transportation EPHA addressed one container of a particular chemical hazardous material involved in a small spill or small fire. In addition, although SNL/NM conducts inter- and intra-site moves of radiological hazardous materials, this EPHA does not address events related to these activities. These weaknesses impair the utility and accuracy of the associated EALs and protective actions and raise concerns regarding the validity of the emergency planning zone, based on a potentially non-conservative material-at-risk. The transportation EPHA weakness was identified during the February 2003 OA inspection.

The degree of EPHA documentation is not adequate to effectively support emergency planning efforts. As mentioned above, the EPHAs are not consistent in content, arrangement, and methodology with that specified in the SNL/NM hazards survey and EPHA development procedure. Although EALs and protective actions are documented in respective manuals, they are not documented in the EPHAs as required by the SNL/NM EPHA development procedure, and the methodology used in preparing them is not documented in the EPHAs or in any other SNL/NM document. Furthermore, the process necessary to verify the accuracy of EALs for specific analyzed events is cumbersome and not documented. Because the EPHA event sequence identifiers are different than those used to identify specific EALs, a companion crosswalk document must be used in conjunction with the EPHA and associated EALs. However, the companion crosswalk document is not referenced anywhere in the EPHA, and the EPHA contains no discussion of its use or purpose. Collectively, these weaknesses limit the internal and external auditability of the EPHAs, and more importantly, may challenge the ability of the site to maintain the validity of the EPHA set over the long term despite personnel turnover, facility or process additions, and changes in hazardous material types and quantities.

**Finding #1: SNL/NM EPHAs do not provide the technical basis for protective actions and PARs; do not comprehensively evaluate the potential consequences of onsite transportation hazards; and are not consistent in content, arrangement, and methodology with that specified in the EPHA development procedure, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.**

There is also some uncertainty in the process for maintaining the validity of the EPHA assumptions regarding the material-at-risk quantity. The facility owners, facility users, and emergency management staff work together to establish hazardous material planning inventory quantities appropriate for use in emergency planning. The planning inventory is usually based on the current and projected facility use, and is the material-at-risk value analyzed in the EPHA. As discussed above, formal requirements have been established for notifying the emergency management department of inventory changes above or below the SNL/NM facility emergency planning threshold limits. However, the understandings regarding the planning inventory quantities have not been formalized, and there is no clear correlation between planning inventory quantities and the emergency planning threshold limits referenced in the ES&H manual. Therefore, facility line management may not have all of the information necessary to ensure compliance with the applicable SNL/NM requirements. For example, a review of the chemical planning inventories in the Microsystems and Engineering Sciences Applications East Facility (Building 858) EPHA identified that a planning inventory of 1,020 gallons for sulfuric acid had been established and analyzed. However, according to the building ES&H representative, up to 1,390 gallons of sulfuric acid would be allowed in the facility.

**Finding #2: The SNL/NM process for developing, approving, and maintaining the EPHA does not establish a clear, documented understanding (between the emergency management department and facility line management) of the hazardous material inventory limits necessary to ensure that facility hazardous material inventories do not exceed material-at-risk assumptions used in the EPHAs, as required by DOE Order 151.1B.**

Finally, although use of the Los Alamos National Laboratory screening thresholds generally avoids the potential non-conservatism inherent in using only regulatory-based thresholds, SNL/NM does not refer to their use in the EPHA development procedure and has not independently verified their validity. Additionally, a formal process has not been developed to ensure that SNL/NM obtains revisions to the data from Los Alamos National Laboratory or updates the screening threshold table when new data is received.

To summarize, SNL/NM has implemented a procedure for preparing the hazards survey, EPHAs, and EALs intended to standardize the content and format of the multiple facility documents. SNL/NM has improved the content and rigor of their hazards survey and EPHAs since the 2003 inspection, has implemented technically accurate EALs that provide appropriate classification and protective action distance information, and now screens identified chemical materials against an analysis-based set of screening thresholds. Furthermore, SNL/NM has formalized institutional mechanisms to notify emergency management staff of process and/or hazardous material inventory changes, and facility management is involved in developing, reviewing, and approving their respective EPHA. As a result, most required elements of the program's foundation are in place. However, the EPHAs are not consistent in content, arrangement, and methodology with that specified in the SNL/NM EPHA development procedure. Consequently, the preferred form of predetermined protective actions is not evaluated in the EPHA or based on event-specific considerations, as required, and various documentation weaknesses negatively impact the long-term maintainability of the EPHAs. In addition, because of analytical weaknesses, the SPR and transportation EPHAs have not adequately identified all hazardous materials at risk for release. Finally, SNL/NM has not formalized understandings between emergency management staff and facility management regarding maximum allowed inventories of hazardous materials to ensure that EPHA assumptions regarding material-at-risk remain valid.

## C.2.2 Program Plans and Procedures

The February 2003 OA inspection determined that the SNL/NM emergency management program did not ensure that the critical, time-urgent tasks of identifying protective actions, formulating PARs, and communicating protective actions could be effectively executed in a timely manner following a significant site

event. Since that inspection, SNL/NM has made many planning and process improvements in several key areas, but significant procedure weaknesses continue to impair program implementation, as was observed during limited-scope performance tests (LSPTs).

SNL/NM has implemented many procedural improvements over the past two years, including a comprehensive set of EALs, an associated protective action plan manual, and a procedure for implementing incident command for security events. The protective action plans provide predefined protective actions, PARs, and supporting logistical information, including traffic control points and command post locations. As observed during LSPTs, the improved procedures facilitate rapid incident commander (IC) event response times and improved coordination between the IC and security forces for traffic control and other security considerations. The offsite notification process has been streamlined, removing the SSO emergency response duty officer from the notification loop to ensure a timely response during both normal working hours and off-hours. To ensure efficient and consistent handling of incoming 911 calls, the Emergency Operations Center (EOC) communication coordinators have developed a comprehensive set of reference cards to provide a series of standardized questions and requests for various calls, including bomb threats, suspicious packages, and spills.

To improve processes associated with dispatching onsite responders and completing protective actions, the EOC communication coordinator position is continuously staffed, and each individual is trained as a 911 telephone communicator and trained and certified by the State of New Mexico as a public telecommunicator. This newly staffed position is complemented by a system of notification tools known as the Sandia Protective Action Notification (SPAN) system. The SPAN system establishes, trains, and equips facility evacuation teams that respond to computerized text pages sent to them electronically from the EOC. Emergency announcements and directives for site personnel are sent to tone alert radio receivers deployed throughout each facility in accordance with the facility's evacuation team needs. Additionally, SNL/NM has deployed a powerful, computer-based mapping program for use by ICs, communication coordinators, and EOC responders in helping to define geographical areas where onsite protective actions and PARs are applicable and to aid in establishing appropriate traffic control points and safe locations for the IC command post.

SNL/NM and SSO continue to enhance their relationship with KAFB emergency response elements through a revised memorandum of understanding (MOU) between the site and the KAFB fire department. The KAFB fire department provides fire, hazardous materials, and off-hours rescue/reconnaissance services for SNL/NM operations. SNL/NM has medical, hazardous material, and rescue-reconnaissance emergency response capabilities independent of and complementing KAFB resources during normal SNL/NM working hours. The MOU provides protocols and delineates roles and responsibilities for designating the lead IC and implementing unified command under various conditions. The February 2003 OA inspection noted that SSO was working on the evaluation and upgrade of interface agreements with Federal, state, and local agencies. This work has yet to be completed; the MOU with the City of Albuquerque expired January 2002.

Notwithstanding the substantive improvements in process, staffing, and equipment, a number of weaknesses remain in the emergency plan implementing procedures (EIPs) and EALs used to direct key decision-making activities after initial event categorization/classification has been completed. A significant weakness is that the EIPs do not contain specific procedural guidance for many key activities associated with formulating and communicating protective actions and PARs. Many of these weaknesses were identified during LSPTs, and are discussed in more detail in Appendix E. The most notable of these is that the EIP for conducting offsite notifications and the associated notification form provide no direction to the communication coordinators regarding proper completion of initial and follow-up notification forms. The offsite notification form is inconsistent with the design of the existing PARs in that it makes no reference to the established geographic sectors (e.g., Albuquerque fire zones, KAFB crash sectors), and no guidance is provided regarding what data to include or how to record the shelter or evacuation zones. Additionally, the form does not include provisions for a brief description of the event or whether a release is in progress, both of which are DOE expectations. These procedural weaknesses significantly impacted the ability of the communicators to complete offsite notifications, which is critical for SNL/NM given the proximity of the public. Additional examples of procedural weaknesses include:

- The EIP for categorizing/classifying events contains limited direction regarding implementation of EALs and protective actions/PARs. For example, the IC is directed to complete a protective action plan, if necessary. However, there is no guidance for choosing the most appropriate protective action (e.g., shelter, evacuation) or identifying the applicable geographic areas. In addition, no specific procedural guidance is provided for the SNL/NM emergency director (ED) regarding classification or protective actions/PARs.
- The EIP for protective action and consequence assessment does not define any methodology or expectations for developing protective actions. No guidance is provided as to when to shelter versus evacuate (both in the hot zone and downwind), how to develop downwind evacuation recommendations (i.e., width of evacuation zone), or how to choose onsite evacuation routing. In addition, protective action plan maps contain circles labeled “Hot Zone” and “PA Zone” that are not defined in any implementation procedures.
- Based on difficulties observed during LSPTs, the EIP intended to direct the actions of the consequence assessment team and the associated checklists do not provide adequate guidance to successfully complete timely initial assessments, develop dispersion plumes, or review PARs.
- The SPR EALs do not facilitate effective decision-making. The EALs that are available for use by the IC do not fully describe the analyzed event because only a portion of the scenario description block is displayed on the hard copy printout. Furthermore, the layout of the EALs is complex, and although a large number of events are addressed, there is no index. Collectively, these weaknesses contributed to the IC inappropriately declaring a Site Area Emergency, and not a General Emergency, during the force-on-force exercise, as described in Appendix E.

