Volume II

Inspection of
Emergency
Management
Programs
at the

Los Alamos National Laboratory

April 2002

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

INDEPENDENT OVERSIGHT
INSPECTION OF
EMERGENCY MANAGEMENT AT THE
LOS ALAMOS NATIONAL LABORATORY

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ACRONYMS

AA	Audits and Assessments Division
ACIS	Automated Chemical Inventory System
AL	Albuquerque Operations Office
AL-EMB	Albuquerque Operations Office Emergency Management Branch
AL-OPA	Albuquerque Operations Office of Public Affairs
CBT	Computer-Based Training
CER	Community and External Relations
CFR	Code of Federal Regulations
CMR	Chemistry and Metallurgy Research
CRO	Community Relations Office
CY	Calendar Year
DOE	U.S. Department of Energy
EAL	Emergency Action Level
EMP	Emergency Management Plan
EMPIP	Emergency Management Plan Implementing Procedure
EM&R	Emergency Management and Response
EOC	Emergency Operations Center
EPI	Emergency Public Information
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
GRO	Government Relations Office
HA	Hazards Assessment
JIC	Joint Information Center
LANL	Los Alamos National Laboratory
LIR	Laboratory Implementing Requirement
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
OLASO	Office of Los Alamos Site Operations
PAO	Public Affairs Office
RLWTF	Radioactive Liquid Waste Treatment Facility
SWANS	Sitewide Area Notification System
TIA	Timely Initial Assessment

1.0 INTRODUCTION

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA) conducted an inspection of environment, safety, and health and emergency management programs at the U.S. Department of Energy's (DOE) Los Alamos National Laboratory (LANL) in March-April 2002. 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 LANL emergency management program. The results of the review of the LANL environment, safety, and health programs are discussed in Volume I of this report, and the combined results are discussed in a separate summary report.

The DOE National Nuclear Security Administration (NNSA) has DOE Headquarters responsibility for programmatic direction and funding of activities at LANL. Within the NNSA, the Albuquerque Operations Office (AL) and its subordinate Los Alamos Area Office historically had line management responsibility for operational direction and DOE line management oversight at LANL. In accordance with the changes in line management directed by the NNSA Administrator in March 2002, the Los Alamos Area Office has been renamed the Office of Los Alamos Site Operations (OLASO), was made a direct report to the NNSA Administrator, and will be given increased responsibility and accountability for managing and directing the LANL contractor. Concurrently, AL will transition to a support office for OLASO and other NNSA site operations offices. Under contract to AL, the University of California is the prime contractor for operations at LANL. Transition of contractual administration to OLASO is planned.

Throughout its evaluations, OA reviews the role of DOE organizations in providing direction to contractors and conducting line management oversight of contractor activities. OA is placing more emphasis on review of contractor self-assessments and DOE line management oversight in ensuring effective emergency management programs. In reviewing DOE line management oversight, OA focused on the effectiveness of AL and OLASO in managing the LANL contractor, including such management functions as setting expectations, providing implementation guidance, allocating resources, 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 emergency management oversight and operational awareness activities of AL and OLASO, OA evaluated the institutional-level emergency management program that is managed and administered by the LANL Emergency Management and Response (EM&R) group and the facility emergency preparedness programs at the Chemistry and Metallurgy Research (CMR) facility and Radioactive Liquid Waste Treatment Facility (RLWTF). As part of this inspection, the inspection team conducted tabletop performance tests with a sample of the site's key decision-makers to evaluate their ability to employ available tools and skills developed in training to respond to postulated emergency conditions.

LANL's primary mission is to provide scientific and engineering support to U.S. national security programs. LANL performs research, development, design, maintenance, and testing in support of the nuclear weapons stockpile. LANL also performs theoretical and applied research and development in such areas as materials science, physics, environmental science, energy, and health.

To support these activities, LANL operates numerous laboratories, test facilities, and support facilities and performs such activities as facility maintenance and waste management. LANL activities involve various potential hazards that need to be effectively controlled, including exposure to radiation,

radiological contamination, nuclear criticality, hazardous chemicals, and various physical hazards associated with facility operations (e.g., machine operations, high-voltage electrical equipment, pressurized systems, noise, and construction/maintenance activities). Large quantities of fissile and radioactive materials are present in various forms at LANL.

The results of this review indicate that LANL has established a solid program foundation through the development of a generally thorough and technically sound hazards assessment, laboratory implementing requirements, and laboratory performance standards. However, the programmatic basis is not supported by response procedures and a training and drill program that has ensured that responders are capable of fulfilling their assigned response duties. Weaknesses were also observed in the areas of hazard identification, emergency public information, and, most notably, the OLASO and LANL feedback and improvement programs. OLASO has not assigned sufficient resources to conduct operational awareness activities and to ensure that DOE personnel are fully prepared to respond to an emergency. LANL has performed few internal and self-assessments of its emergency management program that have not been sufficiently rigorous to identify the weaknesses in this report and those identified by other DOE entities.

