

# Volume II

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Inspection of  
Emergency  
Management  
at the

# Sandia National Laboratories - New Mexico



February 2003

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

**INDEPENDENT OVERSIGHT  
INSPECTION OF  
EMERGENCY MANAGEMENT AT THE  
SANDIA NATIONAL LABORATORIES – NEW MEXICO**

**Volume II**

**February 2003**

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## Acronyms

AL	Albuquerque Operations Office
BNA	Baseline Needs Assessment
CFR	Code of Federal Regulations
CIS	Chemical Information System
DOE	U.S. Department of Energy
EAL	Emergency Action Level
EOC	Emergency Operations Center
EPI	Emergency Public Information
EPIP	Emergency Plan Implementing Procedure
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
ERPG	Emergency Response Planning Guideline
ES&H	Environment, Safety, and Health
FY	Fiscal Year
HAD	Hazards Assessment Document
IC	Incident Commander
JIC	Joint Information Center
KAFB	Kirtland Air Force Base
KAFB/FD	Kirtland Air Force Base Fire Department
MAR	Material At Risk
MESA	Microsystems and Engineering Sciences Applications
MDL	Microelectronics Development Laboratory
MOU	Memorandum of Understanding
MRC	Media Relations Center
NA-40	NNSA Headquarters Office of Emergency Operations
NARAC	National Atmospheric Release Advisory Center
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
OSHA	Occupational Safety and Health Administration
PAR	Protective Action Recommendation
PHS	Primary Hazards Screen
SNL/NM	Sandia National Laboratories – New Mexico
SPAN	Sandia Protective Action Notification
SSO	Sandia Site Office
TEDS	Training and Employee Development System

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# **INSPECTION OF EMERGENCY MANAGEMENT AT THE SANDIA NATIONAL LABORATORIES – NEW MEXICO**

## **Volume II**

### **1.0 INTRODUCTION**

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA) conducted an inspection of environment, safety, and health (ES&H) and emergency management programs at the U.S. Department of Energy's (DOE) Sandia National Laboratories – New Mexico (SNL/NM) site in January-February 2003. The inspection was performed as a joint effort by the OA Office of Environment, Safety and Health Evaluations and the Office of Emergency Management Oversight. This volume discusses the results of the review of the SNL/NM emergency management program. The results of the review of the SNL/NM ES&H programs are discussed in Volume I of this report, and the combined results are discussed in a summary report.

The National Nuclear Security Administration (NNSA) Office of the Deputy Administrator for Defense Programs is the lead program secretarial office for SNL/NM. As such, it has overall Headquarters responsibility for programmatic direction, funding of activities, and emergency management at the site. At the site level, line management responsibility for SNL/NM operations and safety falls under the Manager of the Sandia Site Office (SSO). SNL/NM is managed and operated by Sandia Corporation, under contract to NNSA. Sandia Corporation is a Lockheed Martin Corporation entity.

The primary missions of SNL/NM include activities that support the Department's nuclear weapons stockpile maintenance program and the Department's efforts to reduce the proliferation of weapons of mass destruction, the threat of nuclear accidents, and the potential for damage to the environment. SNL/NM also performs research and development to enhance the reliability of energy and critical infrastructures and to address emerging threats to national security. 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 shares a 20,000-acre land withdrawal area with KAFB; this area is used for remote testing activities.

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. These hazards include exposure to external radiation, radiological contamination, hazardous chemicals, explosives, and various physical hazards associated with facility operations (e.g., machine operations, high-voltage electrical equipment, pressurized systems, and noise). Significant quantities of radiological and chemical hazardous materials are present in various forms at SNL/NM.

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 review of contractor self-assessments and DOE/NNSA line management oversight in ensuring effective emergency management programs. In reviewing NNSA line management oversight, OA focused on the effectiveness of SSO in overseeing the SNL/NM contractor, including such management functions as setting expectations, providing implementation guidance, monitoring and assessing contractor performance, and monitoring/evaluating contractor self-assessments. Similarly, OA focuses on the effectiveness of contractor self-assessment

programs, which DOE expects to provide comprehensive reviews of performance in all aspects of emergency management.

In addition to the OA review of SSO's emergency management oversight and operational awareness activities, this portion of the inspection evaluated progress since the February 2001 OA program status review (and for one area, the September 1999 OA exercise evaluation) in addressing key emergency response concerns. The inspection team also conducted tabletop performance tests with a sample of the site's key decision-makers to evaluate their ability to employ available tools and skills when responding to postulated emergency conditions.

The results of this review indicate that, since the 2001 OA program status review, SNL/NM has improved its capability to respond to events that involve the release of a significant quantity of hazardous material. However, progress in most areas has been limited, and in the critical, time-urgent areas of protective action formulation and offsite notifications, longstanding weaknesses in plans and procedures inhibit effective response. Furthermore, significant challenges remain for SNL/NM and SSO to effectively follow through on existing corrective action initiatives, particularly in the areas of training and SSO line management oversight and response. SNL/NM and SSO line management attention is necessary to ensure that programmatic weaknesses are critically examined and effectively addressed, and that sustained effort is employed, to complete the task of establishing a comprehensive emergency response system that effectively protects site workers and the public following a significant event.

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 SNL/NM management of the emergency management program. Section 4 presents the ratings assigned as a result of this review. 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 are working to improve the site's capability to respond to significant events by establishing an organizational structure for prompt, initial decision-making and systems for prompt notification of site workers. Positive attributes of the emergency management program are discussed below.

**SNL/NM has implemented program improvements in several areas since the 2001 OA program status review.** In response to previously identified weaknesses, SNL/NM hired an experienced emergency management department manager from outside SNL/NM; fundamentally altered its emergency response approach by assigning the key, time-urgent actions of categorization/classification, notification, and protective-action decision-making to the incident commander (IC); and is in the process of establishing continuous coverage for the emergency operations center (EOC) communications coordinator position. SNL/NM also expanded the breadth of the hazards assessment document (HAD) to include significant scenarios such as fires/explosions, has nearly completed implementing an improved emergency notification system for site workers, and is actively working to improve the quality and definition of the relationship with the KAFB Fire Department, which has primary jurisdiction for fires and significant hazardous material events.

**Facility-specific emergency response plans and procedures comprehensively address facility response planning elements and functions.** Emergency response plans and procedures for such facilities as the Microelectronics Development Laboratory include a well-defined set of responsibilities, requirements, and response expectations for facility emergency response supervisors and teams. These documents also include appropriately-detailed descriptions of the onsite emergency notification system and the interactions among facility personnel and the SNL/NM incident command system. Important provisions for actions to protect facility personnel, such as accountability and evacuation processes, are also clearly described.

**SNL/NM and SSO self-identified some of the weaknesses identified during the OA inspection and corrective actions have been initiated.** SNL/NM and SSO have assessed their respective emergency management programs and are aware of several of the weaknesses identified by the OA inspection team. For example, as a result of their April 2002 self-assessment, SNL/NM is in the process of hiring a full-time emergency management training coordinator, who is expected to address the generally deficient condition of the SNL/NM emergency management training program. Following SSO's assumption of new roles and responsibilities in the emergency public information (EPI) arena, the SSO public affairs organization is working to formulate an effective approach to significant events having broad media interest. A December 2002 assessment of the SSO emergency response program appropriately identified numerous weaknesses in the SSO emergency response and line management oversight functions. In response, SSO has obtained additional staff through a 120-day detail arrangement to support improvements in defining and structuring the SSO emergency response program.

### 2.2 Program Weaknesses and Items Requiring Attention

Despite the improvements noted above, significant weaknesses persist in several aspects of the SNL/NM emergency management program, particularly in the approaches, plans, and implementing procedures for the site's emergency response system. Concerns about the rigor of the drill and exercise program, the completeness of the HAD, and the effectiveness of SNL/NM and SSO feedback and improvement systems were noted as well. Many of these weaknesses are longstanding concerns that were identified in

previous OA inspections, but that have not been adequately addressed through past corrective actions. Specific weaknesses are discussed below.

**Significant, longstanding weaknesses exist in the decision-making tools and processes that direct the key, time -urgent actions for categorization/classification, protective action formulation, and offsite notifications.** SNL/NM has not yet developed emergency response procedures and tools that have the necessary content, detail, and usability to ensure prompt and accurate event classification and protective action formulation. Furthermore, SNL/NM has not established an offsite notification process sufficient to ensure that offsite notifications for significant events can be performed within required time limits, particularly during off-hours. The impact of these weaknesses was demonstrated during tabletop performance tests, where SNL/NM ICs did not consistently and correctly classify events; ICs and EOC teams were generally unable to develop appropriate protective actions and protective action recommendations in a timely manner; and notification processes (if strictly followed by the SSO duty officers) would have unnecessarily delayed offsite notifications. Additionally, the offsite notification forms developed by SSO duty officers and EOC teams were inaccurate, incomplete, and potentially confusing for offsite recipients.

**The SNL/NM drill and exercise program is not structured or implemented to effectively evaluate emergency response organization performance or serve as a vehicle for identifying and correcting programmatic weaknesses.** The SNL/NM drill and exercise program is characterized by numerous shortcomings, the most important of which is the lack of clear implementation guidance and expectations. The drill and exercise program guide has been in draft form for several years, and although it contains appropriate guidance in many areas, it is not used. As a result, drills are inconsistently documented; many drill packages are not on file; and weaknesses identified during drills and exercises are not developed into findings and tracked to closure. The 2002 annual exercise postulated an event at a facility that does not actually store or use significant quantities of hazardous materials; suffered from a limited set of exercise objectives; and did not provide an unambiguous evaluation of whether the objective was met or an overall performance assessment. Consequently, the exercise feedback and improvement process was ineffective in identifying needed programmatic improvements.

**Despite recent improvements, the HAD does not yet comprehensively establish the foundation for the emergency management program.** The HAD evaluation of onsite transportation and aircraft crash events is incomplete, and the quantitative basis for some emergency action levels (EALs) has not been appropriately established in the HAD. Although generally conservative, the screening processes used by SNL/NM do not ensure that all appropriate facilities and hazardous materials are adequately considered. In addition, the process for establishing the material-at-risk value (i.e., source term) used in the HAD analyses is not well documented, and it does not ensure that the material-at-risk values are based on conservative assumptions about maximum facility inventories of hazardous materials. Finally, the HAD development and maintenance process is not formally documented. While most of these issues were identified in previous reviews, they have not been effectively addressed by corrective actions.

**SNL/NM has not comprehensively addressed all critical, previously-identified program weaknesses, and SSO has not provided sustained, effective oversight of the SNL/NM program.** Many of the most significant weaknesses identified during this inspection, including issues related to protective action formulation, EAL content, and the offsite notification process, were identified by OA during the 2001 program status review. Although some of these areas have seen incremental improvement, corrective actions have often been only partially effective, and thus most of the key initial decision-making areas are still problematic. Contributing to the slow pace of improvement has been the extended absence of sustained, rigorous SSO oversight of emergency management, which has been addressed only recently by the assignment of an acting SSO emergency management program manager.

### 3.0 CONCLUSIONS

OA first assessed the SNL/NM emergency management program in April 1998 as part of a Secretary of Energy directive to perform an independent review of the status of emergency management programs within the DOE complex. That review identified several fundamental deficiencies in the SNL/NM program. Subsequent appraisals in 1999 and 2001 each identified some improvements in the program, but many of the fundamental shortfalls remained and continued to limit the overall effectiveness of the program. Similarly, this review found that further improvements have been made, but the persistence of significant weaknesses continues to challenge the site's ability to adequately protect workers and the public in the event of a serious incident.

The most significant improvement in the SNL/NM emergency management program is the approach used for initial emergency response. The key, time-urgent actions of categorization/classification and protective action decision-making have been reassigned to the full-time IC position, and SNL/NM has nearly completed the initiative to hire and train EOC communications coordinators in order to establish continuous EOC coverage. In addition, implementation of an improved worker notification system, including the identification and training of facility emergency response teams and installation of tone alert radios in approximately 150 facilities, is well advanced. Collectively, these efforts are intended to promote effective and timely initial response, regardless of the initiating event and the time of day.