**Finding #3: SNL/NM EIPs do not provide the specific instructions necessary to ensure that the desired actions are effectively accomplished, as required by DOE Order 151.1B.**

Additionally, although initial IC roles, responsibilities, and authorities are clearly spelled out in the SNL/NM emergency plan and EIPs, the various inconsistencies among these documents confuses the separation of duties between the IC and ED after the EOC is activated. As was observed during LSPTs involving EOC staff, this unclear definition of response roles and responsibilities can substantially degrade the response, particularly when timely and accurate decisions must be made regarding the formulation and communication of protective actions and PARs. Examples of confusing roles and responsibilities include:

- One chapter of the SNL/NM emergency plan states that the primary decision-maker for consequence-based decisions at SNL/NM from the onset of an emergency is the IC (with ED concurrence, when available). This differs from information in the subsequent chapter, which states that during normal working hours, the ED is responsible for recommending offsite protective actions to local authorities.
- EPIP 610, Table 1, states that after EOC activation, the ED has primary responsibility for event classification, onsite protective actions (outside the incident command area), and PARs. This differs from one of the emergency plan chapters, which assigns primary decision-making responsibilities to the IC (see preceding bullet). The EPIP for event classification does not specifically mention EOC activation; it assigns the IC responsibility for classification, all onsite protective actions, and PARs, with the ED ensuring these actions.
- Another emergency plan chapter states that the ED reviews and approves all external information releases and notifications. The responsibilities section of the notification procedure states that staff obtain either IC or ED approval for notification updates, and that the ED approves updated notification forms, if appropriate. The procedure section directs staff to obtain IC approval for both the initial and updated notifications.

**Finding #4: The SNL/NM emergency plan, EIPs, and position-specific checklists do not consistently define and implement the roles and responsibilities of the IC and ED for determining and executing protective actions and protective action recommendations, as required by DOE Order 151.1B.**

There are common issues affecting procedure inconsistencies and lack of specificity. SNL/NM does not utilize a procedure writer's guide that provides a common format and defines such key words as ensure, verify, should, and shall. Additionally, there is no written guidance regarding how to maintain the procedure set and process revisions. The current process used by emergency management staff is effective in tracking revisions to the emergency procedures and supporting documents. However, it is an expert-based system developed and maintained by a single person. There is also no formal procedure or guidance document that provides requirements regarding the use of emergency management response procedures or checklists for the EOC staff or communication coordinators. This has resulted in inconsistent application of procedural requirements and no consideration of human error reduction practices, such as peer checks for critical procedure steps.

Finally, SNL/NM has not completed the project through which the protective action plans were developed. Consequently, nearly all of the protective action plans (and their associated protective actions and PARs) for the low-probability, high-consequence events that will affect both onsite and offsite personnel are not available. SNL/NM appropriately prioritized the development of these plans based on the likelihood of event occurrence, but in the interim period, did not issue specific procedural guidance for ICs and EDs to use in formulating protective actions or PARs for these events. Furthermore, there is currently no corrective action tracking item, project plan, or set of milestones that addresses completion of the remaining protective action plans, although the site recently issued a request for outside support to complete this work. The level of training provided to the ICs, their familiarity with the 2004 Emergency Response Guideline, and their experience with the EALs provides a high level of confidence that ICs will be able to develop an adequate protective action plan without such guidance. However, given the current lack of procedural guidance, a less rigorous training program, and observed performance difficulties with classification and protective action/PARs, EDs may not be able to fulfill their responsibilities related to protective action and PAR formulation for the high-consequence events.

**Finding #5: SNL/NM has not developed predetermined protective actions or PARs for nearly all of the high-consequence accident scenarios for which the concentration of hazardous materials would exceed protective action criteria beyond the KAFB outer boundary, as required by DOE Order 151.1B.**

To summarize, SNL/NM has implemented corrective actions since the 2003 OA inspection that have improved the procedures and processes for initial decision-making and onsite protective actions. The most noteworthy improvements are the implementation of a protective action plan manual and communication system upgrades, including 24/7 EOC communication coordinator staffing, and implementation of the tone alert radios and SPAN, all of which support notification of site workers. These changes have improved IC response in event categorization/classification and development of initial protective actions. However, the existing SNL/NM implementing procedures and tools do not promote timely and accurate PAR formulation and communication. Notification form and procedure weaknesses, combined with the absence of protective action plans and formal interim protective action guidance, and minimal levels of training for the EDs mean that emergency responders in the EOC may not be adequately prepared to protect site workers and the public following significant events. These weaknesses were the dominant contributor to the significant performance weaknesses demonstrated during LSPTs involving emergency response organization personnel. Furthermore, many of these weaknesses were previously identified during the 2001 and 2003 OA assessments, but corrective actions were not consistently effective. The OA team noted that following LSPT completion, SNL/NM promptly implemented compensatory actions to begin addressing the observed notification deficiencies and to provide interim written guidance for formulation of PARs by key decision-makers.

### C.3 Conclusions

Following the OA inspection in 2003, SNL/NM improved its emergency planning in a number of key areas. SNL/NM prepared and implemented an emergency plan that addresses the functional elements necessary to plan, prepare, and respond to an emergency event. To provide an adequate technical

foundation for the program, SNL/NM developed and implemented procedural direction for the preparation, review, and approval of key emergency planning documents, and, subsequently, prepared an updated site hazards survey and improved EPHAs for most of its hazardous facilities. SNL/NM also developed and implemented a comprehensive set of EALs and an associated protective action plan manual, and revised emergency procedures to reflect the addition of 24/7 coverage by certified communication coordinators. The improvements in plans, procedures, staffing, and equipment have contributed to observed improvements in initial decision-making and communication of onsite protective actions. In spite of these improvements, some significant areas of weakness remain in the site's emergency planning basis. The EPHAs do not provide a firm analytical basis for the type of predetermined protective actions; some required protective action plans have not been prepared; and specific procedural guidance has not been developed for use in formulating PARs for events where a protective action plan has not been developed. More importantly, because of significant weaknesses in the detail of the SNL/NM implementing procedures and the inconsistent designation of roles and responsibilities for the IC and ED, the procedures do not adequately support decision-makers in their time-urgent responsibilities of event categorization/classification, protective action formulation, and notifications, as was observed during LSPTs conducted as part of this inspection.

### C.4 Ratings

A rating of NEEDS IMPROVEMENT is assigned to the area of hazards survey and hazards assessments.

A rating of SIGNIFICANT WEAKNESS is assigned to the area of program plans and procedures.

### C.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

## NNSA Office of Emergency Operations

- Absent other screening processes directed or permitted by DOE Order 151.1B, consider validating the adequacy and providing guidance for the use of the hazardous material threshold screening quantities derived by Los Alamos National Laboratory for use at DOE sites to improve the rigor of hazardous chemical screening processes currently in use across the DOE complex.

## Sandia Site Office

- Consider implementing a mechanism for reviewing the hazards survey and EPHAs that ensures that appropriate SSO disciplines (e.g., safety analysis experts and facility representatives) support the review.
- Consider engaging the NNSA Office of Emergency Operations in reviewing the SNL/NM hazards survey and EPHAs.
- Consider revising the SSO emergency response duty officer checklist to ensure that changes in event status are communicated in a timely manner to DOE Headquarters if these changes occur between initial notification and transmission of the situation report. The addition of a note in the checklist to immediately communicate changes in classifications and protective action planning would aid in assuring that the emergency response duty officer responsibility of providing verbal updates, as discussed in the SSO emergency response procedure, is completed.

## Sandia National Laboratories – New Mexico

- Enhance the usefulness of the process for developing and maintaining the hazards survey and EPHAs by incorporating survey activities and providing additional specificity in the survey and assessment development procedure and documents. Specific actions to consider include:
  - Perform a detailed review of the survey and assessment-related sections of DOE Guide 151.1-1, *Emergency Management Guide*, 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).

- Procedurally define line management responsibilities at the facility and activity levels to ensure that integrated safety management implementation mechanisms trigger formal notification to the emergency management staff when quantities of material approach or exceed emergency preparedness planning thresholds (i.e., threshold screening quantities obtained from Los Alamos National Laboratory or radionuclide screening threshold quantities from 10 CFR 30.72).
  - Revise the hazards survey and SNL/NM EPHA development procedure to include a reference to the chemical screening threshold quantities obtained from Los Alamos National Laboratory. Consider analyzing a percentage of the chemicals to evaluate validity of quantities as they pertain to SNL/NM.
  - Revise the format of event consequence output tables in the EPHAs to make them more useful as an emergency response resource document. For example, the tables should provide a clear linkage between the specific event scenario descriptions, the rollup of the events into EAL statements, and the consequences of the events at various receptor locations.
  - Include transportation activities in the facility hazards surveys, and include assessment documentation in the transportation EPHA for movement of radioactive materials on the site.
- Enhance the EALs and integrate them with the implementing procedures to make them a more effective emergency response tool. Specific actions to consider include:
    - Ensure that each EAL is technically supported by the EPHA.
    - Develop recommended EALs, together with integrated and fully defined protective actions, as output products of the EPHAs.
    - Evaluate EALs to determine whether they can be enhanced by the addition of symptom-based

EALs that include specific instrument setpoints. Installed instruments and indicators, such as toxic gas monitoring system or radiation area monitor readings, should be incorporated into EALs where possible to facilitate timely classification of events.