2.0 RESULTS

2.1 Positive Program Attributes

The LANL emergency management program exhibits a number of positive attributes, several of which could serve as models for programs across the DOE complex. These include:

CMR has implemented an outstanding emergency preparedness program. The CMR building emergency plan establishes an excellent foundation for the facility's emergency preparedness and response program. The plan is supplemented by well-developed implementing procedures and response instructions that specifically address responder roles and responsibilities and prioritized response actions. To implement these plans and procedures, CMR has established a rigorous training and drill program for its facility incident commanders, operations center supervisors, and emergency response team. CMR also maintains and conducts periodic inventories of a wide array of strategically positioned emergency response equipment both inside and outside the facility and has installed visual and audible warning systems to quickly alert employees to abnormal conditions or events. Facility incident commanders are knowledgeable of their duties and responsibilities, facility response mechanisms, and the important elements for interfacing with responders from outside the facility. Finally, CMR is proactively working to correct self-identified program weaknesses, such as those associated with the capability to shelter in place.

EM&R has established conservative chemical screening thresholds based on the potential for health and safety impacts rather than on the significantly larger threshold quantities outlined in DOE Order 151.1A, *Comprehensive Emergency Management System*. EM&R derived chemical-specific screening thresholds based on the quantity of material that, if released, could exceed protective action criteria beyond the immediate event area. The thresholds were calculated using conservative assumptions and are significantly lower than the thresholds mandated by DOE Order 151.1A. The use of the lower screening thresholds recognizes that small quantities of some materials may produce significant consequences outside a facility and provides assurance that all such hazards are reviewed to determine whether further assessment or additional emergency planning is necessary.

EM&R maintains strong and productive interfaces with offsite responders and local emergency planning committees. EM&R staff are active participants on the Los Alamos County local emergency planning committee and the Interagency Wildfire Management Team, among others. EM&R has been

proactive in working with the local emergency planning committee to develop and disseminate emergency public education information and materials. The LANL hazardous devices and crisis negotiations teams are composed of laboratory personnel and local, offsite personnel, thus facilitating effective interagency coordination in responding to emergencies.

AL's site-level assistance and assessment activities `have significantly increased and improved over the past year. AL emergency management and public affairs staff have significantly increased both the frequency and quality of their interactions with OLASO and LANL emergency management and response personnel. Operational awareness activities have included monthly visits to discuss program status, staff assistance visits that have included limited scope performance tests, and exercise planning and evaluation assistance. In addition, the August 2001 LANL portion of the AL baseline emergency response capabilities study, while not yet formally transmitted to the site, is a major improvement over previous AL evaluation reports and identified many of the same weaknesses that are discussed in this report.

2.2 Program Weaknesses and Items Requiring Attention

The LANL emergency planning, preparedness, and response programs are largely expert-based and, as such, do not reflect the necessary structure to support timely and accurate identification and implementation of emergency response actions. The most significant weaknesses involve the plans, procedures, systems, and tools that are intended to facilitate implementation of time-urgent response functions, and the emergency response organization (ERO) training, drill, and qualification program. A combination of the weaknesses in these two fundamental areas resulted in emergency responder decision-making demonstrated during tabletop exercises that was not sufficiently timely or accurate to have been effective in protecting workers and the public from exposure in the event of a significant hazardous material release. Specific weaknesses include:

EM&R has not effectively implemented the necessary program elements to ensure timely and accurate emergency response decisions and actions, most notably in the areas of protective actions, emergency notifications, and emergency classification. Due to the collective impact of significant weaknesses in emergency response plans, implementing procedures, decision-making aids, timeliness expectations, notification systems, and responder training and drills, the LANL emergency management program does not ensure that the promptness and accuracy of decision-making will be commensurate with the severity of an emergency and its potential consequences. While LANL has successfully managed responses to recent wildfires and facility-level chemical incidents, the existing EM&R program has not established and tested the necessary infrastructure and response expectations to ensure that time-urgent decisions are formulated and implemented in the event of an airborne hazardous material release outside a facility. As a result, EM&R emergency managers and other responders were unable to respond appropriately and effectively to simulated emergency conditions during both this evaluation and a recent no-notice exercise conducted by the DOE Headquarters Office of Emergency Operations.