Other improvements have been made within both SNL/NM and SSO. SNL/NM hired a new emergency management department manager from outside SNL/NM who has substantial experience with the DOE emergency management system. The HAD has been broadened to include more severe initiating events, such as fires and explosions, to strengthen the program's foundation; the drill program is active; and well-defined EPI procedures were developed that appropriately address most events. SNL/NM is in the early stages of implementing a more critical feedback and improvement process (which is an area of historical weakness), as demonstrated by a programmatic self-assessment that identified most of the issues identified by the OA team and resulted in a comprehensive corrective action plan that is under way. SSO also took the initiative to have its emergency management function evaluated by NNSA personnel. As a result, weaknesses were appropriately identified in emergency response and line management oversight, and SSO has developed a suitable set of corrective actions.

Nonetheless, critical problems persist. As demonstrated during tabletop performance tests, the most significant programmatic deficiency is the challenge posed to effective initial decision-making by the current set of plans, implementing procedures, and EALs. As a result of an incomplete set of EALs and poorly defined predetermined protective actions, in concert with various weaknesses in the content and usage of associated implementing procedures, ICs were unable to accurately classify events, and ICs and EOC teams experienced significant difficulty in formulating timely, appropriate protective actions (for site workers) and protective action recommendations (for the public). Furthermore, the current approach for conducting offsite notifications does not ensure that protective action recommendations, even if correctly determined, can be received and quickly understood by offsite agencies. Finally, due in large part to weaknesses in the approach used for generating plume dispersion plots, plume modelers were unable to generate dispersion plots in a timely manner.

Other notable weaknesses exist as well. The HAD still does not include a sufficiently broad spectrum of events or a well-defined and documented process for determining the hazardous material source term to provide assurance that the HAD event consequences are bounding. Beyond the significant weaknesses in the emergency management training program that were already known to SNL/NM, the drill and exercise program does not facilitate the systematic identification of emergency response or programmatic issues. Additionally, longstanding weaknesses in the treatment of the joint information center concept by the Albuquerque Operations Office (for which roles and responsibilities were recently assumed by SSO)

make it unlikely that the EPI function of providing accurate and timely information to the public can be satisfactorily executed following a significant event requiring activation of the joint information center.

The evolving nature of the SNL/NM emergency management program reflects an improved awareness by site personnel of the fundamental precept of the DOE emergency management system, which is to act as a last line of defense in protecting site workers and the public. However, the site is still not adequately prepared to respond to a serious incident involving the release of hazardous materials. Persistent weaknesses in SNL/NM feedback and improvement processes impede continuous improvement of the program; hence corrective actions implemented in response to previous reviews have frequently been ineffective in resolving deficiencies. Sustained emphasis and attention by senior NNSA, SSO, and SNL/NM managers are necessary to ensure that current initiatives are effective; that expectations are met; and that root causes of programmatic deficiencies are rigorously determined and appropriately addressed in order to maintain the necessary level of preparedness.

## 4.0 RATINGS

This inspection focused on a detailed assessment of eight key emergency management programmatic elements, divided into four major categories. 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 ratings assigned below to the readiness assurance category are specific to those assessment, corrective action, and performance monitoring mechanisms applicable to the emergency management area.

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

### Emergency Planning

Hazards Survey and Hazards Assessment.....NEEDS IMPROVEMENT  
Program Plans and Procedures .....SIGNIFICANT WEAKNESS

### Emergency Preparedness

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

### Emergency Response

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

### Readiness Assurance

NNSA Assessments and Performance Monitoring .....NEEDS IMPROVEMENT  
Contractor Assessments and Issues Management .....NEEDS IMPROVEMENT

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# APPENDIX A

## Supplemental Information

### A.1 Dates of Review

Scoping Visit	October 15 - 17, 2002
Onsite Inspection Visit	January 27 - February 6, 2003
Report Validation and Closeout	February 18 - 20, 2003

### A.2 Review Team Composition

#### A.2.1 Management

Glenn S. Podonsky, Director, Office of Independent Oversight and Performance Assurance  
Michael A. Kilpatrick, Deputy 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
Patricia Worthington	Douglas P. Trout
Charles B. Lewis	

#### A.2.3 Review Team

Patricia Worthington, Director, Office of Environment, Safety and Health Evaluations (Team Leader)

Steven Simonson (Topic Lead)  
Al Cerrone  
J.R. Dillenback  
Michael Lloyd  
James O'Brien  
Jeff Robertson  
Tom Rogers

#### A.2.4 Administrative Support

Mary Anne Sirk

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## APPENDIX B

### Site-Specific Findings

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

<b>FINDING STATEMENTS</b>	<b>REFER TO PAGES:</b>
1. The SNL/NM HAD does not comprehensively or conservatively evaluate the potential consequences of onsite and offsite hazards, and the process for maintaining the HAD does not ensure that facility and process changes that could affect emergency planning are captured and adequately addressed, as required by DOE Order 151.1A, <i>Comprehensive Emergency Management System</i> .	15
2. The SNL/NM notification process does not ensure that the appropriate protective actions, protective action recommendations, and other required event information are communicated in a timely manner to site workers and offsite jurisdictions, as required by DOE Order 151.1A.	17
3. SNL/NM emergency action levels do not support timely and accurate emergency classification or protective action formulation for affected populations, as required by DOE Order 151.1A.	18
4. The SNL/NM drill and exercise program is not effective in validating the site's emergency management posture or in identifying and addressing programmatic weaknesses, as required by DOE Order 151.1A.	28
5. SSO and SNL/NM have not implemented an integrated set of EPI plans and implementing procedures that ensure that accurate and timely information is provided to site workers and the public during emergency events having wide media interest, as required by DOE Order 151.1A.	29
6. SNL/NM plume modelers did not demonstrate the ability to make timely assessments of event consequences, as required by DOE Order 151.1A.	38
7. SNL/NM and SSO emergency responders did not demonstrate the ability to accurately identify and communicate offsite protective action recommendations, as required by DOE Order 151.1A.	40

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## **APPENDIX C**

### **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 ensure an effective emergency response. Key elements of emergency planning include developing a hazards survey and emergency planning hazards assessment to identify and assess the impact of site- and facility-specific hazards and threats, and establishing an emergency planning zone (EPZ). 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, regardless 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 corrective actions developed and implemented in response to emergency action level (EAL) and emergency plan implementing procedure (EPIP) weaknesses identified during the February 2001 Office of Independent Oversight and Performance Assurance (OA) program status review at Sandia National Laboratories – New Mexico (SNL/NM). Also reviewed were the SNL/NM hazards survey document, hazards assessment document (HAD), and emergency plan and associated implementing procedures, with a focus on the guidance provided to initial decision-makers in event classification, offsite notifications, and protective action formulation. Finally, the OA team evaluated the efforts of SNL/NM and the Sandia Site Office (SSO) in coordinating the site's emergency management program with the Kirtland Air Force Base Fire Department (KAFB/FD). SSO emergency response procedures are discussed in Appendix E.

#### **C.2 STATUS AND RESULTS**

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

The February 2001 OA program status review determined that SNL/NM had made significant progress in developing its HAD. Nonetheless, the HAD reviewed in 2001 contained several substantive weaknesses, including a very limited range of analyzed accident scenarios, source terms that did not reflect the maximum quantities of hazardous materials present on site, and the absence of an effective process for ensuring that the HAD was updated before significant changes in facilities or hazardous material inventories. Since that evaluation, the site has implemented improvements in key areas of the HAD, but remaining weaknesses continue to limit its breadth and rigor.

Since the last review, the hazards survey document and HAD have undergone several revisions that collectively have improved their content and rigor. For example, the current HAD corrects a previously documented weakness by identifying selected receptor locations of interest, such as KAFB housing, public facilities, private enterprises, hospitals, and schools. SNL/NM has also utilized a conservative analytical approach for the Microelectronics Development Laboratory (MDL), where the HAD assessed

the worst-case release involving several different gases using an accepted mixture default methodology to determine those chemicals having the same hazard index (i.e., additive consequences). In addition, the close working relationship between the HAD coordinator and line management at the various SNL/NM facilities has resulted in generally prompt feedback and notification of changes in operations that could affect the hazards survey or the HAD, and has helped motivate facility management to reduce hazardous materials inventories to reduce facility risk.

Notwithstanding these improvements, many of the actions undertaken to correct the issues identified in the 2001 status review remain incomplete, and several items have not been addressed. The first major weakness is that the HAD does not yet address the appropriate spectrum of initiating events that could cause a release of hazardous materials. For example:

- The evaluation of onsite transportation activities lacks a documented analytical methodology for developing impact zones.
- Several facilities addressed in the HAD were examined with respect to aircraft crash, but the consequences are not consistently or completely documented, and potential protective actions have not been developed. Furthermore, some facilities that are not discussed in the HAD (e.g., the Radioactive Mixed Waste Management Facility) may contain toxic or radioactive material inventories that could cause significant source terms under the severe conditions associated with an aircraft crash. Aircraft crashes are a particularly important consideration because SNL/NM is in close proximity to the KAFB/Albuquerque airport runways.
- Hazards associated with such offsite facilities and activities as hazardous materials shipments on I-40 have not been addressed.
- Explosives have been evaluated from an explosive overpressure viewpoint only. Dispersal of toxic byproducts from the detonation/burning of explosive materials has not been analyzed.
- The HAD does not consider the toxicity of radioactive materials, but the basis for this assumption is not documented.

The second major weakness is that the HAD still does not in all cases address the maximum quantities of hazardous materials that could be present. In most cases, the material-at-risk (MAR) value is based on a combination of factors, including actual inventory on hand, historical maximums, inventory database output, and discussions with facility personnel. However, MAR assumptions in the HAD are not well documented or justified. For example, onsite transportation events were generally analyzed assuming one or two containers of a particular hazardous material, rather than considering the maximum quantity of material that could normally be carried on a given truck. Consequently, EALs, protective actions, and EPZs could be based on non-conservative MAR values.

Compounding this problem are the following: (1) chemical facilities generally have no administrative limits on material quantities that can act as theoretical maximums or “triggers” for updating the HAD; and (2) the Chemical Information System (CIS), which supports HAD development and maintenance, does not always accurately reflect actual building inventories. During walkdowns of two facilities, discrepancies were noted between the facility inventory according to CIS and the actual facility inventories for randomly selected hazardous materials specified in the HAD. For example, an inventory spot check at MDL found one more bottle of nitrogen trifluoride gas than was reported in CIS. The absence of building administrative limits for hazardous chemicals, in combination with CIS inaccuracies,

reduces confidence that the HAD analyses include an appropriately conservative MAR and hence, produce a bounding set of consequences for postulated events.

The third significant weakness is that there is no systematic, documented, approved process for developing, maintaining, reviewing, and approving the hazards survey and HAD. Consequently, the accuracy of the HAD is vulnerable to personnel turnover and lapses in rigor. The HAD development and maintenance effort is complex, and it currently depends on the personal relationships established by the individuals involved in the process. A further shortcoming in HAD maintenance is that the screening process does not ensure that all facility information regarding changes in facility inventories or processes is funneled into the HAD. Part of the HAD update process involves screening the primary hazards screen (PHS) database for question sets that indicate a facility/process change. However, no PHS question sets are explicitly related to the HAD process, and the questions selected for review by the emergency management department do not include all changes that could affect the HAD. For example, under the PHS question set for explosives, the emergency management department has arranged its search criteria to trigger notification only if facilities, activities, or programs have a maximum credible event that would affect the general public; this approach fails to factor in events that involve the facility or the SNL/NM site and that could involve an Alert or Site Area Emergency. Therefore, facility/process changes that could impact the required protective actions for an explosives operation may not be carried forward into the HAD. Additionally, the PHS process screens chemical inventories against the Occupational Safety and Health Administration (OSHA) process safety management thresholds, which are in many cases significantly larger than the hazards survey screening thresholds adopted by SNL/NM. Although the SNL/NM HAD coordinator often conducts further screening beyond the PHS screen to capture items missed by the PHS, the additional screenings lack the formality necessary to minimize the likelihood of errors. To address these weaknesses, SNL/NM is developing a procedure to document the hazards survey and HAD maintenance process.

The lack of a formal HAD maintenance process contributed to the use of several incorrect values for the one-hour emergency response planning guideline (ERPG-2) concentrations used in HAD dispersion analyses. For example, an out-of-date ERPG-2 value for ammonia had a significant impact on the calculated distance where protective action should be taken for release of this chemical. As a compensatory measure, SNL/NM provided interim protective action distances for the affected chemicals until all of the affected consequence assessments could be reanalyzed and the EALs revised, as necessary.