- Conduct performance testing to validate EALs. Ensure that EALs and corresponding protective action tables are used consistently and as written by trained personnel in a manner that will efficiently accomplish the desired actions in a high-stress, time-urgent environment.
- Consider the addition of discretionary EALs to compensate for scenarios outside of those analyzed to ensure that timely decisions can be made based on the current understanding of the situation.
- Consider formalizing the procedure development, use and revision process to enhance the performance of emergency response organization responders in use of the EIPs and the associated checklists as follows:
  - Develop a procedure writer's guide that provides a specific format and defines key words (e.g., ensure, verify, should, shall) to aid in producing a consistent response from procedure users. This procedure could also contain guidance on how to maintain and revise the procedure set.
  - Revise the current text-based format to an outline-based format that allows indication of critical steps (e.g., an asterisk or highlight).
  - Develop formal guidance that provides requirements regarding the use of emergency management response procedures 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.

- Review current EIPs to ensure that requirements for emergency management response and responder actions are not contained only in lower tier, uncontrolled documents, such as checklists. For example, EIP-100, "Emergency Operations Center Activation," does not contain the requirements for minimum staffing required for activation. That information is included only in the lower tier checklists that are uncontrolled.
- Include the "Call Handling Questions and Instructions Cards" used by the EOC communicators as part of the document management process to ensure that they are current.
- Consider revising the offsite notification form contained in EIP-500 to better match the format of the current protective action plans. Utilize benchmarking of similar facilities to aid in the development of an SNL/NM specific form that meets all DOE requirements and expectations. Suggested improvements include:
  - Reference established geographic sectors (e.g., Albuquerque fire zones, KAFB crash sectors) in a checklist-type format to identify affected areas to shelter/evacuate. Ensure that the notification form uses the same naming conventions as the protective action plans.
  - For each geographic zone include a checkbox for shelter or evacuate.
  - Provide an area for a brief description of the event.
  - Provide a checkbox to indicate whether a chemical/radiological release is in progress.
- Consider developing a formal process for the SNL/NM ED to accept turnover of the "overall emergency response" from the active IC upon EOC activation. This would enhance the definition of clear roles and responsibilities between the ED and the IC.

# APPENDIX D

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## 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, and in part 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 and Performance Assurance (OA) evaluated the Sandia Site Office (SSO) and Sandia National Laboratories – New Mexico (SNL/NM) training, drill, and exercise programs used to support the ERO at the institutional and facility levels. As part of the programmatic review of the training, drill, and exercise elements, OA 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 both enhance responder proficiency and evaluate the level of the site's response preparedness. The OA team also evaluated the effectiveness of EPI plans and applicable processes for an emergency at SNL/NM.

### D.2 Status and Results

#### D.2.1 Training, Drill, and Exercise Program

The February 2003 inspection determined that the SSO and SNL/NM training, drill, and exercise programs were poorly defined and lacked the structure necessary to prepare personnel for their emergency response duties, promote performance improvements, and validate the effectiveness of the site's emergency response system. SSO and SNL/NM were aware of these issues and had developed a series of corrective actions that, for SNL/NM, included adding an experienced emergency management training coordinator to the emergency management staff. In recognition of SSO and SNL/NM self-assessment findings and corrective action plans, OA did not issue a finding to address the numerous training program weaknesses. This 2005 inspection found that significant improvements have been achieved in the areas of focus, namely field response activities, and SNL/NM has actively pursued the resolution to weaknesses identified in the 2003 inspection report. Efforts to improve the proficiency of the incident commanders were particularly effective, as demonstrated in the limited-scope performance tests (LSPTs). However, some corrective actions have not been completed, therefore some longstanding weaknesses remain.

#### Training

Since the February 2003 OA emergency management inspection, SNL/NM has made significant improvements in the training, drill, and exercise programs. A highly experienced, full-time, emergency management training coordinator was added to the emergency management staff and a training plan was written and approved. Extensive training was conducted on procedures that were developed to define

the processes used by field response teams. A longstanding issue that hindered coordination with the Kirtland Air Force Base (KAFB) fire department was resolved by training and certifying SNL/NM incident commanders to the National Fire Protection Association standards for hazardous materials response. Additionally, evacuation teams for all buildings have been established and trained on the Sandia Protective Action Notification system and process.

In November 2004, SNL/NM issued an emergency management training plan designed to meet all minimum regulatory requirements, consensus standards, and DOE orders. The training plan includes such key elements as provisions for an instructional systems design process; initial and annual certifications; a tracking system to document and track certifications and training for verifying qualification status; criteria for successful completion of course material; record-keeping requirements; and instructor qualifications. A training requirements matrix defines initial and refresher training for all ERO positions, and monthly, ERO members receive a schedule that identifies upcoming training and drill opportunities. Furthermore, the training program includes a good mix of academic and practical training elements, and training emphasizes both the safety and proficiency of responders. The training plan is very ambitious both in its comprehensive approach and in the extensive initial and annual refresher training requirements. However, as discussed below, some elements of the plan have not been fully developed or implemented.

The initial focus of training was appropriately directed toward field response elements, based on the immediacy of their responsibilities, and has resulted in improved performance by the incident commanders and their support staff, as noted in the LSPTs that were conducted by OA-30. Initial and refresher training material associated with field activities is comprehensive and makes good use of written exams and the demonstration of proficiency. Training for Emergency Operations Center (EOC) teams is not as fully developed as that for the field elements. Within the last year, training for the EOC teams has included courses on emergency action levels, incident command, and consequence-based decisions. However, training on EOC operations that includes specific roles and responsibilities and use of emergency plan implementing procedures and response checklists was not provided during calendar year (CY) 2004. The two emergency directors who participated in the LSPTs last received this training several years ago (one in 1998 and the other in 1999), even though numerous

changes have been recently made to the procedures and protective action plans. Additionally, the degree of drill participation only partially compensates for the training weaknesses in this area. Only one of the two emergency directors who participated in the LSPTs had participated in a drill within the past 12 months. These weaknesses in EOC training and drill participation contributed to the EOC team performance weaknesses discussed in Appendix E of this report, and the actions required to address the related finding will necessarily entail strengthening the EOC training and drill component.

Because the recently issued training plan includes many new initial and requalification training requirements, few, if any, of the ERO members are qualified in accordance with the plan. SNL/NM has not defined a core set of training requirements that would identify the minimum qualification standards required to be on the ERO roster until such time that a training plan is fully implemented. Additionally, some of the initial and refresher training courses are not yet developed. The training coordinator also cannot readily monitor the qualification status of ERO members. Although the emergency plan specifies the use of the sitewide Training and Employee Development System (TEDS) for tracking personnel training and qualifications, the TEDS structure does not meet all of the specific needs of the emergency management organization. A local database has been developed and is being implemented for tracking the status of training and drill participation, but the absence of a formal set of criteria that defines an interim level of required training and experience limits the use of the database as a tool to identify individuals who should remain on the ERO roster.

**Finding #6: SNL/NM has not implemented a process to ensure that only qualified individuals are placed on the emergency response organization watch bill, as required by DOE Order 151.1B.**

Although much of the scheduled training appears to be effective, this was not necessarily true for training that was provided to consequence assessment staff. The six members of the consequence assessment team met frequently over the past year to receive training and practice developing plume plots. Training addressed the consequence assessment procedure and checklists and the selection of appropriate dispersion modeling tools, such as Hotspot and EPICode, based on the specifics of the event. Practical training sessions were

held to improve proficiency with the various dispersion modeling tools. There were 15 such training or practical sessions documented in 2004 alone. However, many consequence assessment team performance weaknesses were identified during the LSPTs as discussed in Appendix E of this report.

## Drills and Exercises

In November 2003, SNL/NM approved the exercise/drill guidelines document for developing and implementing the exercise program. This document contains several positive features, including an exercise and drill matrix that identifies organizations and buildings to be evaluated over a multi-year period and a generic set of exercise objectives with criteria that are used in exercise and drill development. SNL/NM has developed a five-year exercise schedule that includes an appropriate mixture of hazardous material, mass casualties, weapons of mass destruction, and radiological events. These exercises all involve different facilities. The CY 2004 annual exercise, “Turquoise Coffin,” indicated an improved degree of exercise planning and conduct, as evidenced by such elements as the documented purpose, scope, and limitations; scenario timeline; and assignment of controllers, evaluators, responders, and actors. Additionally, exercise objectives with criteria for each participating organization were established by expanding the generic set contained in the exercise/drill guidelines document. The most significant improvement was the choice of a credible SNL/NM scenario supported by an emergency planning hazards assessment and emergency action levels that provided the opportunity to adequately test many program elements.

Drills conducted at SNL/NM are designed to meet specific objectives and range in scope from evaluated limited-scope exercises to focused tabletop performance tests. Because many drills are conducted by the training coordinator, many identified performance weaknesses result in training program enhancements either in the form of updated lesson plans or briefing sessions. Announced evacuation drills and no-notice shelter drills are well scheduled, conducted, evaluated, and documented. Any building that fails an evacuation or shelter drill is scheduled for another drill within 90 days to verify that corrective actions were effective. However, with the exception of the evacuation and shelter drills, many drill packages are incomplete, and corrective actions that are the responsibility of an individual outside of the emergency management organization are not assigned and tracked.

Although improvements were evident since the 2003 OA inspection, the administration of the drill/exercise program has not adequately addressed all required elements of the program, and some weaknesses identified during the 2003 inspection remain. For example:

- Findings and corrective actions have not been identified to address performance weaknesses demonstrated during the October 2004 exercise. As a result, the exercise was not used to improve the emergency management system.
- Approximately 40 percent of the 160 ERO members have not participated in a drill or exercise within the last year, although the SNL/NM emergency plan requires annual participation.
- The exercise/drill guidelines document incorporates generic language taken directly from the DOE *Emergency Management Guide*; consequently, many aspects of the program could be considered, at the discretion of the reader, as guidance. The document does not identify SNL/NM-specific roles, responsibilities, or program requirements. This weakness was previously identified by the 2003 OA inspection, when the document was in draft form, and also by an SSO assessment in March 2004.
- There is no mechanism, such as a tracking matrix, to ensure that all elements of the emergency management program are validated over a five-year period by exercises.

**Finding #7: The SNL/NM exercise program is not effective in identifying and correcting programmatic weaknesses, as required by DOE Order 151.1B.**

To summarize, SNL/NM has implemented many improvements in the training, drill, and exercise program. A comprehensive training plan defines the program and establishes the required program elements. A full-time training coordinator was added to the emergency management staff, and he has implemented an effective training program for field responders, as was demonstrated during the LSPTs conducted during this inspection. Training and drills for building evacuation and sheltering are well managed. Additionally, improvements in the annual exercise development process resulted in a scenario that was based on an

analyzed event that appropriately challenged the ERO. However, the entire training program envisioned in the training plan is not yet fully implemented, and hence weaknesses exist that hamper the effectiveness of the training, drill, and exercise program. Training for EOC teams is not fully developed and implemented, and a process is not in place to identify and remove from the ERO roster those personnel who have not met minimum training, drill, and exercise requirements. Finally, the exercise program has not been used effectively to identify and correct emergency management program weaknesses.

## D.2.2 Emergency Public Information

The February 2003 OA inspection determined that the EPI processes were well conceived, appropriately documented in most cases, and understood by public affairs personnel. However, the SSO EPI plan and the SNL/NM media relations plan had not been integrated to ensure that, during a significant event, the EPI and Joint Information Center (JIC) staff would effectively transition from the media relations center (MRC) to the JIC. These weaknesses degraded the site's ability to provide accurate and timely information to site workers and the public during events that would require JIC activation. SSO was aware of this issue, but the corrective action approach had not been formally defined. This 2005 inspection determined that SSO and SNL/NM have developed a well-conceived, generally comprehensive, integrated EPI plan, and are in the early stages of developing a public education program. However, previously identified issues related to JIC operations remain largely unaddressed.

The OA inspection team observed several strengths in the integrated SSO–SNL/NM EPI program. The EPI plan establishes an EPI response organization that is based on a graduated activation approach determined by incident severity and the level of media interest. The plan effectively describes the development of information in the EOC and the activation and operation of the MRC. The news release approval process is well considered and appropriately detailed, and the plan includes templates for initial and subsequent news releases. Position-specific response checklists for EPI staff in the EOC and MRC include an appropriate set of roles and responsibilities and address interfaces among DOE Headquarters, SSO, KAFB, and SNL/NM EPI personnel.

While the OA team noted progress in the EPI area, some portions of the EPI plan have not been fully developed or lack specific implementing mechanisms.

The principal weakness, one that remains from the 2003 OA inspection, is that the status of EPI planning provides little assurance that EPI personnel working in the JIC could produce a coordinated, accurate, and timely release of public information during a significant event. For example, with the exception of the JIC manager, SNL/NM has not clearly delineated or documented the roles and responsibilities for JIC staff, and no criteria have been established to determine when, after JIC activation, the JIC can be declared “operational.” Consequently, as identified in the 2003 OA inspection and in the lessons learned during the March 2004 JIC drill (held to close the 2003 OA finding), there are no criteria to ensure a smooth transition from the MRC to the JIC. The JIC location, at the Energy Training Center on another section of KAFB, is still problematic due to its likely inaccessibility by media; local, state, and tribal organizations; and SNL/NM and SSO EPI staff in the likely event that KAFB is placed in a lockdown status following a significant incident. Neither SNL/NM nor SSO have established any formal, long-term JIC access agreements with KAFB officials, although a newly established KAFB readiness working group, of which SNL/NM and SSO are members, may serve as the forum to address this issue. Additionally, the memorandum of understanding with the Energy Training Center has not been reviewed since 2003, although the SNL/NM emergency plan requires an annual review.

Finally, with the exception of the March 2004 JIC drill, there have been no drills or exercises that include the JIC. The 2004 annual exercise included an event classified as a General Emergency, which, in accordance with the EPI plan, appropriately requires JIC activation. However, not only was the JIC not activated during that exercise, a news release was never issued. The previously published JIC checklists still exist and are being reviewed by the SSO public affairs specialist, but much work remains to establish a workable JIC concept.

**Finding #8: SNL/NM and SSO have not developed and implemented Joint Information Center processes that provide adequate assurance that emergency public information personnel can produce and disseminate coordinated, effective, accurate, and timely public information during a significant event, as required by DOE Order 151.1B.**

Some other consistency-related weaknesses were noted as well. SSO and SNL/NM have documented

an effective process for disseminating event information to site workers and the public, but supporting plans and response checklists provide either conflicting guidance or lack sufficient detail regarding the development and approval of initial and subsequent news releases and the five-minute message to workers to ensure timeliness and accuracy. For example:

- The response checklist for the SNL/NM EPI officer requires that the initial news release be issued within one hour. However, there is no mention of this expectation in the EOC position checklists for the newswriter, SNL/NM emergency director, or the SSO emergency manager, all of whom share responsibility for developing, approving, or ensuring that the initial news release is issued. Additionally, there is no mention of the approval process in the SSO emergency plan.
- The EPI plan requires that the emergency director, emergency manager, and authorized derivative classifier approve news releases, but the SNL/NM EPI officer checklist specifies approval by the emergency director and the SSO public affairs specialist.
- The EPI officer checklist requires that the five-minute employee message be approved by the emergency director and the SSO public affairs specialist, but the MRC checklist requires approval by only the emergency director.

Additionally, the EPI plan is unclear regarding expectations for issuing the initial news release. The EPI plan states “within one hour of the point at which enough appropriate information is available” and “within one hour of learning of the event.” These statements of policy are not consistent with DOE expectations that call for issuing the initial news release within one hour of event occurrence. Lastly, SNL/NM has not developed a process to ensure the timely correction of misinformation and rumors in news releases and news conferences, and they have not established criteria for identifying rumors, such as what constitutes a rumor, or how many times media and public inquiry teams are required to hear the same or similar statement before it is identified as a rumor.

While there has been little turnover in personnel, and the EPI cadre has routinely exhibited expertise in their EOC and MRC roles, the training program referenced in the EPI plan has not been reviewed, updated, or implemented. The EPI plan stipulates that

all EPI personnel assigned to a specific position receive performance-based training in their respective functions and in the overall concept of emergency operations. The SNL/NM emergency management training plan identifies only one EPI position and requires multiple courses, including hazardous material awareness, basic radiology, and overviews of incident command and consequence assessment. These plans have not been integrated, the EPI organization has not received the initial training or annual re-qualification training specified in either plan, and lessons plans have not been developed for any EPI-specific position training. Of additional concern is the lack of a formalized mechanism incorporating lessons learned into position-specific training and EPI plan updates. Following the March 2004 JIC drill held to close the 2003 OA finding, 16 lessons learned were identified, and the corrective action closure package indicated that the lessons learned would be incorporated into the new EPI plan and other applicable procedures. However, six of the lessons learned, including one relating to clarification of roles and responsibilities for JIC personnel and the transition from the MRC to the JIC, have not been addressed.

Lastly, SSO/SNL has not implemented a formal public education program to inform the public about actions that might be required in case of an incident at SNL/NM. In an effort to overcome the fact that Albuquerque media have not historically exhibited interest in participating in public education, SSO and SNL/NM have undertaken an effort to educate the media and be proactive in identifying useful public outreach program tools, such as the “in case of emergency” fact sheets for media use, and media advisories for blast and burn tests. While these efforts are noteworthy, development of direct public information materials, such as fliers or telephone book inserts, would help to widen public knowledge of potential protective actions that might be recommended.

To summarize, while SSO and SNL/NM have developed a well-conceived, integrated, and mostly comprehensive EPI plan, the absence of a proven JIC operational concept with the necessary supporting planning elements and procedures remains an important weakness. Consequently, there is reduced assurance that SSO and SNL/NM will be able to provide the public and the media accurate and timely information following a significant site event. Additionally, there are inconsistencies among EPI planning documents and response checklists regarding the review and approval of news releases and information for site workers.

## D.3 Conclusions

SNL/NM and SSO have collectively implemented a number of improvements that enhance the site's degree of emergency preparedness. SNL/NM has developed a comprehensive training plan, and a full-time training coordinator is working to fully implement its requirements. SNL/NM and SSO have improved their ability to respond to public information needs during a significant event by developing a generally complete EPI plan. Nevertheless, the training and drill program does not yet address all the ERO positions, including those in the EOC and JIC, although to a large extent the training provided to field response teams, particularly the incident commander, mitigates EOC training weaknesses. Additionally, the exercise program is not yet being utilized to validate program elements or initiate program improvements. Furthermore, SNL/NM and SSO have not taken the steps necessary to ensure that a fully functional JIC can be activated and effectively operated during an emergency to provide timely and accurate information to the media and the public.