**Finding #1: The SNL/NM HAD does not comprehensively or conservatively evaluate the potential consequences of onsite and offsite hazards, and the process for maintaining the HAD does not ensure that facility and process changes that could affect emergency planning are captured and adequately addressed, as required by DOE Order 151.1A, *Comprehensive Emergency Management System*.**

Finally, although SNL/NM facility line managers review and approve their sections of the HAD, SSO (or its predecessor organization) has neither formally or extensively reviewed the hazards survey or HAD, nor provided formal concurrence or approval of the HAD or EPZs. The SSO Facility Representatives exhibit varying degrees of involvement in the hazards survey and HAD process in those facilities having adequate Facility Representative coverage. For example, the MDL Facility Representative is knowledgeable and actively participates in the HAD process for the facility. However, SSO has not formalized this process.

In conclusion, SNL/NM has improved the content and rigor of the HAD since the 2001 OA program status review. As a result of these efforts, potential risks to site workers and the public are better defined, and the involvement of facility management in the HAD process has in some cases reduced hazardous

material inventories, thus lowering facility risk. However, the HAD does not analyze the complete spectrum of initiating events that could cause a release of hazardous materials, nor does it definitively address the maximum quantities of known hazardous materials that could be present. Both of these are longstanding issues and were most recently highlighted in the 2001 OA status review. Consequently, the HAD may not conservatively bound the consequences of accidents for which emergency planning is warranted. In addition, SNL/NM lacks a well-defined, formally documented, and approved process for developing and maintaining the hazards survey and HAD. Moving from the current expert-based system to one that is appropriately structured and formalized is critical to minimizing the likelihood of errors and ensuring that the accuracy of these documents is not adversely affected by personnel turnover.

## **C.2.2 Program Plans and Procedures**

The February 2001 OA program status review determined that SNL/NM's emergency management program did not ensure that the critical, time-urgent tasks of event categorization and classification, offsite notification, and protective action decision-making could be effectively executed in a timely manner following a significant site event. Instead, the initial decision-making process was highly dependent on whether the event occurred during normal working hours; procedures had not been established for several critical tasks; and the implementing procedures that had been developed did not provide adequate guidance on how to perform required tasks. Furthermore, there was confusion between SNL/NM and KAFB/FD regarding roles and responsibilities for disseminating protective actions and protective action recommendations (PARs). Since that evaluation, SNL/NM has redefined the incident commander (IC) roles and responsibilities regarding categorization, classification, and protective action decision making. Additionally, the onsite Sandia Protective Action Notification (SPAN) system, which is a system for notifying facility evacuation teams of the need to implement protective actions in their facilities, has been further developed to include tone alert radios, which are installed in many facilities to rapidly communicate the need for protective actions. Evacuation teams in many facilities have been trained as well. However, a number of weaknesses remain in the emergency plan and procedures used to direct key initial decision-making activities.

### **Emergency Plans, EPIPs, and EALs**

The SNL/NM emergency plan contains all the essential elements of a comprehensive management program identified in DOE Order 151.1A and the associated emergency management guide. In addition, in January 2003, the SNL/NM emergency management department issued for comment a draft emergency plan that more accurately reflects the current onsite notification process. The facility-specific emergency response plans and procedures that support the overall emergency response approach comprehensively address the initial facility response planning elements and functions. They contain detailed information required to implement the site emergency management plan, including detailed explanations of the notification processes; shelter and evacuation procedures; evacuation maps; and emergency response team roles and responsibilities, assignments, and training requirements.

Implementation of the site's overall approach to emergency response is hampered by key weaknesses in each of the major elements: processes, EPIPs (and related procedural tools), and EALs. The single most important process deficiency is that offsite notifications cannot be accomplished in a timely manner for events occurring after normal working hours or on weekends. Currently, offsite notifications are the responsibility of the SSO duty officer. Offsite notification procedures require the SSO duty officer to obtain an approval signature from the derivative classifier and either the admin/finance section chief or the emergency director before transmitting the notification form to offsite authorities; this process occurs within the emergency operations center (EOC). For off-hours events, this process precludes duty officers from meeting the 15-minute criterion in DOE Order 151.1A, which is a requirement that is intended to help ensure that PARs can be communicated to offsite agencies in time for public protective actions to be

effective. Even during normal working hours, this process can cause unnecessary delays. Additionally, roles and responsibilities for making offsite notifications are not consistently identified in the applicable procedures and checklists and have not been clearly communicated to all affected personnel. For example, the flowchart for issuing PARs during off-hours directs the IC to have either the EOC coordinator or a protective force representative disseminate PARs. However, protective force personnel are not aware of this expectation, and they have not been provided with the appropriate information or procedures to perform this function.

Similarly, the notification process for communicating protective actions to facility personnel is hampered by time-of-event considerations. Both SPAN and the tone alert radio system must be activated by trained personnel from the associated computer consoles located in the EOC. Because the EOC is currently manned continuously on weekdays only, these systems cannot be employed effectively for events that occur on weekends.

**Finding #2: The SNL/NM notification process does not ensure that the appropriate protective actions, protective action recommendations, and other required event information are communicated in a timely manner to site workers and offsite jurisdictions, as required by DOE Order 151.1A.**

Other examples of process weaknesses include:

- Responsibility and authority for event classification and formulation of protective actions and PARs remain with the IC after the EOC is activated. These responsibilities unnecessarily distract the IC from vital on-scene activities and could slow the process of formulating protective actions and PARs.
- There is no documented process for developing, maintaining, and updating emergency management response documents. Consequently, there is no assurance that revisions made in emergency response plans and processes and the requisite changes in procedures and job aids will be consistent or effective. Additionally, facility emergency plans and associated implementing procedures are not formally reviewed or approved by the appropriate facility managers.

SNL/NM EIPs address most elements, but in several instances the EIPs, supporting position job aids, and the overall emergency plan were found to be inconsistent or inaccurate, or to contain inappropriate levels of detail. Consequently, the response tools do not collectively support effective decision-making in a high-stress environment. Some examples include:

- The EIP for classification and categorization inappropriately requires the IC to be at the scene prior to classifying events, and does not provide guidance for events that do not fit specific EAL criteria but that decrease safety, thus warranting classification.
- The EIP for protective actions does not provide appropriate guidance supporting formulation of protective actions. For example, this EIP does not discuss how to determine the breadth of the area to protect when utilizing predetermined protective action information contained in the EALs. In addition, the technical basis for the generic protective actions (i.e., Figures 2 and 3 in the protective action EIP) and guidance on protective actions are not documented.
- EIPs are inconsistent and lack important details. For example, the EIPs for categorization/classification and protective actions do not include step-by-step instructions for the listed responsibilities, and EIPs do not consistently and accurately reference attachments.

- Emergency response organization (ERO) position checklists do not include the appropriate level of detail or are inconsistent with applicable EPIPs. For example, the admin/finance section chief checklist for activating the EOC identifies a different minimum staffing level than does the EOC activation EPIP; many of the IC duties outlined in the EPIP for event resolution are not reflected in the IC response guideline (checklist); and the EPIP for emergency reentry includes responsibilities for various responders that are not included in any of the respective checklists.
- The set of maps used by the ICs and EOC teams do not support prompt identification of areas to protect. For example, the maps are too large to be easily used and are difficult to read. This weakness in particular caused delays in determination of protective actions (and in establishing appropriate cordons) during the tabletop tests.

The OA inspection team also identified significant weaknesses in the EALs, which are used to categorize and classify emergency events and to formulate protective actions. For example:

- Transportation EALs do not discuss whether the user should consider the actual distance to the site boundary when deciding whether the event may be a General Emergency, and facility EALs at the General Emergency threshold level inappropriately depend on wind direction.
- EAL tables do not include a complete set of instructions on how to use the information (e.g., unexplained footnotes and parenthetical distances), and some EAL indicators do not include logical operators so that the user will know whether all indications need to be met before classifying, or whether one or some combination is sufficient.
- EALs for the Hazardous Waste Management Facility use a single chemical to represent each class of hazardous materials, which is not bounding in all cases. It can also cause confusion on the part of initial decision-makers because instructions are not provided on how to use this information to support event classification and protective-action formulation.
- Although the EAL set appropriately associates predetermined protective actions with each EAL (in a column adjacent to the EAL), a number of the protective actions are unclear. For example, several EALs specify the same protective actions for events at different classification levels (e.g., Site Area Emergency and General Emergency classifications for ammonia release at the MDL bottle farm have the same protective actions). In addition, some information provided in the protective action column is unrelated to protective actions (e.g., KAFB and Radiological Assistance Program team notification).

**Finding #3: SNL/NM emergency action levels do not support timely and accurate emergency classification or protective action formulation for affected populations, as required by DOE Order 151.1A.**

### **KAFB/FD and Other Interfaces**

The KAFB/FD is adjacent to the site and, under a 1999 memorandum of understanding (MOU), provides fire and related emergency services for SNL/NM operations. They also provide these services for other base tenants. SNL/NM has medical, hazardous material, and rescue-reconnaissance emergency response capabilities independent of and complementing KAFB/FD 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. In September 2002, a baseline needs assessments study of SNL/NM and KAFB/FD emergency response capabilities identified several areas

that could further improve the combined effectiveness of the two entities. The two primary areas identified included training – ensuring that SNL/NM personnel are trained and certified in accordance with 29 CFR 1910.120 – and pre-fire plans – providing KAFB/FD with the information on buildings’ hazardous material inventories (needed for inclusion in pre-fire plans).

SSO, SNL/NM, and KAFB/FD are in the process of developing a new MOU to further clarify response roles and responsibilities. The development of this MOU will enhance the relationship between SNL/NM and KAFB/FD and facilitate the consideration of recommendations from the baseline needs assessment. Overall, the relationship between SNL/NM and KAFB/FD has improved over the past few years, and implementation of the revised MOU should further improve this interface. In parallel with this activity, SNL/NM and SSO are actively engaged in evaluating and upgrading interface agreements with Federal, state, and local agencies. Due to SSO resource constraints, SNL/NM has taken the lead in working with “outside agencies” to develop an umbrella MOU detailing how these agencies will respond with respect to the recapture and recovery of nuclear materials.

To summarize, SNL/NM has implemented an emergency plan that addresses the required elements and effective facility-specific emergency response plans and procedures. Corrective actions taken since the 2001 OA program status review have improved the processes for initial decision-making, and efforts to clarify interfaces between SNL/NM and KAFB/FD responders and further improve response coordination continue. However, for significant events, the existing SNL/NM response concepts and implementing procedures and tools do not promote timely and accurate event classification, protective action formulation, or off-hours offsite notifications. Consequently, emergency responders are not 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 tabletop performance tests involving the ICs and ERO personnel. Furthermore, many of these weaknesses were previously identified during the 2001 OA program status review, but corrective actions were not consistently effective.

### **C.3 CONCLUSIONS**

Since the 2001 OA program status review, improvements have been made in the breadth and rigor of the SNL/NM hazards survey and HAD, and SNL/NM has improved its response plans by redefining roles and responsibilities for categorization, classification, and protective-action decision-making and enhancing onsite worker notification processes. However, corrective actions implemented to address areas of weakness have been only partially effective. Several shortcomings persist in critical areas such as the spectrum of events analyzed, the identification and analysis of maximum quantities of hazardous materials, and processes for ensuring that the accuracy of the HAD is maintained. As a result, the emergency planning basis for SNL/NM is incomplete. Furthermore, several key weaknesses remain in the emergency plan and implementing procedures used to direct key initial decision-making activities. The most significant weaknesses are that SNL/NM and SSO have not established a process that ensures timely notification of site workers and offsite agencies of significant events at SNL/NM, and SNL/NM has not developed adequate tools for supporting timely and accurate event classification and protective-action decision-making.

### **C.4 RATING**

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

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

### **Sandia Site Office**

- Consider implementing a mechanism that ensures the active involvement of Facility Representatives in the hazards survey and HAD review process.