## 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 EPI area.

## D.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible National Nuclear Security Administration and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

### Sandia National Laboratories – New Mexico

- Evaluate the training, drill, and exercise programs to ensure that personnel are adequately trained to respond to an emergency. Specific actions to consider include:

- Define the core set of training and experience requirements that must be met for an individual to be provisionally qualified to serve as an ERO member until the training plan is fully implemented.
- Identify ERO members that have not participated in a drill or exercise within the last 12 months, and design and conduct drills to qualify these individuals.
- Remove from the ERO roster those individuals who have not met the minimum interim training, drill, and exercise requirements.
- Re-evaluate the adequacy of consequence assessment team training, based on the performance test results discussed in Appendix E. Specific actions to consider include:
  - Conduct a root cause analysis to determine why consequence assessment staff were unable to demonstrate familiarity with concepts and practices that had been the subject of the many training sessions in 2004.
  - Conduct additional performance tests of consequence assessment staff, using scenarios and a process similar to that used during the LSPTs conducted by OA, to confirm areas of weakness in knowledge or proficiency and, following the completion of corrective actions, to confirm the effectiveness of training upgrades.
- Consider modifications to TEDS that would make it more useful for tracking ERO qualifications.
  - Determine whether fields can be added that would facilitate sorting and reporting on the status of ERO training both for the ERO as a whole and by specific ERO positions.
  - Maximize the use of TEDS, particularly for annual refresher requirements, to reduce the administrative burden on the emergency management staff and to take advantage of the corporate system that notifies individuals of training due dates.

- Ensure that the exercise/drill guidelines document adequately defines SNL/NM site-specific concepts and processes.
  - Address the emergency management department staff's roles and responsibilities for developing and implementing the SNL/NM exercise program.
  - Remove from the exercise/drill guidelines document inappropriate or non-applicable phraseology drawn from the DOE emergency management guide.
  - Edit guidance language, such as using "should" or "may" as the operative words, to remove flexibility where none is intended. Specifically define the exercise requirements that are expected to be met at SNL/NM.
  - Refine the criteria for evaluating whether exercise objectives are met or not. Identify what criteria are required to be met for the overall objective to be met.
  - Define the process to be used by exercise evaluators to document findings so that they can be properly evaluated for significance and corrective actions. Consider developing a finding form that identifies the information that is necessary to fully evaluate the concern after the exercise is completed.
- Improve the effectiveness of exercise reports by communicating concise and relevant information to management. Consider the following:
  - Provide an overall assessment and rating of performance. Include findings as well as noteworthy practices and correlate them to specific objectives. State corrective action recommendations for identified weaknesses.
  - Remove raw data, such as "hot wash" notes and evaluator record sheets, from the exercise report or place them in a separate attachment. Place only the analyses and conclusions derived from the raw data in the body of the report.
  - Ensure that the necessary authorization is established to enter exercise findings into the sitewide corrective action tracking database.
- Improve the timeliness of the initial news releases through the following:
  - Clarify expectations for the timeliness of the initial news release by specifying, in the EPI plan, when it should be released.
  - Emphasize the use of the pre-formatted news releases currently in the plan, and ensure that new vital/emergency and event classification information is inserted at the beginning of news releases.
  - Consider using a pre-approved initial news release to rapidly disseminate initial information during normal working hours and for an off-hour incident.
- Consider the following to improve the effectiveness of the MRC and JIC and to validate the consistency and function of the EPI plan and checklists:
  - Consider conducting a crosswalk of all EOC, MRC, and JIC checklists to ensure that there are consistent assignments of roles and responsibilities and accurate integration of JIC checklists. Ensure that each checklist addresses the relaying of questions, answers, and/or issues to and from all positions involved.
  - Review all EPI and ERO/EOC checklists with the appropriate approval authorities to ensure that responsible parties are aware of implementing expectations.
  - Develop a process for media monitoring that includes identification of misinformation, trends, analysis of issues, and public and media perceptions needing resolution.
  - Develop a process for rumor/misinformation control between the public and media inquiry teams and the EOC. Include mechanisms to enable and direct flow of information between these groups.
  - Provide guidance or criteria to the public and media inquiry teams as to what is or is not approved information for release (e.g., status board information, approved news releases, chronologies, fact sheets, news conference notes, and resource books).

- Develop a mechanism to capture information released to the media during news conferences and route that information back to the public and media inquiry teams.
- Review and clarify classification definitions in the EPI plan and include them in public and media inquiry teams' checklists/handbooks.
- Establish an understanding with KAFB regarding use of the JIC. If a firm understanding cannot be reached, consider changing the location of the JIC.
- Strengthen the EPI training program by developing and implementing EOC and JIC position/task-specific training. Consider the following recommendations in EPI training program development:
  - Use the position-specific task lists for SSO and SNL/NM EPI personnel as the basis for job and training needs analysis.
  - Develop lesson plans with learning objectives and associated training materials consistent with the SNL/NM emergency management training plan requirements.
  - Include a demonstration of performance of all EPI tasks in the criteria for successful course completion.
  - Develop training matrices for EPI positions to identify all training requirements, such as practical training (e.g., on-the-job training), classroom training, drills, refresher training, and lessons-learned training.
- Coordinate the EPI training program with the overall SNL/NM emergency management training plan, and establish a mechanism to ensure that program and procedure changes, lessons learned, and corrective actions are included in initial, periodic, and/or refresher training.
- Develop EPI objectives with criteria to validate all EPI and JIC functions during drills and exercises.
- Improve public awareness of SNL/NM emergency management concepts and practices by establishing a public education program. In its development, consider incorporating the following recommendations:
  - Work with the EPI working group within the Emergency Management Issues Special Interest Group to coordinate and share outreach tools.
  - Coordinate implementing efforts with the local emergency planning committee and local emergency managers.
  - Develop and distribute information regarding methods and terminology used to notify the public of an SNL/NM emergency as well as methods used to effectively implement protective action recommendations.

# APPENDIX E

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## 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 of three sets of emergency management limited-scope performance tests (LSPTs) and a combined safeguards/security and emergency management force-on-force performance test conducted by the Office of Independent Oversight and Performance Assurance (OA). The first set of LSPTs involved three Sandia National Laboratories – New Mexico (SNL/NM) incident command decision-making teams, each consisting of the operations incident commander (IC), the senior shift security officer, an operations chief, a rescue-reconnaissance team leader, and supporting communication coordinators located in the Emergency Operations Center (EOC). The second set of performance tests involved two EOC teams, each consisting of an SNL/NM emergency director (ED), a Sandia Site Office (SSO) emergency manager, an SSO emergency response duty officer (ERDO), and selected EOC support staff. The third set of performance tests involved the SNL/NM consequence assessment team, which is activated following declaration of a classified emergency and responds to the site EOC. Information and recommendations generated by the consequence assessment team during their performance test were subsequently provided to the EOC teams to facilitate evaluating the utility of that information.

Collectively, three operational emergency scenarios were developed for the LSPTs: 1) an event occurring at a facility that both produces a release of a hazardous chemical and results in an injured person; 2) a transportation event involving a release of two hazardous chemicals; and 3) a malevolent act with a

potential bomb explosion and release of multiple hazardous chemicals. The consequence assessment team and the EOC teams were presented with the facility hazardous chemical release and the potential bomb explosion scenarios. The incident command teams responded to one or two of the three scenarios. The LSPT scenarios, which were developed by OA in conjunction with SNL/NM Trusted Agents, were presented to the participants by several Trusted Agents to ensure scenario validity and delivery of accurate event cues. The Trusted Agents also played the roles of several positions not staffed, such as ICs and the consequence assessment team leader during the EOC team performance tests.

The scenario for the force-on-force performance test involved armed adversaries whose primary objective was theft or sabotage of special nuclear material from the Sandia Pulsed Reactor (SPR). Specific objectives that the OA team evaluated included those related to the roles of the SNL/NM IC and the security shift captain in a unified command structure and 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. Participants who were evaluated from an emergency management perspective included the IC, EOC communication coordinator, security shift captain, and secondary alarm station operators.

### E.2 Status and Results

In the event of an emergency, the duty SNL/NM IC, who is a member of the SNL/NM emergency management department, provides initial direction and control of the SNL/NM emergency response. The IC implements the incident command system by recalling selected field team components based on event conditions. Modular components of the SNL/NM scene response include the IC, an operations chief, a safety officer, the SNL/NM security force, the SNL/NM rescue-reconnaissance team, and possibly the Kirtland Air Force Base (KAFB) fire department, under unified command. The IC is responsible for command and control at the event scene and for making key decisions regarding the safety of emergency responders, event categorization and classification, protective actions for

site workers, protective action recommendations (PARs) for offsite populations, initiating notifications to offsite authorities, and recall of the EOC responders. The IC is supported by communication coordinators that are continuously present in the EOC to conduct EOC recall, facilitate acquisition of other emergency response assets, perform offsite notifications, and transmit protective action messages to building evacuation teams and site workers in affected areas. After the EOC is activated, the SNL/NM ED oversees the overall response. Key ED responsibilities are to ensure appropriate IC decisions regarding event categorization, classification, and protective actions and to review and approve offsite media releases and information provided to all site workers regarding the event. The SSO emergency manager reviews ED decisions and provides concurrence or additional directions, as necessary. The SSO ERDO, also an EOC cadre position, performs reporting and notification tasks to predetermined DOE and National Nuclear Security Administration (NNSA) organizations. The SNL/NM consequent assessment team supports the IC and the ED by identifying areas that could be affected by event hazards and recommends event classification and predetermined protective action plans for implementation.

During the February 2003 inspection, the ICs, EOC teams, and plume modelers performed some initial response actions effectively. However, the performance of SNL/NM emergency responders did not provide confidence that SNL/NM could quickly and accurately classify an event, develop plume plots, formulate protective actions and PARs, and provide timely notifications to offsite authorities. Most of the performance concerns resulted from weaknesses in the procedures and other response tools available to support the responders and in the training of response personnel. This 2005 inspection found that ICs demonstrated significant improvements in their performance, but that EOC teams and consequence assessment staff experienced several difficulties in executing their key, time-urgent response functions. Furthermore, with few exceptions, communications coordinators were unable to send accurate and timely notifications to offsite agencies. As discussed below, to some extent, performance weaknesses can be attributed to weaknesses in the response procedures.