### **Sandia National Laboratories – New Mexico**

- Improve processes for maintaining the accuracy of the hazards survey and HAD:
  - Incorporate necessary process improvements, and then finalize, approve, and implement the HAD development and maintenance procedure (currently in draft form).
  - Consider establishing facility administrative limits for hazardous materials that tie directly to hazards survey and HAD criteria in order to better capture changes in hazards at SNL/NM facilities. Ensure that users involved in the change control process are alerted to the need to follow up with emergency management department staff when changes could affect the hazards survey or HAD.
  - Revise the PHS question set to trigger formal notification of emergency management department staff when quantities of material exceed SNL/NM emergency preparedness planning thresholds or when the conditions of material storage or use change.
- Improve the documentation of the HAD analytical assumptions:
  - Define the technique for selecting facility boundaries. Refrain from using a flat 100-meter radius in lieu of the actual facility boundary. Consequences should be modeled against the actual facility boundary. This is particularly important for a site such as SNL/NM, where facilities under different management jurisdictions are located in close proximity to one another.
  - Clarify wording in the HAD to better reflect the basis of a General Emergency classification (i.e., consequence in excess of ERPG-2 at the site boundary is the actual criterion).
  - Ensure that the details of barrier failure indicators (e.g., detection and alarm systems, alarm setpoints) are documented in the facility description, and that relevant information is then carried over into the HAD section where the potential EALs are developed.
  - Provide documentation in the HAD of the bases for the actions and configurations of systems that are claimed to limit hazardous material release quantities.
  - Document the analytical methodology (e.g., release quantities and HAD results) used to develop impact zones for onsite transportation events.

- Provide a basis for not analyzing the consequences associated with the toxicity of radioactive materials in the HAD.
- Obtain a waiver from NNSA/SSO if SNL/NM is going to continue using DOE-STD-1027 threshold planning quantities for radionuclides in lieu of those prescribed by 10 CFR 30.72, as required by DOE Order 151.1.
- Expand the spectrum of accident scenarios analyzed in the HAD:
  - Analyze HAD facilities that have potentially-significant toxic or radioactive material inventories when considering aircraft crashes as the initiating event. Clearly document the results of this analysis.
  - Assess the potential effects of emergency events involving hazardous material operations and activities off the SNL/NM site that could adversely affect DOE operations and personnel on site (e.g., events associated with KAFB and hazardous materials shipments on I-40).
  - Work with the DOE Headquarters Office of Emergency Operations to establish appropriate planning thresholds for explosives and toxic byproducts of explosives. Apply the outcome of this process to the explosives used and stored at SNL/NM to determine whether additional emergency planning, such as establishing EALs, is warranted.
- Strengthen processes supporting the determination of the IC with primary jurisdiction and the delineation and performance of their critical, time-urgent tasks:
  - Clarify the priorities and roles and responsibilities for the initial decision-making activities for all emergencies, including fire and hazardous material events. Review and clarify the roles and responsibilities for initial decision-makers, including the SNL/NM IC, KAFB/FD, and the ERO.
  - Identify the IC with primary jurisdiction by specific event characteristics or indicators and include coordination responsibilities under unified command.
  - Consider reassignment of IC responsibilities for categorization/classification and protective-action decision-making to the emergency director after the EOC is activated.
  - Revise the IC response guideline to comprehensively address, in a step-by-step manner, expected actions that are currently included in a variety of response documents, including EIPs, EALs, and MOUs.
  - Review and simplify maps to support prompt identification of areas to protect.
- Improve the categorization and classification process by establishing additional clarification and guidance in the appropriate response procedure. Include procedural steps or expectations for:
  - Emergency roles and responsibilities for categorizing and classifying an emergency
  - EAL usage requirements and instructions for handling unique situations
  - A comprehensive set of thresholds for declaring operational emergencies not requiring classification and non-emergency events.

- Strengthen and clarify the notification process and roles and responsibilities for initial reporting of emergency events:
  - Review plans and procedures and clarify the requirement for 15-minute notification to offsite authorities following the declaration of an Operational Emergency.
  - Ensure that all applicable procedures are corrected and checklists are annotated.
  - Consider consolidating the responsibility for initial offsite notification into the EOC following notification of the SSO duty officer.
  - Consider simplifying the offsite notification form to better reflect the duty officer’s roles and responsibilities and the immediate issues important to offsite entities.
  - Consider establishing preauthorization criteria for offsite notification.
- Strengthen the emergency management program plans, processes, and procedures:
  - Consider simplifying and consolidating the procedures and checklists into one usable document for each ERO responder to avoid inconsistencies and duplication.
  - Review the ERO checklists line-by-line against all applicable EIPs, MOUs, and other response documents for content, detail, and consistency.
  - Incorporate the informal response tools, IC checklist, and notification list into the EIPs.
  - Develop a procedure revision process that allows SNL/NM procedures and checklists to be kept current with best response practices while still being controlled. For example, use temporary change notices until complete procedure revisions can be issued.
  - As part of a procedure and response tool improvement process, consider requiring individuals with responsibility for procedure implementation to conduct procedure verification (for accuracy) and validation (for usability). Walk through and rigorously validate the procedures with users to determine whether there is an established method for implementing each step and how readily those steps can be implemented based on existing systems. Determine whether the timing is sufficiently prompt for protective actions to be effective in protecting onsite workers and the public.
- Improve categorization and classification EIPs and EALs:
  - Consider revising the classification procedure to clarify responsibilities, remove inconsistencies, and provide instructions on use of EALs.
  - Consider reviewing the EALs (and revising as needed) to ensure that they are consistent with the hazards assessment results. Include all appropriate indications and logical operators.
- Consider establishing a pre-approved *initial* offsite notification form that can be transmitted when the derivative classifier and/or emergency director is not readily available:

- The notification EPIP should allow flexibility in the review and approval process in order to ensure the timeliness of the offsite notification.
- The notification form and training should provide the necessary guidance to ensure that classified material is not released.
- Develop tools to support rapid identification of the geographic areas impacted by a release within which protective actions should be taken:
  - Consider developing a set of maps that divides the site into grids to support initial protective action decisions (for example divide Technical Area I into eight grid areas). Consider establishing these grids or sectors based upon notification capabilities and the need for the IC to be able to quickly identify these areas for transportation or facility-based events.
  - Consider developing a reference that identifies all buildings (including trailers) within each of the given SNL/NM site grids (if they are established).
  - Evaluate whether Figures 2 and 3 of the protective action EPIP provide appropriate guidance for issuing a decision to shelter in place or to evacuate.
  - Consider enhancing the EALs to include all information needed to support protective action decisions (e.g., distance where Immediately Dangerous to Life and Health – IDLH – as well as ERPG-2 levels are exceeded).
  - Consider coordinating with KAFB and local offsite officials to establish a means to quickly identify offsite areas that could be impacted by a release from SNL/NM in order to effectively communicate PARs.
- Consider establishing an identification badging process for hazardous material responders that would allow the IC to quickly identify them as qualified to enter the emergency area.
- Negotiate and communicate emergency planning zones with KAFB and local authorities. Work with KAFB/FD and local authorities to ensure that they have a clear understanding of DOE emergency categorization/classification levels and SNL/NM recommendations for protective actions.

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## **APPENDIX D**

### **Emergency Preparedness**

#### **D.1 INTRODUCTION**

A coordinated program of training, drills, and exercises is necessary to ensure that emergency response personnel and organizations can respond effectively to emergencies impacting the site or facilities. 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 validate all elements of an emergency management program over a multi-year period using realistic, simulated emergency events and conditions, and should provide emergency response organization (ERO) members with an opportunity to practice their skills. An effective emergency public information (EPI) program provides the public, media, and U.S. Department of Energy (DOE) employees with accurate and timely information during an emergency event. In part, effectiveness is based on having in place a long-term 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) team evaluated the training, drill, and exercise program used to support the emergency response organizations at the institutional and facility levels. The team also evaluated the EPI processes applicable for an emergency at Sandia National Laboratories – New Mexico (SNL/NM). As part of the programmatic review of the training, drill, and exercise and EPI elements, the OA team evaluated the plans and procedures that support these elements and reviewed training and proficiency records for key site emergency responders. Drill and exercise reports were also reviewed for indications that they are being used effectively to enhance responder proficiency and evaluate the level of the site's response preparedness.

#### **D.2 STATUS AND RESULTS**

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

###### **Training**

The SNL/NM emergency management training program is described in the SNL/NM emergency plan and in an emergency management training program plan. Together, these documents describe the program implementation process. With the exception of the core training area, discussed below, these documents appropriately establish broad program requirements, such as ERO initial training courses; criteria for successful completion of course material; instructor qualifications; and SNL/NM responsibilities in educating offsite agencies.

SNL/NM has been active in addressing longstanding emergency management program weaknesses through additional training over the past year. Most notable are efforts in implementing the Sandia Protective Action Notification (SPAN) system; improving incident commander (IC) and plume modeler proficiency in performing categorization/classification and plume dispersion tasks, respectively; and improving known interface problems between SNL/NM and Kirtland Air Force Base Fire Department (KAFB/FD) when establishing unified command. In addition, the emergency management department is developing training to instruct users of newly acquired chemical and biological detection instruments. However, the results from these training activities have been mixed, as indicated by recent SNL/NM drill and exercise reports and the OA tabletop performance tests for ICs and plume modelers. Some of these

continued weaknesses can be attributed to the current state of the training program, as well as delays in addressing the procedure weaknesses discussed in Appendix C.

The effectiveness of the emergency management training program is being impeded by several structural weaknesses, most of which are recognized by SNL/NM. The most significant weakness is that implementation of the emergency management training program is based primarily on the emergency plan and emergency management training plan requirements. Since these high-level program documents do not provide specific roles, responsibilities, and specific methods of implementation, most of the details for conducting training, such as instructional setting, course content, presentation materials, and criteria for successful completion of the course, are at the discretion of individuals assigned to provide the instruction. However, these individuals are not certified instructors and do not typically have instructional or educational backgrounds. Additionally, the emergency management department does not have a training coordinator to set expectations or ensure consistency of implementation. Other training program weaknesses include:

- A systematic analysis of training needs has not been performed. As a result, some key training topics (e.g., contents of the SNL/NM and KAFB/FD interface memorandum of understanding, position-specific training on procedures, checklists, and other tools) have been missed.
- Training materials are not consistently reviewed and approved before use or periodically reviewed and updated.
- Lesson plans are not developed and used for academic instruction.
- The emergency management department relies on subject matter experts and does not typically use certified instructors.
- Successful completion of training courses is not, in most cases, based on written or performance examinations or other demonstration of competence.

Furthermore, the position-specific training matrix contained in the emergency management training plan does not include all core training requirements, annual refresher training, periodic training, or drill participation requirements. Other training requirements are identified in emergency plan implementing procedures and site-wide and other emergency management databases, but these requirements are not included in or considered by the monthly ERO training report. Consequently, individuals who are not current in all of their required training (i.e., not qualified) can be included on the ERO roster because the monthly ERO training report is used both to report training and qualification status to management and to make assignments to the ERO duty roster. For example, the January 2003 monthly report indicated that all but one newly created ERO position had all primary and alternate members trained and qualified, but other tracking systems indicated that all ICs were overdue in periodic training by as much as three years. Many other responders are overdue for drill participation, and some groups, such as the rescue-reconnaissance teams, are not being tracked.

The emergency management department's decision to discontinue use of the site wide system (the Training and Employee Development System – TEDS) to track the status of ERO training and qualifications has contributed to the qualification tracking problem. TEDS is an institutional training and qualification tracking system that automatically notifies affected personnel when training requirements are complete, coming due, or overdue. The other databases used by emergency management staff do not provide this automated feature, and their manual process for notifying individuals when their training and drill participation is overdue has not been effective. As a result, individual ERO training deficiencies can

remain unaddressed for extended periods of time, as in the case of the ICs, discussed above. It should be noted that SNL/NM took action during the OA inspection to address nearly all of the IC training deficiencies.

Symptoms of these training weaknesses were observed and documented in the 1999 OA exercise evaluation and in subsequent exercises by SNL/NM, the Albuquerque Operations Office, and the National Nuclear Security Administration (NNSA) Office of Emergency Operations (NA-40). Examples include weaknesses in the SNL/NM and KAFB/FD unified command performance, lack of timely categorization and classification of events, unfamiliarity of responders with responsibilities assigned in procedures, and responder reluctance to use procedures. A 2002 SNL/NM self-assessment identified many of these program weaknesses; a finding was issued, and now a corrective action plan is in place. The major component of the corrective action plan is to hire a full-time emergency management training coordinator in the next several months who will be responsible for addressing all training program weaknesses.

The Sandia Site Office (SSO) emergency management training program also has key weaknesses, including SSO duty officer and emergency manager training programs that are not well defined or formally documented. The SSO acting emergency management program manager is developing procedures and training materials intended to support a more rigorous training and qualification process for SSO emergency responders. Additionally, as described in more detail in Appendix F, the December 2002 assessment of the SSO emergency management program identified training program weaknesses and led to an appropriate set of related corrective actions. Currently, SSO is focusing on training duty officers and emergency managers in known areas of weakness while the qualification standards and qualification cards are being developed. Some of SNL/NM's corrective actions will also strengthen the SSO program, because SSO uses some of the SNL/NM training materials and SNL/NM tracks SSO drill participation.

## **Drills and Exercises**

The SNL/NM drill and exercise program contains many appropriate attributes, such as frequent drills and participation of all response organizations in exercise development. However, the drill and exercise program is informally managed and implemented and lacks the structure and rigor to provide the necessary impact on the emergency management program. The primary issue is that a well defined set of roles, responsibilities, and expectations has not been clearly documented and communicated to personnel involved in implementing the drill and exercise program. Examples of weaknesses in implementing the drill element include lapses in notifying ERO members when their drill participation requirement is overdue; substantial variance among response groups in the content and level of documentation in drill reports; unavailability of some drill packages; and the fact that weaknesses identified during drills and exercises are not developed into findings and tracked to closure so that the emergency management program can be improved. Contributing to drill and exercise program weaknesses is the fact that the exercise and drill program guide has been in draft form for several years, and although it contains appropriate guidance in many areas, it is not used by emergency management staff.

Numerous weaknesses were also identified in exercise planning, exercise reporting, and the use of exercises to both identify areas needing improvement and validate the effectiveness of previous corrective actions. Examples include:

- The exercise planning process does not include a systematic mechanism for selecting exercise objectives. Consequently, some elements, such as the joint information center (JIC) and most offsite response groups, have never been incorporated into an exercise. A matrix template for scheduling exercises involving the various emergency management elements over a five-year period has been drafted, but does not accurately reflect the participating organizations or the elements that have been evaluated.

- The 2002 exercise involved a facility that does not contain significant hazardous materials, and hence did not have applicable emergency action levels. Nonetheless, the report states that the exercise tested categorization and classification, although there are no criteria for these tasks on the IC evaluator record sheet.
- The exercise report does not provide an overall performance assessment and provides conflicting information regarding successful completion of exercise objectives. Some objectives are not graded, and other objectives and criteria are graded as both “met” and “not met.”
- Findings were not developed from participant comments, questions, and concerns or from objectives that were not met. Development of findings was left to the discretion of individual participating organizations upon distribution of the report. Although the 2002 exercise report documented hundreds of comments, questions, and concerns and seven evaluated objectives were not graded as “met,” no findings or opportunities for improvement were developed.

**Finding #4: The SNL/NM drill and exercise program is not effective in validating the site’s emergency management posture or in identifying and addressing programmatic weaknesses, as required by DOE Order 151.1A.**

To summarize, the SNL/NM training, drill, and exercise program is poorly defined and is not structured to adequately prepare personnel for their emergency response duties, promote improvement in performance, or validate the effectiveness of the site’s emergency response system. Many historical performance weaknesses persist, even though additional tabletop drills have been performed as corrective actions. Through self-assessment, SNL/NM has identified many programmatic weaknesses in the emergency management training program, and a corrective action plan has been implemented. The success of this plan is based largely on the critical action of hiring and supporting a highly qualified emergency management training coordinator. Similarly, SSO’s emergency management training program is informal and lacks definition; SSO also has a training-related self-assessment finding and corrective action plan in place. In recognition of SSO’s and SNL/NM’s self-assessment findings and corrective action plans, OA did not issue a finding to address the numerous training program weaknesses. However, continued management attention is warranted to ensure the timely implementation of planned corrective actions.

## **D.2.2 Emergency Public Information**

The EPI element was last evaluated at SNL/NM during the September 1999 OA exercise evaluation. During that appraisal, OA determined that responsibilities and authorities among the Albuquerque Operations Office (AL), the Kirtland Area Office (now SSO), and SNL/NM for developing and disseminating emergency public information had not been sufficiently defined in supporting response plans and procedures or integrated to ensure the timely release of authorized information to DOE Headquarters, the public, and the media. Since that evaluation, AL public affairs staff and SNL/NM developed well-defined procedures for each organizational entity. In December 2002, as part of the NNSA reengineering effort, AL became an NNSA Service Center. The SSO public affairs function has therefore assumed all responsibility for EPI and line management oversight of the SNL/NM public affairs functions and has developed a draft SSO EPI plan based on the AL EPI plan.

With the reorganization, SSO became responsible for establishing and documenting the approval process for all information disseminated to the public, the media, other stakeholders, and DOE/NNSA

Headquarters. SSO and SNL/NM EPI activities are conducted in accordance with the SSO EPI plan and procedural attachments, which describe policy elements and provide supporting checklists for the SSO public affairs advisor in the emergency operations center (EOC) and the primary positions within the JIC. The SNL/NM media relations emergency response guide (i.e., the SNL/NM EPI plan) serves as a support document to the SSO EPI plan and provides procedures for EPI functions prior to JIC activation.

The OA inspection team noted several strengths in the draft SSO EPI plan and the SNL/NM EPI plan. The SSO EPI plan effectively establishes an EPI organization to address the development of information in the EOC, detail the approval process for media releases, dispatch an on-scene public information officer, and activate and operate the media relations center (MRC). The supporting implementing procedures describe the roles and responsibilities of the JIC staff. For most postulated events, the SNL/NM EPI plan addresses the required EPI functions at the EOC and the MRC. This plan also details the approval process for media releases, and the checklists include clear roles and responsibilities. Personnel are well acquainted with their roles and have been cross-trained. In addition, the SNL/NM EPI plan calls for, and is supported by, tools that facilitate an initial release of information to the media within one hour of being advised of the incident.

During emergency conditions, it is essential that all EPI activities function as a single operational unit; that each organization's plan is coordinated and integrated; and that the staff are capable of responding accurately and quickly as one voice. However, the SSO and SNL/NM EPI plans and procedures are inconsistent and not appropriately integrated. In some planning areas, they contain confusing guidance and policy regarding the media release approval process; they lack coordinated and formalized mechanisms to ensure that timely and accurate answers will be provided to identify misinformation or rumors; and they duplicate efforts in some functional areas, including EOC news writing and media monitoring.

Additionally, for events requiring JIC activation, the SSO and SNL/NM EPI programs do not reflect the necessary degree of coordination. For example, the SSO EPI plan requires JIC activation at the declaration of a General Emergency. This activation is not addressed in the SNL/NM EPI plan. More importantly, there is no process for coordinating the transition of staff and responsibilities from the MRC to the JIC, including the issuance of media releases during JIC activation and the formal handoff of responsibilities when the JIC is declared operational. Compounding this problem is the fact that the JIC has never been exercised, nor has its performance been objectively evaluated in at least three years, as discussed in the previous section. Thus, JIC staff members have not been provided an opportunity to review and thoroughly understand the transition process and the JIC checklists, or to appreciate the relationship between the JIC and MRC and their roles in the effective functioning of the overall EPI element. Consequently, it is unlikely that the MRC and JIC staff could produce a coordinated, effective, accurate, and timely release of public information during a significant event. Furthermore, there has been no formal public education outreach program in recent years, largely because initial attempts to provide the media with emergency response information met with little interest.

**Finding #5: SSO and SNL/NM have not implemented an integrated set of EPI plans and implementing procedures that ensure that accurate and timely information is provided to site workers and the public during emergency events having wide media interest, as required by DOE Order 151.1A.**

To summarize, the EPI processes are well conceived and, in most cases, appropriately documented. EPI plans and supporting procedures effectively define the processes, and personnel are knowledgeable of those processes and have been cross-trained. However, key programmatic weaknesses degrade the site's ability to provide accurate and timely information to site workers and the public during events that would

require activation of the JIC. Specifically, the SSO EPI plan and the SNL/NM media relations plan have not been integrated to ensure that, during a significant event having wide media interest, the EPI and JIC staff would effectively transition in a timely manner from the MRC to the JIC. SSO recognizes this issue, but efforts to address EPI plan and procedure deficiencies have only recently begun, and the corrective action approach has not been formally defined.

### **D.3 CONCLUSIONS**

The SNL/NM and SSO training, drill, and exercise programs are not well defined, and they have not been effective in preparing emergency responders to perform critical actions, such as event classification, protective action decision-making, or offsite notifications during an emergency. Although SNL/NM and SSO had self-identified the significant programmatic weaknesses in training and have developed a corrective action plan, correcting these weaknesses and establishing an effective program will remain a challenging task. The SNL/NM and SSO EPI program is generally well conceived and supports effective response to most events. However, SNL/NM and SSO have not established all necessary processes, such as JIC operations, to support effective response to significant events that may generate media interest. SSO initiatives to address weaknesses in the EPI plan and procedures are at a very early stage.

### **D.4 RATING**

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

A rating of NEEDS IMPROVEMENT is assigned to the area of emergency public information.

### **D.5 OPPORTUNITIES FOR IMPROVEMENT**

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

#### **Sandia Site Office**

- Strengthen the EPI program plans, procedures, and information processes:
  - Further develop and execute the service level agreement between the SSO Office of Public Affairs and the NNSA Service Center to define the services that will be provided and how to obtain them.
  - Review and update the memorandum of agreement for the JIC with the Office of Human Resources and Training, Energy Training Complex.
  - Consider establishing an alternate JIC site that can provide access to the media if emergency or security conditions affect access to KAFB.
  - Initiate an annual review and approval process for the SNL EPI plan and tools.
- Ensure the integration and consistency of the SSO and SNL/NM EPI programs:

- Consider conducting a crosswalk of all EPI procedures to ensure consistent definition of roles and responsibilities and integration of the procedures. Ensure that each procedure has specified mechanisms linking the movement of information, questions, answers, and/or issues to and from all positions involved.
- Clarify, in the procedures, the expectations for the timeliness of initial news releases. Emphasize the use of a pre-formatted, pre-approved initial news release to rapidly disseminate basic emergency information in the early stage of the emergency. Ensure that “This is an Exercise” is added to every media release developed during drills and exercises.
- Clarify the approval process for media releases and ensure that all organizations and signers are aware of their responsibilities.
- Consider developing guidelines for the telephone operators regarding the definition of approved information for release. Ensure that the plan includes the processes for their receipt of approved media releases, fact sheets, chronologies, status board information, and transcripts or highlights of media conferences.
- Consider developing formal rumor control mechanisms to ensure the informational flow of rumors and misinformation from the source of the rumor, to the ERO for clarification, and back to the source.
- Consider integrating lessons learned from the Cerro Grande fire into the EPI program.
- Develop a JIC activation procedure that establishes the authority for JIC activation, the transition process from the MRC, the method for ongoing media releases while the JIC is becoming operational, minimum staffing levels for JIC operation, and the method for declaring the JIC’s operational status to the EOC, MRC, media, and public.
- Review and develop the resources available within SSO, SNL/NM, and the NNSA Service Center regarding a public education outreach program:
  - Review the expert-based information in the NNSA Service Center regarding public education tools, including the use of their 800 number, web site, and fact sheets, and also the Enduring Freedom web site for posting media releases.
  - Document the SSO public education program in the EPI plan.

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

- Formalize the training, drill, and exercise program administrative requirements by developing program administrative procedures and communicating adherence expectations:
  - Establish requirements for periodic review and approval of training materials and program records retention.
  - Provide guidance on developing lesson plans and other training support documents. Include direction on when to use classroom training, drills, and on-the-job training and any restrictions, such as when a qualified mentor or supervisor may be required during on-the-job training sessions.