### **E.2.1 SNL/NM Incident Command Teams**

During the LSPTs and the force-on-force exercise, ICs consistently demonstrated effective command and

control and expertise in implementing an incident command system that included an integral security component. The responding ICs took immediate actions to identify scene hazards and assess overall event conditions so that they could appropriately structure their incident command organization. While in transit to the scene, ICs selected the location of command posts and staging areas, communicated the locations to other responders, and directed the communication coordinator to request the necessary support assets. After arriving at the scene during LSPTs, responders donned position-identifying vests, were briefed by the IC, and established a responder accountability system, and the safety officer developed an event-specific safety plan. The safety officer subsequently briefed the IC regarding required personnel protection equipment, entry team capabilities with and/or without available back-up teams, capabilities of field detection equipment, and preplanned contingencies if suspected hazardous materials were detected or protection equipment malfunctions occurred. During the force-on-force exercise, the security shift captain thoroughly and accurately briefed the IC after arriving at the incident command post regarding the nature and extent of the attack, which included explosives and small arms fire, and their likely target. Furthermore, the IC effectively explained his protective action decisions to the security shift captain so that the security forces could assist in their implementation. The command and control actions taken during the LSPTs and the force-on-force exercise, combined with effective teamwork and a good understanding by all responders of field position roles and responsibilities, facilitated a safe and timely response.

Key response decisions made by the IC, and use of the supplied emergency response tools, were nearly uniformly effective. With one exception, categorization and classification decisions made during the LSPTs were accurate and timely and were promptly transmitted to the communication coordinators for offsite notification purposes. The SNL/NM emergency action levels (EALs) are linked to protective action plans that the ICs appropriately used to select command post positions, staging areas, and traffic control points and to identify areas affected by the event to facilitate formulation of protective actions and PARs. To complement these tools, most ICs used computer-based mapping systems that enabled them to overlay wind direction, add event-specific information, and identify site fire zones to facilitate protective action implementation. The ICs provided protective action decisions to the communication coordinators by radio

or cell phone, who then sent instructions to building evacuation team members by pager and provided instructions to site workers in the affected area using the site's tone alert radio system.

The ICs also demonstrated flexibility in their decision-making, whether by repositioning personnel in response to changing conditions or, during a transportation event for which no EAL was available, by appropriately applying an existing EAL and protective action plan that were developed for a similar event at a fixed facility. Similarly, during the force-on-force exercise, the IC correctly recognized that the emergency should be classified because of the potential for a release of hazardous material, and pursued an appropriate set of protective actions when he saw that the SPR "Explosion" EAL did not require classification of the event or any protective actions. Consequently, the IC reviewed all the EALs applicable to the building under attack to identify the worst-case scenario for use in event classification and identification of a protective action plan. This effort resulted in a Site Area Emergency classification and identification of a protective action plan for implementation. However, the IC overlooked analyzed scenarios in the EAL book that were more severe than the EAL he implemented and that would have resulted in a General Emergency classification and an expanded area for protective actions. Contributing factors to the misclassification included the complexity of the EALs, the large number of EALs that needed to be reviewed, and the absence of an index to guide the IC. The EAL book typically contains an index for analyzed events for each building, but in the case of SPR, no index had been developed.

Certain procedure and process weaknesses negatively impacted IC performance. For example, the ICs had difficulty in determining the appropriate protective actions for the areas indicated in the protective action plans, and ICs did not always specify PARs to the communication coordinators. The plans provide two concentric circles; the inner circle is labeled as a "hot zone" and the outer is labeled as a "protective action zone," but these concepts are not defined in any emergency planning or response documents. Among ICs, the specific protective actions chosen within the hot zone included sheltering downwind, sheltering only upwind, and no sheltering whatsoever without appropriate personal protection equipment. Field team members also were confused as to the protective actions for a hot zone and a protective action zone. The bases for these zones, particularly the hot zones, must be fully understood so that site workers are not kept in areas where lethal concentrations of hazardous

materials may exist for an extended period of time. Additionally, the ICs did not follow up on directives that they issued to communication coordinators and other responders to ensure that such critical tasks as offsite notifications, building evacuations, and personnel accountability were conducted.

Of the responders evaluated during the incident command team LSPTs, the communication coordinators experienced the most difficulty. Appropriate notifications and instructions were not always transmitted to building evacuation teams and workers in the affected areas. Furthermore, most offsite notifications were not transmitted when required, and when they were transmitted, they were either inaccurate or inappropriate. For example, for a postulated event where a hazardous material release affected only a portion of KAFB, offsite notification forms with shelter-in-place PARs were sent to all six offsite organizations preprogrammed in the facsimile machine without an affected area being specified. Contributing to this weakness was the absence of reviews of notification forms for completeness or accuracy by nearly all the ICs. Similarly, some of the building evacuation team pager messages and building tone alert radio messages were not initiated because the communication coordinators became overwhelmed with other tasks, and they did not solicit, nor did the IC provide, direction on task prioritization. Procedure and process weaknesses were an important factor in the performance issues identified during the LSPTs; consequently, the communication coordinator performance weaknesses are reflected in the findings identified in Section C.2.2 of this report.

To summarize, during LSPTs, ICs demonstrated improved response since the 2003 OA inspection. The ICs accurately categorized and classified events and demonstrated effective command and control in executing the incident command system and establishing safe tactical positions for responders at the scene. However, ICs had different understandings as to the application of protective actions for site workers within the designated hot zones and protective action zones that are identified in the protective action plans. Additionally, procedure and process weaknesses impaired the ability of communication coordinators to make timely and accurate notifications to offsite agencies, site workers, and evacuation teams.

## E.2.2 EOC Teams

The SSO ERDOs and emergency managers functioned as integrated members of the EOC teams.

The ERDO performed telephone notifications of event status to DOE/NNSA personnel prescribed in the ERDO checklist. A complete, accurate, and timely situation report was also prepared for transmission to the DOE Watch Officer to complement the DOE emergency management notifications made through SNL/NM notification process. The emergency managers used checklists to perform their emergency response duties and were actively engaged in EOC team discussions. Emergency managers performed such tasks as assessing the need for changes in the site security condition level, and they concurred with EDs in applicable EAL and protective action plan usage, categorization/classification decisions made by the IC, and approval of press releases and sitewide employee notification messages.

However, the EOC teams did not demonstrate the ability to effectively ensure the adequacy of decisions made regarding event categorization/classification, protective actions, and notifications. Decision-making weaknesses included the following:

- A classification of a General Emergency was not made when it was known to the EOC teams that a confirmed bomb threatened to disperse hazardous materials offsite. Although thoroughly discussed in the EOC, the EDs did not initiate protective actions or PARs.
- The EOC teams did not use the EAL number provided by the IC to ensure that the appropriate EAL/protective action plan was being used. Instead, the EOC teams made their decisions based on a review of EALs for events similar to the postulated scenario. This practice contributed to EOC personnel implementing an incorrect protective action plan for the duration of one of the scenarios.
- One EOC member concurred in the IC's event classification before the EOC team understood the exact nature of the source term.
- In scenarios where a safeguard and security operational emergency was declared by the ICs, the EOC teams did not review the EAL in use to verify that the event did not also need to be classified.
- One EOC team considered downgrading a Site Area Emergency classification, based on a projected plume plot developed by the consequence assessment team, until corrected by the EOC coordinator. During the

same scenario, although SNL/NM field response personnel possess air monitoring capability, the ED inappropriately directed the IC to reduce his scene perimeter based on a computer plume plot provided by the consequence assessment team.

- By procedure, the flow of information to offsite authorities and site personnel is from the scene, to the communication coordinators, and out to offsite authorities or appropriate site workers. Although the EOC teams demonstrated concern with sending out timely notifications, EOC personnel did not question the contents of the notification forms before or after transmission or check on the status of messages to building evacuation teams or workers in affected areas.
- The EOC team continued to project a superseded protective action plan on the EOC screens for the duration of one of the scenarios. The EOC team initially displayed the correct protective action plan for the known conditions, but when new information necessitated a new protective action plan, only one screen was momentarily updated.

The ability to confirm IC categorization, classification, and protective action decisions and to follow up on previously issued directives to ensure completion is especially critical at SNL/NM because the ICs are not typically relieved of any of these responsibilities throughout the event, despite their concurrent duties related to directing tactical operations in the field. Decisions made by the ICs that are not reviewed for accuracy or completeness could lead to an inappropriate response.

The EOC teams also could not ensure that appropriate protective actions were ordered by the IC because, like the ICs, the EDs do not understand the application of protective actions to the hot zones and protective action zones that are identified in the protective action plans. Inappropriate protective actions or incomplete protective action implementation could place responders and site workers in areas of unnecessary risk. This is especially important at SNL/NM because evacuation team captains report evacuation status to the communication coordinators, who then relay the information to the IC that building sweeps are complete (or report areas they could not sweep). If a message is not sent to a building/evacuation team, the team captain will not know to report the accountability status, and the absence of his/her report could go unnoticed.

**Finding #9: The EOC teams did not ensure that critical decisions were made and implemented to facilitate an effective emergency response, as required by DOE Order 151.1B.**

To summarize, responders who staffed the EOC teams, including the SSO emergency manager and ERDO, worked cooperatively to accomplish some team functions, such as verification of decisions made by the IC. However, the EOC teams did not demonstrate the ability to effectively ensure the adequacy of decisions made regarding event categorization/classification, protective actions, and notifications. As discussed in Appendices C and D, EOC response was likely hampered by weaknesses in procedures and training, respectively.