- Implement the requirements for student evaluation after course completion, and include remedial training and retest requirements. Identify and document the criteria for evaluating successful participation in a drill, event, or exercise to meet ERO members' annual participation requirements.
- Consider using a simplified approach, such as a tabletop job analysis, to perform a systematic analysis of the tasks required of each ERO position. Establish a process for evaluating training needs for new tasks that might arise in the future:
  - Review roles and responsibilities documents for each position to identify job functions that may require specific knowledge. Walk through position-specific procedures, checklists, job aids, and other tools to identify job tasks. Evaluate tasks for frequency, difficulty, and consequences of errors or incompleteness when establishing initial and periodic training frequencies.
  - When new procedures are written or existing procedures are revised, include a training needs evaluation on the document revision sheet.
  - Add training requirements derived from the existing primary hazards screening process.
  - Include all mandatory training requirements for responders identified in Occupational Safety and Health Administration (OSHA) 1910.120. Consider the suggested training identified in OSHA 1910.120.
- Strengthen the management of ERO member training and qualification status and their placement on the ERO roster:
  - Establish a single source for emergency management training requirements by consolidating existing sources into a controlled document. Include all requirements for initial, refresher, and periodic training and drill participation in this single source.
  - Establish a consistent method, such as a course number, to clearly and consistently identify required training courses. Also assign a course number to each drill and give it an annual due date.
  - Use an automated notification system to track and alert personnel to training and drill requirements that are near due or overdue. Also consider establishing a grace period to avoid unnecessary disqualification of personnel.
  - Establish a process for ensuring that personnel with training deficiencies are not placed on the ERO roster.
- Consider developing training for selected SNL/NM facility personnel and SSO Facility Representatives to help strengthen their role in reviewing and approving facility-specific documents related to the emergency management program.

**Sandia National Laboratories – New Mexico**

- Consider the following improvements to the exercise planning process:

- Update the exercise scheduling template to include all response organizations. In filling out the template, consider which elements have not been tested recently so they can be added to the objectives for the coming year. Continue to update the schedule for planning future exercises. Develop exercise scenarios so that all elements are tested over a five-year period.
- Ensure that exercise packages contain criteria for all elements the exercise is designed to test. Remove objectives that are not within the design of the exercise.
- For facilities that contain significant hazards, beyond the base program, use site exercises to test and validate procedures and tools developed for the hazardous material program. Consider using facility-level exercises or drills to test base program facility capabilities.
- Improve the effectiveness of exercise reports by communicating concise and relevant information to management:
  - Provide an overall assessment of performance. Include findings, noteworthy practices, deficiencies, weaknesses, etc., 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, or place them in a separate attachment. Place only the analyses and conclusions derived from the raw data in the body of the report.
- Compare the MRC emergency response guide to the SSO EPI plan to ensure that they are integrated. Include procedures for MRC deactivation.

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## **APPENDIX E**

### **Emergency Response**

#### **E.1 INTRODUCTION**

The ultimate objective of emergency planning and preparedness is to prepare emergency responders so that they can apply their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public. Critical elements of the initial response include the categorization and classification of the emergency, formulation of protective actions, and notifications to 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.

Most of the information provided in this section consists of observations from tabletop performance tests that were conducted by the Office of Independent Oversight and Performance Assurance (OA) with three Sandia National Laboratories – New Mexico (SNL/NM) incident commanders (ICs), three emergency operations center (EOC) teams that included the emergency director position, and two plume modelers. Three operational emergency scenarios were presented to each participant: a transportation event involving the spill of a hazardous chemical; a fire resulting in a release of radioactive material; and a malevolent act resulting in a release of hazardous chemicals. The scenarios, which were developed by OA in conjunction with an SNL/NM trusted agent, were presented to the participants by the trusted agent to ensure scenario validity and delivery of accurate event cues. In addition, the tabletop performance tests included the participation of Sandia Site Office (SSO) duty officers and emergency managers.

#### **E.2 STATUS AND RESULTS**

##### **E.2.1 SNL/NM Emergency Response Decision-Making**

In the event of an emergency, the SNL/NM IC provides initial direction and control of the SNL/NM emergency response. Depending upon the nature and severity of the event, the IC is supported at the event scene by a number of organizations including the Kirtland Air Force Base Fire Department (KAFB/FD), SNL/NM security, and the SNL/NM rescue-reconnaissance team. The IC is responsible for command and control of the event scene and for making key decisions regarding the safety of emergency responders, event classification, protective actions for site workers, and protective action recommendations (PARs) for offsite populations. Once the EOC is activated, the emergency director assumes responsibility for overall response. Key emergency director responsibilities are to concur on event classification and PARs, and to review and approve offsite notifications. Plume modelers in the EOC support both the IC on scene and the EOC by identifying areas that could be affected by the hazardous material release.

##### **Incident Commanders**

The February 2001 OA program status review found that ICs were not aware of the responsibilities assigned to them in emergency response procedures, particularly in the area of formulating and disseminating protective actions and PARs to site workers and the public, respectively. This OA evaluation found that the ICs understood their roles and responsibilities but that significant weaknesses in plans and procedures (discussed in Appendix D), and some lapses in the use of these procedures, severely impacted the ICs' ability to perform such critical actions as event classification and protective action determination in a timely and accurate manner.

As part of the tabletop performance test, each IC simulated his/her response to three scenarios involving a release of hazardous materials. Upon notification, all the ICs promptly responded to the event scene utilizing an appropriate route (upwind) and established cordons to isolate the event scene. The ICs promptly activated the incident command system in the field and requested additional response resources (e.g., safety officer, operations officer, and industrial hygienist) to support field operations. The ICs also demonstrated a thorough knowledge of resources (e.g., subject matter experts) available to support their response, and were generally familiar with the emergency response guide.

However, the OA inspection team identified several concerns, the most significant being that in a number of the postulated events, the ICs did not appropriately classify the event and did not determine all appropriate onsite protective actions and PARs. For example, none of the ICs conservatively classified the transportation event that involved a spill of 55 gallons of hydrochloric acid. For this event, the size of the spill was in between the Alert emergency action level (EAL) threshold and the General Emergency EAL threshold (i.e., the EAL set does not cover the complete spectrum of spill sizes). Two of the ICs non-conservatively declared this event as an Alert, and a third did not classify the event at all. Furthermore, only one IC referred to the EALs to support event classification. This IC chose to remain at the lower classification level even though the threshold for the Alert EAL was clearly exceeded and the protective actions that were taken were consistent with a Site Area Emergency classification. Concerns were also identified in the classification of the security event. Although all the ICs correctly *categorized* the event initially as a security operational emergency, none of the ICs *classified* the event based upon the potential for a release of hazardous materials (which would have warranted a classification at the General Emergency level). Furthermore, after the bomb (postulated by the scenario) had exploded, causing the release of toxic gases to offsite areas, one of the ICs classified this event as a Site Area Emergency rather than as a General Emergency, as would have been appropriate.

In a number of tabletop scenarios, the ICs also did not promptly and accurately determine onsite protective actions and PARs. For example:

- For the transportation and security events, none of the ICs directed protective actions for the Microsystems and Engineering Sciences Applications (MESA) complex and 898 south trailers (which could have been affected by the hazardous material release).
- For the facility fire at the Annular Core Research Reactor, none of the ICs issued protective actions for the Manzano area, and one of the ICs evacuated personnel in a direction that put them into the hazardous material plume.
- In one case, an IC classified the event as a General Emergency and informed the communicator to notify offsite officials to shelter in place without identifying what specific areas were affected.
- In two cases, cordons were established downwind of the event scene.
- None of the ICs utilized information in the protective action emergency plan implementing procedure (EPIP) to help identify areas in which protective actions should be taken, and many of the resulting protective actions were not consistent with the procedure guidance.

In addition, protective actions and PARs were not always clearly communicated to the EOC communicator, and the ICs did not document these decisions in a checklist or log. Some of the problems with developing protective actions and PARs can be attributed to the poor maps the ICs used in identifying the areas to protect. The recently issued maps are large and, although detailed, are unwieldy

and difficult to read. Furthermore, the command vehicle was not equipped to support the maps (maps fell off the back of the lift gate), making map usage even more difficult. Another set of maps (smaller and with better detail) was available in the vehicle, but they were not used; however, one of these maps was grossly out of date (e.g., it did not show a major facility, Building 701).

In addition to weaknesses in event classification and protective action decision-making, the OA team observed some weaknesses in command and control of the event. For example, ICs did not usually identify themselves clearly as the IC in charge or delineate responsibilities in the unified command response structure, and none of the ICs developed a prioritized action plan or established accountability of response personnel. Furthermore, none of the ICs used the “suspicious package” EPIP to support response to the security (bomb) scenario, so some important guidance (such as the extent of the isolation zone) was not followed. Although some of these command and control weaknesses can be attributed to the nature of the tabletop test (i.e., one IC acting alone, with support played by the trusted agent), they indicate potential problem areas.

### **Plume Modelers**

The September 1999 OA exercise evaluation determined that the plume modelers were not proficient in using consequence assessment tools. This evaluation again identified weaknesses in plume modelers’ proficiency, but also found that SNL/NM had not established clear expectations for, or the tools to support, timely generation of plume dispersion plots.

During the tabletop performance tests, the plume modelers demonstrated that they understood their roles and responsibilities, and that they were knowledgeable of and able to perform all of the duties called for in the consequence assessment EPIP. For example, the plume modelers quickly reviewed event classification and protective actions taken. In addition, the plume modelers have access to some very useful tools, including reference materials, three plume-modeling codes, and a site mapping system, to support EOC and IC operations.

However, neither plume modeler was able to develop plume plots quickly enough to adequately support response efforts during the three scenarios presented to them. For example, the plume modelers needed approximately 25 minutes to develop a plume plot of the hydrochloric acid spill scenario and as much as 50 minutes to generate a plume plot for the radiological release from the facility fire scenario. The reason for the delays, in many cases, was that the plume modelers chose to use the National Atmospheric Release Advisory Center (NARAC) code, which is a sophisticated code that requires sending data to Lawrence Livermore National Laboratory. The time required to perform these actions and receive the results is at least ten minutes. Although SNL/NM has other codes that could be used (e.g., ALOHA and HOTSPOT), the plume modelers chose not to use them first. Even when these codes were run, some proficiency problems were noted. SNL/NM has not established an expectation that unsophisticated codes be utilized to generate plume plots quickly to support immediate response needs. Furthermore, SNL/NM has not established all the tools needed to generate plots quickly, such as preloaded default source term assumptions based upon the hazard assessment document (HAD); such assumptions could allow generation of a plume plot with only the input of actual meteorological conditions and the event location, considerably reducing the time needed for analysis.

Concerns were also identified in the accuracy and usefulness of some of the plots. For example, one plume plot indicated that protective action guides were exceeded at nine miles, but the worst-case HAD analysis indicated that the protective action guides would not be exceeded beyond two miles. In addition, a number of NARAC plots were useless to the ICs and EOC teams because although they showed extremely low concentration levels, extending out several miles, no data was displayed for areas close to the release point. This type of plot is the standard for NARAC, so the plume modelers would have had to

request a specific run to obtain NARAC plots with more useful contours, such as contours at the one-hour emergency response protection guide (ERPG-2) or immediately-dangerous-to-health levels to support protective action decision-making. In addition, the NARAC plots did not include a map scale to support identification of the distance where certain exposure concentrations were exceeded.

Finally, a number of additional proficiency weaknesses were identified:

- One plume modeler could not utilize the Chemical Information System effectively to determine actual toxic gas inventories at the Microelectronics Development Laboratory.
- Neither plume modeler realized that plume plots could not be printed while connected with NARAC.
- One of the plume modelers was not familiar with some information in the HAD. For example, the modeler did not realize that the HAD provided maximum quantities, not actual quantities.
- One plume modeler erroneously stated that the protective action guide for long-lived radionuclides was 1 rem, when it is actually 5 rem.

**Finding #6: SNL/NM plume modelers did not demonstrate the ability to make timely assessments of event consequences, as required by DOE Order 151.1A.**

### **EOC Teams**

OA's evaluation of the 1999 exercise identified some positive performance attributes, such as effective command and control, as well as a number of weaknesses that were largely attributed to problems with plans and procedures. In addition, it identified concerns with the ability of the EOC to support implementation of onsite protective actions and to notify offsite response organizations of PARs. This evaluation found very similar strengths and weaknesses in EOC team performance.

The EOC teams demonstrated a high degree of teamwork during the tabletop performance tests. With a few notable exceptions, EOC team members understood and effectively performed their emergency response duties. Command and control demonstrated by the emergency directors was a strength. The teams utilized status boards and checklists effectively, and they periodically stepped back to review the event situation and priorities. The EOC staff promptly reviewed the event classification and, in consultation with the IC, made appropriate upgrades. In addition, the EOC staff performed verbal offsite notifications in a timely (though not always accurate) manner. Finally, two of the EOC teams proactively coordinated with security organizations in response to the postulated security event. However, as in 1999, a number of weaknesses were identified; some, but not all, are attributable to problems in the plans, procedures, and tools supporting EOC operations.

The most significant weakness was that the EOC teams were unable to quickly evaluate the appropriateness of onsite protective actions and PARs. As a result, the EOC did not recognize that the IC had not adequately protected all onsite areas that could have been affected by the plume and did not communicate to offsite officials the offsite areas that might be affected or the recommended protective actions. Delays in identifying onsite protective actions and PARs resulted from:

- Lack of timely plume plots
- Maps that were too large and too detailed to support easy identification of areas to protect
- Ineffective use of EALs to support identification of protected areas

- Failure to use the protective action EPIP.

The failure to utilize the protective action EPIP hampered such decisions as determining the extent and breadth of protective actions and deciding whether to shelter in place or evacuate. EOC teams typically defaulted to shelter-in-place, without carefully considering the benefits of one protective action over the other. In addition, one EOC team that did specifically consider different options for protective action had difficulty in evaluating whether sheltering in place or evacuation was more appropriate for various offsite areas.

Furthermore, numerous weaknesses were observed in completing the offsite notification form, both by the SSO duty officers before EOC activation and by EOC teams after EOC activation. Specific concerns about SSO response actions are discussed in Section E.2.2, below. The SNL/NM emergency director, who has overall responsibility for emergency response and specific responsibility for approving the notification form, should have identified and corrected these weaknesses.

In conclusion, although the ICs, plume modelers, and EOC teams performed some initial response actions effectively, the performance of SNL/NM emergency responders during the tabletop performance tests does not provide confidence that SNL/NM can quickly and accurately classify an event, develop plume plots, and determine protective actions and PARs. A number of concerns were identified in the performance of each of the three response positions/teams that were evaluated. Most of these concerns result from weaknesses in the tools available to support the responders and in the training of response personnel—very similar to concerns noted in past OA evaluations.

## **E.2.2 SSO Emergency Response**

During an emergency event at SNL/NM, the primary function of the SSO duty officer is to make offsite notifications and serve as a communications liaison and primary contact with offsite agencies, including DOE Headquarters. The duty officer also acts as the SSO emergency manager when the emergency manager is not present. The SSO emergency manager is responsible for reviewing and concurring with the SNL/NM emergency director in emergency classifications, PARs, and media releases. Three SSO duty officers and emergency managers were involved in the tabletop performance tests to evaluate their understanding and performance of assigned duties, roles, and responsibilities. Controlling SSO plans and procedures were also reviewed for adequacy of direction and guidance.

The duty officer and emergency manager assignments are designated and distributed on a duty roster, and responsibilities for off-hours responses are well understood and clearly documented in the duty officer response notebook. However, the specific responsibilities and requirements for emergency response are not well integrated into the EPIPs. For example, the role of the emergency manager is not addressed in the EPIPs for categorization/classification and protective actions. Although the emergency managers were asked for concurrence on event classification and protective actions, it was not clear to all participants whether this concurrence was required and who would have the ultimate authority if there were a disagreement. Additionally, the SSO EOC procedures for the duty officer and emergency manager, as well as the emergency manager checklist, do not reflect changes in the lines of authority resulting from the transfer of responsibilities from the Albuquerque Operations Office to SSO. The SSO EOC procedures are being revised.

Despite these procedural weaknesses, the SSO duty officers and emergency managers understood and effectively executed nearly all of their roles and responsibilities during the tabletop scenarios. The duty officers adequately performed their role in support of the overall emergency response, including gathering information on the event, making management notifications, and initiating communications with offsite organizations. They acted for the emergency manager (the scenario delayed arrival of the emergency

manager) and used appropriate judgment in establishing priorities. The duty officers also demonstrated their ability to use the EALs for event categorization/classification. The emergency managers used the EALs appropriately, and when the EALs did not fit the exact conditions of the scenario, they made conservative recommendations as part of the EOC team. For example, the emergency managers used the EALs to determine the most conservative protective actions for a postulated bomb that threatened to disperse numerous chemicals. The emergency managers worked well with the SNL/NM emergency directors and admin/finance chiefs and were effectively integrated in the decision-making processes, and they made valuable recommendations as part of the EOC team. In most cases, the emergency managers demonstrated a questioning attitude to ensure the adequacy of categorization/classification, protective actions, and plume modeling.

The one area of weaknesses was that the duty officers and emergency managers were not proficient in making offsite notifications. At Sandia, notifications to offsite agencies are the responsibility of the SSO duty officer. In his/her absence, the offsite notification EPIP tasks the admin/finance section chief with this function. During tabletop performance tests, the emergency managers completed notifications when the duty officers were not present. Regardless of who prepared them, the offsite notification forms were usually incomplete and/or inaccurate, especially with respect to PARs. Although PARs are only appropriate for classifications at the General Emergency level, the PAR section of the form usually contained information about protective actions that were being taken on site. For events where PARs were appropriate, the PARs noted on the forms were often contradictory and confusing. Additional errors in offsite notifications included missing approval signatures, inadequate event descriptions (e.g., no identification of the hazardous material released), and no indication of a contact name and number for offsite agencies to call to verify receipt. As stated in the previous section, the SNL/NM emergency directors approved notification forms that contained these errors.

**Finding #7: SNL/NM and SSO emergency responders did not demonstrate the ability to accurately identify and communicate offsite protective action recommendations, as required by DOE Order 151.1A.**

To summarize, SSO duty officers demonstrated their understanding of their roles and responsibilities and, with few exceptions, supported the overall emergency response. The emergency managers demonstrated conservative decision-making and an understanding of required priorities, and they made valuable recommendations as integral members of the EOC teams. However, offsite notification forms were usually incomplete and inaccurate. Of particular importance, the PAR section of the notification forms often contained contradictory or confusing information that would not be readily understood by the offsite agencies responsible for implementing PARs. Additionally, the role of the SSO emergency manager is not addressed in the EPIPs.

### **E.3 CONCLUSIONS**

All SSO and SNL/NM emergency responders who participated in the tabletop performance tests demonstrated a thorough understanding of their emergency response roles and responsibilities, worked effectively as a team, and could effectively implement some initial response actions. However, they did not demonstrate that they can quickly and accurately classify an event, develop plume plots, and determine and communicate protective actions and PARs. Most of the significant performance concerns that were noted can be attributed to longstanding weaknesses in the tools available to support the responders and in the training of these response personnel.

## E.4 RATING

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

A rating of NEEDS IMPROVEMENT is assigned to the area of SSO emergency response.

## E.5 OPPORTUNITIES FOR IMPROVEMENT

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

### Sandia Site Office

- Coordinate with SNL/NM to ensure that the roles of the SSO emergency manager are clearly defined. Consider the following improvements:
  - Clearly establish who has ultimate authority and responsibility for ensuring that an event is properly categorized/classified and that the PARs are appropriate. Incorporate the results of this determination into the emergency plan and applicable EPIPs.
  - Ensure that the duties and responsibilities of the SSO emergency manager are included in all applicable EPIPs, particularly for categorization/classification and PARs.
  - Expedite the revision and approval of the SSO emergency response procedures and checklist for the duty officer and emergency manager.

### Sandia National Laboratories – New Mexico

- Conduct drills to validate the usability and effectiveness of checklists, procedures, and tools supporting SNL/NM ICs:
  - Consider conducting limited-scope drills that require the SNL/NM ICs to utilize all of their checklists (and procedures, as appropriate), step by step. The purpose of these drills would be to evaluate how well the checklists and procedures support the emergency response, to identify improvements, and to reinforce the need to use them during events.
  - Consider conducting a drill focusing on the use of EALs and onsite and offsite maps in order to determine the effectiveness of these tools in supporting event classification and protective action decision-making and to identify improvements.
- Conduct drills or exercises to evaluate and strengthen the effectiveness of interfaces among response organizations at SNL/NM:
  - Consider conducting a series of limited-scope exercises involving multiple response organizations/teams (e.g., SNL/NM IC, KAFB/FD, rescue-reconnaissance, and hazardous material teams). The purpose of these exercises would be to evaluate the effectiveness of the plans and agreements for interactions between these organizations—in particular, the plans for

establishing a command structure (including delineation of responsibilities, establishment and tracking of priorities, and establishment and maintenance of responder accountability).

- Consider including a scenario involving a large release of hazardous material in drills or exercises with KAFB. Such a scenario would require development of onsite protective actions and offsite PARs, allowing evaluation of the coordination between KAFB and SNL/NM in these decisions and their implementation.
- Establish clear expectations for plume modelers and provide the guidance, tools, and training needed to meet these expectations:
  - Consider re-prioritizing the plume modeler procedure checklist to assign development of a basic plot showing the direction, extent, and breadth of the plume as the highest priority.
  - Consider developing an aid that provides default source term data for the scenarios evaluated in the HAD to support quick development of plume plots. Consider pre-loading this data into the computer models to further enhance rapid development of plots.
  - Evaluate the effectiveness of the tools and training by running a series of tabletop tests simulating the demands on the plume modelers during an actual event. Consider including scenarios taken from the HAD as part of these tests.
- Consider conducting tabletop tests of EOC teams to evaluate the effectiveness of the tools and training supporting the EOC in performing protective action decision-making and offsite notifications.

## **APPENDIX F**

### **Readiness Assurance**

#### **F.1 INTRODUCTION**

The readiness assurance program provides the Department of Energy (DOE)-wide framework and multi-year planning mechanism for ensuring that program plans, procedures, and resources are adequate and sufficiently maintained to mount an effective response to an emergency. 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, contractor self-assessment programs, and timely implementation of corrective actions for identified weaknesses. For exercise evaluations, readiness assurance includes assessment of exercise effectiveness as a means of demonstrating and continuously improving a site's integrated response capability.

This inspection examined the processes by which NNSA's Sandia Site Office (SSO) provides guidance and direction to and maintains operational awareness of the Sandia National Laboratories – New Mexico (SNL/NM) emergency management program. The inspection also included a review of SNL/NM emergency management self-assessments and reviewed the status of actions taken to address program weaknesses previously identified during the February 2001 program status review that was conducted by the Office of Independent Oversight and Performance Assurance (OA).

#### **F.2 STATUS AND RESULTS**

##### **F.2.1 NNSA Assessments and Performance Monitoring**

SSO has primary responsibility for providing programmatic line management oversight. The SSO emergency management program manager, within the Environment, Safety, and Health Branch, is responsible for the day-to-day operations of the SSO emergency management program and for ensuring the effectiveness of the SNL/NM emergency management program. The individual acting in the emergency management program manager position for the past year is now detailed from the NNSA Service Center in Albuquerque. Since this assignment, progress has been made toward the goal of establishing programs and developing program documents for SSO, including defining training requirements for the SSO duty officer and emergency manager (as discussed in Appendix D) and updating SSO emergency response procedures and plans. The emergency management program manager has established and is maintaining an appropriate level of operational awareness of the SNL/NM emergency management program, a function that had essentially lapsed over much of the past two years due to vacancies and turnovers in this position. In February 2003, an emergency management specialist detailed from the NNSA Service Center to focus on implementing SSO programmatic requirements is expected to provide additional support. The acting emergency management program manager will focus primarily on oversight of the SNL/NM emergency management program, including verification of SNL/NM corrective actions.

At the request of SSO, a three-person team from NNSA conducted an assessment of the SSO emergency management program in December 2002. This assessment provided meaningful feedback on many key aspects of the program and provided critical assessments of both SSO's emergency management functions and oversight of the SNL/NM program. The report identified deficiencies in roles and responsibilities, training, plans and procedures, and resolution of incident command issues between SNL/NM and Kirtland Air Force Base Fire Department (KAFB/FD). Additionally, the report

documented the absence of defined processes for conducting line management oversight of the SNL/NM emergency management program and for transmitting direction and improvement items to SNL/NM. While the finding statements in the report are appropriate, the assertion by the review team in the report introduction that the number of findings can be directly attributed to the assumption of new response roles and responsibilities from the Albuquerque Operations Office conflicts with the longstanding nature of most of the identified weaknesses.