### E.2.3 Consequence Assessment Team

Since the 2003 OA inspection, SNL/NM has taken several positive steps to improve the performance of consequence assessment personnel. Additional computer resources and related analytical tools have been provided; EALs are linked to the protective action plans and are based on the emergency planning hazards assessments; personnel have access to facility chemical inventory information; and procedures and checklists were developed, including a formalized process for preparing briefings and related recommendations for the EOC team and conducting a quality review of data. The additional tools and a clarified set of roles and responsibilities facilitated an improved team approach to promote a more timely delivery of consequence assessment information. OA observed the impact of many of these improvements during the LSPTs.

However, the consequence assessment team did not produce assessments that would have been useful in decision-making. A timely initial assessment was developed for only one of two scenarios due to the crash of a computer program that had not been sufficiently tested following installation, and the assessment that was developed was not considered useful by one EOC team because it did not provide any additional information beyond that already provided by the EAL – a recommended classification and protective action plan. Similarly, a complete ongoing assessment was not provided for one scenario because the consequence assessment team could not locate pertinent modeling input data and did not pursue the use of an available alternate dispersion modeling

program. The team subsequently continued with an ongoing assessment by assuming a leak rate considered to be conservative, but lacking a technical basis, to identify an area where protective actions should be applied. The ongoing assessment in the other scenario did include a plume plot, but the team did not use the most hazardous material postulated to be present. Furthermore, although consequence assessment personnel appropriately assessed the consequences of a bomb blast and a resulting hazardous material release, their briefing to the ED only addressed the hazardous material release component. The briefing included a recommendation to keep personnel sheltered in place when the bomb blast zone included normally occupied buildings that should have been evacuated.

**Finding #10: The consequence assessment team did not provide event assessments that were useful in decision-making, as required by DOE Order 151.1B.**

To summarize, SNL/NM consequence assessment team capability has improved over that observed during the last inspection by the addition of such response tools as improved computers, checklists and procedures, dispersion model programs, and source term references, and in clearer definitions of roles, responsibilities, and expectations for teamwork. However, during the LSPTs, the consequence assessment team did not provide assessments that were complete, appropriately conservative, or useful to the EOC teams.

## E.3 Conclusions

During the LSPTs and force-on-force exercise, SNL/NM emergency responders serving in key positions demonstrated the ability to protect responders, formulate safe approaches in protecting site workers (even though protective action plans are not fully understood), and make appropriate categorization and classification decisions for communication to offsite agencies. However, weaknesses exist in support functions performed by the EOC communication coordinators and EOC teams that are not compensated for through a process of reviews and approvals. Consequently, most notifications to offsite authorities were not transmitted, and some instructions to building evacuation teams and site workers in affected areas were not disseminated or were not completed in a manner to provide adequate protection to personnel.

Additionally, the EOC teams did not understand the application of the zones used in the protective action plans, did not direct protective actions when conditions warranted, and did not ensure that accurate PARs were sent to offsite authorities. Finally, the consequence assessment team did not complete all attempted assessments, did not take the most conservative approach, and in one case, although an assessment was performed, did not appropriately brief the ED on the consequences of a bomb blast. The latter resulted in a recommendation to keep site workers sheltered in place when they should have been evacuated to a building outside of the blast zone. The LSPTs and force-on-force exercise demonstrated the ability of the site's ERO, principally the ICs, to adequately protect emergency responders and site workers. However, significant weaknesses were noted in the ability of the support functions (communication coordinators and consequence assessment teams) and the EOC teams to adequately respond to an emergency. As mentioned in Appendix C, many of these weaknesses can be attributed to deficiencies in emergency response procedures, and to some extent, the observed performance weaknesses are reflected in the "significant weakness" rating assigned to that area.

## E.4 Rating

A rating of NEEDS IMPROVEMENT is assigned to the area of SSO and SNL/NM emergency response decision-making.

## E.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

### Sandia Site Office

- Together with SNL/NM, strengthen the role of the SSO emergency manager, the SNL/NM emergency manager, and that of the EOC team as a whole in managing the response to an emergency event. Specific actions to consider include:
  - Ensure that verifications of IC EALs, categorization, classification, and protective action plan implementation are based on the EAL number that the IC reports to be using. Verification should be followed by a review of other EALs to identify an EAL that may be more appropriate.
  - Assign to the emergency manager the responsibility for reviewing offsite notifications and maintaining awareness of messages sent to building evacuation teams and site workers under protective actions.
- Consider specifically training SSO emergency response personnel in the application of protective action plan hot zones and protective action zones to enable them to verify that appropriate protective actions are implemented.

### Sandia National Laboratories – New Mexico

- Strengthen the EOC team support functions. Specific actions to consider include:
  - Train SNL/NM EOC decision-makers in the application of protective action plan hot zones and protective action zones to enable them to verify IC implementation of the appropriate protective actions.
  - Add a responsibility for the ED to maintain awareness of messages sent to building evacuation teams and site workers who have been directed to implement protective actions.
  - Assign to the EOC staff the responsibility for reviewing a list of all buildings under protective actions and the status of evacuation team captain reports.
  - Implement a mechanism that ensures that EOC staff maintain awareness of the information provided to workers and offsite authorities when the responsibilities for these actions remain with the IC.
- Assist the IC by transferring IC responsibilities that can be performed away from the scene to the EOC team after the EOC is activated. Specific decisions that might be shifted include:

- Decision-making for changes to event categorization and classification
- All offsite notifications
- Acquisition and tracking of needed offsite assets
- Arrangements for getting assets on site and safe approaches to the command post or staging areas.
- To further improve IC performance and implementation of IC orders, consider the following program enhancements:
  - Train and drill ICs to provide safe routes for onsite evacuees to exit evacuated areas in a manner that would maximize distances or barriers between hazards and site workers.
  - Train and drill ICs on the application of hot zones and protective action zones contained in the protective action plans.
  - Train and drill ICs to solicit/provide verification to ensure that initial notification forms are completely and accurately filled out.
  - Develop a tool to enable the ICs to quickly identify which buildings may be acceptable for short-term sheltering in a hot zone.
  - Assign a field response team member the responsibility for obtaining the status/reports from all evacuation team captains and providing a report to the IC.
- Consider the following in improving the execution of communication coordinators' roles and responsibilities:
  - Have the communication coordinators report to the IC and/or the ED the list of buildings that are sent a tone alert radio message with protective action instructions and the list of building evacuation teams that were sent a pager message with building sweep instructions. The communication coordinators should also record the status of each evacuation team captain report for the IC and/or ED to use.
  - Establish response priorities for the communication coordinators to ensure timely completion of the most urgent tasks during an emergency event.
  - Drill communication coordinators in obtaining approval of notification forms from the IC or ED before they are sent off site.
  - At the beginning of each ERO duty rotation, enter the duty roster into the paging computer to minimize the number of keystrokes required to activate the required pagers when requested.
  - Using one communication coordinator, conduct a series of drill-based, time-motion-activity analyses to identify the minimum number of short-term tasks that can be accomplished while still meeting the 15-minute notification requirements for classified emergencies. For the initial set of protective actions for site workers, evaluate trade-offs between implementation of an optimal set of protective actions and a minimal but adequate set of protective actions until such time as other initial communication coordinator tasks have been completed.
- Consider the following in improving the consequence assessment output products and briefings:
  - Evaluate consequence assessment tools and then authorize their use through a procedure control process to ensure that current, effective tools are being used.
  - Increase the frequency of drills that include multiple hazards, such as multiple chemicals or a postulated bomb near dispersible hazards, and include a briefing component to the ED.
  - Drill the consequence assessment team with the EOC team to improve the usability of consequent assessment team output products by soliciting feedback from EOC personnel.
  - Provide procedure instruction and training on protective action plan implementation.
  - Promote the use of field measurements instead of computer models when reducing hot zones.

# 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 Sandia Site Office (SSO) and Sandia National Laboratories – New Mexico (SNL/NM) 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 for identified weaknesses are identified, implemented, and appropriately closed. 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.

As a follow-up to the February 2003 inspection conducted by the Office of Independent Oversight and Performance Assurance (OA), this inspection examined the processes by which SSO provides guidance and direction to and maintains operational awareness of the SNL/NM emergency management program. The inspection included a review of SSO emergency management program assessment processes, selected aspects of the SSO training and qualification program for emergency response organization (ERO) staff, and the status of actions taken to address findings identified in the previous OA inspection.

### F.2 Status and Results

#### F.2.1 NNSA Line Program Management

The February 2003 inspection determined that SSO had effectively self-identified weaknesses in both line management oversight of the SNL/NM program and

emergency management functions. Furthermore, SSO had developed a set of corrective actions designed to provide the framework and definition necessary to conduct effective line management oversight of the site's emergency management program and enhance the SSO emergency response capabilities. However, the corrective actions had not been scheduled, and availability of personnel resources was a concern. This inspection revealed that although some activities require additional rigor, particularly SSO concurrence with SNL/NM corrective action closure, SSO has notably improved its ability to provide line management oversight and direction to SNL/NM's emergency management program.

Following the previous OA inspection, SSO developed and put into practice an emergency plan that governs the roles, responsibilities, and processes for oversight and implementation of the emergency management program at SNL/NM. SSO added an experienced emergency management program manager to oversee the emergency management program at SNL/NM as well as the other three sites for which SSO is responsible, and to manage SSO's responsibilities for emergency response. The SSO emergency management program manager is actively engaged in oversight of the SNL/NM emergency management program. She maintains her knowledge of the status and performance of the SNL/NM emergency management program through frequent communications and interactions with the responsible SNL/NM manager, including bi-weekly meetings, review of significant emergency management program documents, programmatic assessments, and frequent observation of SNL/NM drills and exercises.