SSO had previously recognized some of these deficiencies, and corrective actions were already in progress. For example, an SSO emergency management program procedure establishing some responsibilities and assessment requirements has been drafted. Because the assessment identified additional areas that should be incorporated in the program, such as responsibilities for review and approval of the SNL/NM emergency plan, emergency readiness assurance plan, and emergency planning zone, SSO has delayed the issuance of the procedure. SSO has developed a corrective action plan that adequately addresses the findings in the self-assessment report, but it contains several notable weaknesses. The corrective action plan is considered approved, but because all 37 corrective actions have the same due date (January 31, 2004), it is not evident that consideration was given to prioritizing or defining the interrelationships among these actions. Additionally, the estimate of resource requirements for some of the actions is not realistic. For example, only 36 hours are assigned to resolve the longstanding incident command issue between SNL/NM and KAFB and to revise the associated memorandum of understanding. Furthermore, no process is in place to track these corrective actions; the need for such a process was also identified as a finding in the self-assessment.

Looking ahead, SSO oversight of the SNL/NM emergency management program is expected to be conducted in accordance with an Environment, Safety and Health (ES&H) Programmatic Assessment Implementation Plan for Fiscal Year (FY) 2003. Emergency management is not specifically addressed in the body of the plan, but the schedule does include emergency management elements. A revised schedule is being drafted to push back the emergency management assessments (originally scheduled in November 2002, February 2003, and April 2003) until May 2003. Considering the scope of known weaknesses in the SNL/NM and SSO emergency management programs and the resources available to SSO, it would be appropriate to suspend the programmatic assessment program and focus on verifying corrective actions. Furthermore, if SSO began conducting assessments in the near term, the absence of a well-defined program for evaluating the SNL/NM emergency management program documentation and performance would limit their effectiveness. Additionally, there is no process in place for transmitting and tracking issues for SNL/NM resolution. For example, a baseline needs assessment (BNA) for fire and related emergency response capabilities, commissioned by SNL/NM and completed in September 2002, identified coordination issues and gaps between SNL/NM and KAFB/FD response capabilities. However, SSO management has not directed actions to address the findings. Contributing to SSO's delay in addressing the findings of this study is the absence of clear requirements, guidance, and expectations within DOE Order 420.1A, *Facility Safety*, for reviewing and approving BNAs.

Overall, the absence of a framework for conducting line management oversight of the site's emergency management program and for tracking associated issues is to some extent mitigated by their self-identified nature and the corrective action plan that has been developed. However, the corrective action plan is newly issued, scheduling is not complete, and SSO is currently relying on staff who are assigned (on 120-day details) to implement the plan. The weaknesses in line management oversight of the SNL/NM emergency management program reflect broader institutional-level problems noted by the OA team regarding SSO issues and corrective action management systems, as described in detail in the "Feedback and Continuous Improvement" section (Appendix D) of the ES&H volume (Volume I) of this report.

In summary, through formal and informal assessments of emergency management, SSO has self-identified weaknesses in both SSO's emergency management functions and their line management oversight of the SNL/NM program. When implemented, the identified corrective actions should enhance SSO emergency response capabilities and provide the framework and definition necessary to conduct effective oversight of the emergency management program. In the meantime, corrective actions have not been scheduled, and the continued availability of personnel resources to the SSO emergency management program remains a concern.

## **F.2.2 Contractor Assessments and Issues Management**

### **Self-Assessments**

DOE Order 151.1 requires annual programmatic self-assessments. However, this requirement has not been carried forward into any emergency management program controlling documents, and there is no indication of any such assessments prior to 2002. In FY 2002, an emergency management self-assessment was conducted as part of a pilot program within the SNL/NM Integrated Security and Safety Center. The process used for this self-assessment was comprehensive in that it was conducted in accordance with a detailed assessment plan and included approximately 500 evaluation criteria. Meaningful findings and observations were identified and grouped into such related topics as training and hazards assessment. Root cause determinations were performed and corrective actions were developed that, when completed, should result in significant programmatic improvements. Corrective actions were then scheduled based on a risk prioritization process. Although the process was generally thorough, a few exceptions were noted in the rigor of the root cause determinations and corrective actions. For example, corrective actions for one finding – “Roll-up of drills and exercise corrective actions is not complete and repeat findings against identified problems have not been addressed” – were limited to training issues and did not address the feedback and improvement process or, more specifically, an issues management process that would include steps to verify the effectiveness of completed corrective actions.

Overall, the SNL/NM emergency management self-assessment was a value-added product that required significant resources to develop and implement. However, a detailed review of the results identified the following weaknesses:

- Evaluation criteria were sometimes judged to be “in compliance” because corrective actions were already in progress, even though the corrective actions were not complete and had not been tracked. As a result, the determination of compliance was sometimes based on an assumption that the necessary actions would be completed. A review of a small sample of these actions found that most, but not all, had been completed.
- Some areas did not critically assess the effectiveness of past corrective actions implemented to address longstanding concerns. For example, although the hazards assessment document was a focus area of the self-assessment, no corrective actions were developed related to completing the event spectrum or strictly identifying the source terms assumed in the accident scenarios.
- In some instances the corrective actions, as written, could be completed without resulting in any improvements. For example, one corrective action was to review a procedure to see whether it should be simplified. However, no provision was made for follow-up action or implementing any necessary procedure revisions.
- The corrective action plan did not always include all of the actual actions being implemented.

Planning for the FY 2003 emergency management self-assessment is under way as part of the ES&H functional area self-assessment annual plan. This plan provides the basic planning, implementation, and corrective action requirements for the self-assessment process. However, even though an emergency management self-assessment is planned for FY 2003, the SNL/NM emergency plan does not include a description of the annual programmatic self-assessment program. The SNL/NM emergency plan only requires a self-assessment following each drill and exercise to identify both positive performance and needed improvements. These requirements are further defined in the emergency management feedback and improvement process procedure. However, as stated in Appendix D of this report, these requirements have not been effectively implemented.

## **Issues Management**

SNL/NM has had mixed success in managing issues and the associated corrective actions. On one hand, SNL/NM has implemented improvements in many aspects of the site's emergency management program since the 2001 OA status review. Some of the more significant improvements include:

- A communications coordinator function has been added that, when fully staffed, will provide continuous support for communicating onsite protective actions for affected workers and making notifications to offsite agencies. The net result will be more timely actions and reduced burden on the incident commander (IC).
- Equipment upgrades have significantly enhanced mapping and display capabilities in the emergency operations center (EOC), and a heavy rescue response vehicle was purchased to improve hazardous material response capability.
- Emergency alerting system support equipment was purchased for the Albuquerque and Bernalillo County EOCs, providing the capability to make timely television and radio emergency announcements to the public.
- Tabletop performance tests conducted as part of this OA assessment found improved competence in the EOC teams and better definition and awareness of IC roles and responsibilities.
- The onsite Sandia Protective Action Notification (SPAN) system has been further developed to include tone alert radios, and trained evacuation teams have been established in most facilities.

However, SNL/NM has not been effective in comprehensively addressing all weaknesses identified by past OA evaluations, a conclusion also reached in their 2002 self-assessment. In particular, most of the weaknesses identified in the areas of initial decision-making, protective actions, and event classification during the 2001 assessment have not been corrected, nor have they been appropriately addressed by the corrective action plan for the 2002 self-assessment. Contributing significantly to the continuation of these issues are a variety of weaknesses in response procedures and the training, drill, and exercise program.

In addition, SNL/NM is not effectively managing more recently identified corporate-level corrective actions in emergency management. The emergency plan and the procedure that addresses the emergency management department feedback and improvement process require that corrective actions from drills and exercises be assigned and tracked through the corporate corrective action tracking system. Instead, findings and improvement items, maintained in a local database, are transmitted by email to responsible organizations for their review and action, as appropriate. Actions are considered discretionary, and feedback on any actions taken is not communicated back to the emergency management department. Because there are no corporate-wide requirements to identify actions taken to address these findings,

issues and corrective actions are not appropriately managed and tracked, and their status cannot be readily determined.

A separate local tracking system is used to track corrective actions from the FY 2002 self-assessment. Because most actions are assigned within his department, the SNL/NM emergency management department manager accurately maintains the status of these actions. However, the process is not documented, it has no visibility beyond the emergency management department, and there is no mechanism for reporting to SNL/NM and SSO management to allow them to judge progress and resource adequacy.

An issues management process is being developed for use by the entire Integrated Safety and Security Center (Center 3100), of which emergency management is a part. As discussed in the feedback and improvement section (Core Function 5) of Volume I of this report, this proposed issues management program contains the elements of an effective system. However, it is a Center 3100 program and not corporate-wide, so its requirements will not be binding on other centers. Because response functions/responsibilities are not all within the purview of the emergency management department, there is no mechanism for holding other centers accountable for correcting emergency management weaknesses. Additionally, issues identified by other centers that impact emergency management might not be captured. For example, the issues identified in the BNA study discussed in Section F.2.1 cut across several SNL/NM centers. Hence, the proposed issues management process for Center 3100 would be limited in its ability and authority to manage these issues effectively.

The weaknesses noted above can be attributed to the absence of an integrated, corporate-wide corrective action program for tracking and verifying the adequacy of corrective actions. This deficiency is not limited to emergency management and is addressed more broadly in the associated finding appearing in Volume I of this report.

To summarize, SNL/NM performed a value-added self-assessment in 2002 that focused on several key response areas, and this activity was successful in identifying such program weaknesses as a poorly-structured and -implemented emergency management training program. Corrective actions are in progress, and SNL/NM is in the process of establishing a more structured approach to performing emergency management self-assessments. However, the self-assessment did not consistently identify areas where additional corrective actions were needed to completely address previously identified concerns. Furthermore, SNL/NM lacks an issues management system to capture, track, and ensure closure of all emergency management issues, regardless of source. This shortcoming has contributed to the persistence of several longstanding weaknesses in emergency management, in part because emergency management program interests and concerns cut across functional areas and organizations.

### **F.3 CONCLUSIONS**

Many enhancements have been implemented in the SNL/NM emergency management program, and, through self-assessments, SSO and SNL/NM have identified areas where substantial improvements are still required. Corrective actions have been identified to address the identified weaknesses; however, most corrective actions have not been completed. More importantly, key areas of weakness that SNL/NM believed were adequately addressed by corrective actions and considered complete remain problematic. Additionally, neither SSO nor SNL/NM has implemented a comprehensive issues management program to ensure that weaknesses identified by all feedback and improvement processes will be tracked to completion and verified to be effective.

## **F.4 RATING**

A rating of NEEDS IMPROVEMENT is assigned to the area of NNSA assessments and performance monitoring.

A rating of NEEDS IMPROVEMENT is assigned to the area of contractor assessments and issues management.

## **F.5 OPPORTUNITIES FOR IMPROVEMENT**

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

### **Sandia Site Office**

- Consider enhancing the corrective action plan developed in response to the December 2002 assessment by implementing the following improvements:
  - Determine the resources required to implement corrective actions based on the current status.
  - Identify and address any barriers to the completion of corrective actions. For example, an SSO document control system may be required to ensure that procedures, once updated, remain current.
  - Develop a realistic schedule for completing and verifying the effectiveness of corrective actions based on priorities and required resources.
- Consider revising the ES&H Programmatic Assessment Implementation Plan for FY 2003 to address the elements of the emergency management program (similar to the ES&H functional areas). Additional considerations should include :
  - Until the corrective action backlog is significantly reduced, consider focusing upcoming assessments on the completion and effectiveness of SNL/NM corrective actions.
  - Continue to work with SNL/NM to identify and, where possible, eliminate barriers to completing corrective actions.

### **Sandia National Laboratories – New Mexico**

- Improve the self-assessment process to ensure that weaknesses are properly documented and addressed by considering the following:
  - Provide guidance and/or training to evaluators on what is acceptable for a determination of “in compliance.” Emphasis should be placed on approved and implemented programs or documents.
  - If an evaluation criterion is found not to be in compliance but corrective actions are in progress, ensure that the action is captured in an issues management system. The FY 2002 self-assessment results should be reviewed to identify where findings and observations were not provided because

of planned corrective actions, and to ensure that those actions either were completed or were included in a tracking system.

- Ensure that the corrective action is adequate to address the weakness without assumptions about additional undocumented actions.
- Consolidate the various systems used for tracking emergency management improvement items and recommendations to ensure that issues are adequately addressed and also to facilitate data retrieval:
  - Establish a department-level procedure for emergency management feedback and improvement that addresses improvement items and recommendations identified by external assessments, self-assessments, drills, and exercises.
  - Ensure that the procedure integrates the provisions of a corporate-wide issues management program to ensure that corrective actions that are outside the control of the emergency management department are implemented.

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