Since the last OA inspection, SSO has also defined the roles and responsibilities for preparing, reviewing, and approving such key emergency management documents as the emergency planning hazards assessments, emergency planning zones, and emergency readiness assurance plans. The most recently submitted readiness assurance plans provide excellent summaries of the program's status and accomplishments and contain discussions of planned activities that provide insight into the direction of the program. The SSO emergency management program manager is supported in her efforts by personnel from

the NNSA Office of Emergency Management Implementation (NA-43). NNSA Headquarters personnel maintain awareness of the SNL/NM program status through regular discussions with the SSO emergency management program manager, and they have assisted SSO in completing oversight activities, such as document reviews and evaluation of the most recent SNL/NM annual exercise.

More recently, SSO has developed and approved a set of qualification standards that provide an excellent foundation for training and qualifying the SSO ERO members in their oversight and implementation roles. SSO has also prepared an implementing procedure that governs the roles and responsibilities for SSO ERO personnel during an emergency event and contains the necessary checklists to support their activities. As demonstrated during limited-scope performance tests (which are discussed in Appendix E), SSO emergency response duty officers and emergency managers are integrated into the Emergency Operations Center and are knowledgeable of their roles and responsibilities.

SSO also uses the Performance Evaluation Plan (PEP) process as a tool to maintain knowledge of SNL/NM program status and to facilitate programmatic improvements. Emergency management is included within the performance objectives for business and operational support, which are part of the operations performance group. During fiscal year 2004, performance targets did not include any specific milestones related to emergency management, but in the current fiscal year plan, performance targets include four appropriate program goals. The status of SNL/NM performance is evaluated and briefed to cognizant SSO managers quarterly, and full fiscal year performance is addressed in an annual performance evaluation report. While the PEP process has been implemented at SNL/NM, the fact that emergency management has only recently been specifically addressed in the plan means that improvements made in the SNL emergency management program cannot be directly linked to PEP implementation. Moreover, the ability of the PEP process to encourage programmatic improvements is limited by the absence of specific deliverables and due dates.

SSO has assessed the performance of the SNL/NM emergency management program through oversight of the SNL/NM self-assessment and corrective action processes and performance of its own formal assessments. Following the 2003 OA inspection, SNL/NM conducted a detailed, critical, self-assessment that resulted in the identification of 23 findings, a similar

number of observations, and the subsequent development of corrective actions for each of the findings and observations. In 2004, rather than conducting an annual self-assessment, SNL/NM validated the accuracy and continued applicability of the open findings, observations, and corrective actions contained in the SNL/NM corrective action database for emergency management.

SSO emergency management program assessment activities are governed by an SSO environment, safety, and health procedure that addresses the roles and responsibilities for scheduling and performing assessments and tracking the subsequent corrective actions. Although no formal performance assessments conducted prior to the assignment of the SSO emergency management program manager were available for review, the program manager conducted two rigorous programmatic assessments in 2004, resulting in the identification of several pertinent findings and observations. These assessments covered six of the emergency management functional areas and focused partially on validation of the corrective actions taken by SNL/NM in response to the 2003 OA inspection. Two programmatic assessments are scheduled for the current fiscal year, and collectively these assessments would address each of the emergency management program functional areas.

Also, with the assistance of NA-43 personnel, SSO conducted an independent evaluation of the SNL/NM 2004 annual emergency exercise using objectives and criteria intended to support closure of corrective action items from the 2003 OA inspection. The evaluation concluded that several criteria were not met, and SSO tasked SNL/NM with preparing a corrective action plan for these items. Though the exercise was conducted in October 2004, a corrective action plan for the exercise is not yet available.

In addition to monitoring the SNL/NM self-assessment process and performing programmatic assessments, SSO tracks the status of corrective actions from the 2003 OA inspection and verifies completion of the actions. Tracking activities include regular status meetings, updates of the corrective action tracking system database, and participation in monthly status report meetings with NNSA line managers, including the Deputy Administrator for Defense Programs. All of the corrective actions from the previous OA inspection have been completed by SNL/NM and verified by the SSO emergency management program manager, and verification files are available for each of the completed actions.

However, as discussed in Appendices C through E, the corrective actions for the OA inspection have not always been effective in correcting the identified deficiencies, and a number of weaknesses in the corrective action process were identified. For example, the corrective action plan for the 2003 OA inspection reflects limited root cause analyses that were conducted for only five of the seven findings. In several instances, the actions taken to address a finding were completed without correcting the underlying weakness. For example, a finding related to identifying and correcting weaknesses identified through the drill and exercise program was closed without demonstrating the ability to evaluate an exercise and generate an adequate set of corrective actions. In other instances, corrective actions were considered complete based on partial deliverables or with follow-up actions required. For example, the corrective action to develop an emergency planning zone was closed without obtaining formal approval of the emergency planning zone. Further, while drills or exercises were appropriately identified as final corrective actions for several findings, problems identified during those drills and exercises were not entered into the corrective action tracking system and did not preclude closure of the action.

While the corrective actions resulting from the previous OA inspection were appropriately tracked and managed, the corrective actions resulting from the SNL/NM self-assessments and the SSO performance assessments have received less attention. Findings from both SNL/NM self-assessments and SSO programmatic assessments were analyzed for underlying causes and associated risk, addressed in corrective action plans, and entered into an issues management system under the SNL/NM Environment, Safety and Health and Emergency Management Center. However, most of the planned corrective actions have not been completed and the status of corrective actions in the database is not always current. As a result, some important weaknesses identified by either SNL/NM or SSO have not been addressed, integrated into the overall corrective action process, and corrected in a timely manner. This deficiency is not limited to emergency management and is addressed more broadly in the associated finding (#12) appearing in Volume II of the April 2005 inspection report issued by the OA Office of Environment, Safety and Health Evaluations.

**From Volume II of the OA-40 report, *Independent Oversight Inspection of Environment, Safety, and Health Programs at the Sandia National Laboratories*:**

**SSO has made limited progress in establishing an effective issues management and commitment tracking system, and has not conducted adequate reviews of contractor corrective actions to verify closure and effectiveness in ensuring resolution of OA findings and preventing recurrence, as required by DOE Order 414.1B and DOE Order 470.2B.**

### F.3 Conclusions

Following the February 2003 OA inspection, SSO added an experienced emergency management program manager to manage SSO's line oversight of the site's emergency management program. Subsequently, SSO developed and put into practice an emergency plan that governs the roles, responsibilities, and processes for oversight and implementation of the emergency management program, and SSO also prepared an implementing procedure to govern the oversight and implementation roles for SSO ERO personnel during an emergency event. SSO maintains effective oversight and awareness of the SNL/NM emergency management program through regular interactions with SNL/NM emergency management personnel and observation of drills and exercises. SSO has also assessed program performance through review of the SNL/NM self-assessment and corrective action processes and performance of its own formal assessments. SSO has been tracking the status of corrective actions resulting from the 2003 OA inspection and verifying completion of the actions. When considered collectively, it is clear that SSO involvement in oversight of the SNL/NM program has contributed to the various improvements in the SNL/NM emergency management program that are discussed in the previous sections of this report. Nevertheless, a fundamental SSO responsibility is to ensure that SNL/NM corrective actions address underlying causes to prevent recurrence, are implemented in a timely manner, and are appropriately closed. This inspection identified several areas in which further development or implementation by SNL/NM was necessary to ensure that the site's program met DOE's expectations, yet SSO had concurred that all of the corrective actions from the previous OA inspection had been completed.

Additionally, SSO and SNL/NM's emphasis on addressing the OA corrective actions and the lack of an integrated corrective action process may have resulted in overlooking some important weaknesses that were identified by either SNL/NM or SSO.

## F.4 Rating

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

## F.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

### Sandia Site Office

- Continue to enhance the ability of SSO ERO members to perform their oversight and implementation roles during an emergency event. Specific actions to consider include:
  - Develop and implement a provisional qualification process to evaluate and document the interim qualification of ERO members while the newly established training and qualification actions are completed.
  - Develop SSO training (or revise SNL/NM training modules) to address specific SSO ERO oversight and performance roles.
  - Implement a process to track training, qualification, and drill/exercise participation for SSO personnel to ensure that assigned ERO watchstanders maintain their proficiency by meeting established requirements.
- Enhance the effectiveness of the PEP in encouraging improvements in the emergency management program. Consider using objective performance measures that contain specific deliverables and fixed due dates.

- To further improve the site's corrective action processes, consider implementing the following specific actions:
  - Improve the determination of the root causes of identified findings and recurring problems through implementation of procedures and/or training in root cause analysis.
  - Evaluate proposed corrective actions to ensure that completion of the actions will adequately address the underlying causal factors.
  - Ensure that corrective action plans incorporate specific verification and validation activities.
  - Validate corrective actions for specific findings as they are completed rather than waiting until the entire corrective action plan is completed.
  - When validation activities identify continuing weaknesses, conduct formal appraisals of the need to either re-open the finding or open a new finding associated with the original finding.
- Enhance the effectiveness of the SNL/NM self-assessment and SSO oversight processes in achieving improvements in the emergency management program. Consider taking the following actions:
  - Ensure that corrective actions for findings and observations identified by site assessment processes are integrated with corrective actions resulting from external assessments.
  - Using the existing SNL/NM risk assessment methodology (or a similar methodology), develop an integrated approach to implementing corrective actions.
  - Ensure that responsible managers from both SNL/NM and SSO are knowledgeable of and concur in the integrated corrective action plan.
  - Establish and implement mechanisms to periodically review the status of open corrective actions from the integrated plan with appropriate managers from SNL/NM and SSO.
  - Implement processes to periodically reappraise and revise the integrated plan.