LANL and EM&R feedback and improvement processes have not ensured that program assessment activities have been conducted as required and that some previously identified weaknesses have been effectively addressed and corrected to prevent recurrence. Internal assessments of the laboratory's emergency management program have not been conducted as required by DOE Order 151.1A and the LANL emergency management plan. Although some program development activities and corrective actions have addressed weaknesses identified in the 1998 OA evaluation of the LANL emergency management program, several significant weaknesses have not yet been fully corrected or warrant further action to achieve satisfactory results. Weaknesses remain in the areas of ERO procedures and training to support prompt and accurate emergency decision-making; back shift duty arrangements for ensuring adequate after-hours response capability; and management of ERO training, drill, and exercise requirements and participation related to responder proficiency. In addition, as in

1998, the laboratory's approval process for releasing public information in an emergency still contains numerous inconsistencies.

OLASO has not formally assigned responsibilities and dedicated resources to monitor the effectiveness of the LANL emergency management program and to fulfill site office emergency planning and response requirements. OLASO expectations for conducting operational awareness of the LANL program and implementing site office emergency management requirements are generally well defined. However, OLASO has not formally assigned responsibility for these activities to one or more staff members to ensure that they are implemented effectively and as required by internal procedures. As a result, day-to-day monitoring of the contractor program has been limited; OLASO duty officers are unaware of and unable to fulfill their assigned emergency response functions; OLASO interfaces with offsite response authorities are minimal; and, as identified during the 1998 OA evaluation, memoranda of understanding for emergency support services from offsite responders have not been maintained current.

3.0 CONCLUSIONS

The LANL EM&R group has established a sound emergency management program basis through its hazards assessment process and through the depth and breadth of experience and expertise of its staff. The laboratory has successfully managed the response to several facility-level events involving hazardous materials and the devastating Cerro Grande fire of May 2000, which burned over much of the laboratory's property and caused evacuations of the laboratory and the surrounding population. While these successes must not be diminished or overlooked, OLASO and LANL have not implemented an emergency preparedness and response program that is fully capable of responding to a significant release of hazardous material, a condition that warrants a more immediate response in order to protect workers and the public.

The hazards assessment provides a good technical foundation for the LANL emergency management program and the emergency action levels and predetermined protective actions derived from those assessments. Notably, EM&R has established very conservative chemical screening thresholds that are based on potential health and safety impacts rather than on the much larger thresholds identified in DOE Order 151.1A. Annual updates of the hazards assessment are rigorously performed and have resulted in a continuously improving planning basis, but the process for conducting hazards surveys and assessments has not been adequately defined and documented to ensure that it is consistently and effectively implemented.

The LANL program continues to be supported by adequate and well-maintained emergency response facilities and equipment and strong interfaces with offsite response authorities and organizations, both of which have been significantly strengthened in the wake of the Cerro Grande fire. LANL personnel from several organizations routinely interface with offsite responders and play an active and beneficial role in local emergency planning committees. LANL maintains the necessary apparatus, equipment, and emergency operations centers to respond effectively to virtually any type of emergency, not only on the laboratory site but throughout the local communities as well. Recent and ongoing upgrades to these facilities and equipment are being made using funds provided to the laboratory following the Cerro Grande fire. The building emergency planning program is well defined and has been implemented at the local level commensurate with facility hazards. CMR is well prepared for facility-level emergencies because of the experience and qualifications of its emergency response staff, availability of response equipment, and well-conceived response procedures and checklists. The RLWTF has established an emergency action plan, but much of the response equipment and supplies identified in the plan was found to be missing or significantly out of date.

The LANL hazard identification and building run sheet process also appropriately mandates line management responsibility for and routine involvement in identifying hazards to EM&R. However, several important weaknesses in implementing this process were identified such that the process does not ensure that the most accurate information is considered when classifying an emergency. Weaknesses include significant discrepancies in hazardous material quantities among the sitewide chemical database, building run sheets, and the amount of material typically used or stored in a facility; inadequate evidence to determine whether some hazardous materials were evaluated against the EM&R screening thresholds and that materials exceeding the thresholds had been further evaluated; and the absence of a mechanism to modify the hazards assessment or emergency action levels following a significant reduction in hazards. While this last condition does not have the same impact as an unidentified increase in hazards, the issuance or recommendation of unwarranted protective actions still presents an unnecessary risk to those who take such actions.

The EM&R emergency management and response program is largely expert-based. Response capabilities have not been sufficiently tested and are not adequately supported by procedures, job aids, and expectations to ensure timely and accurate decision-making for a hazardous material emergency. The training and drill program for ERO members does not include any performance-based elements to determine whether responders can readily implement procedures and decision-making aids, or that responders are proficient in applying those tools under varying emergency conditions. Success of the LANL response system is highly dependent on numerous individuals being available in the emergency operations center at the time of an emergency to assist in decision-making and to perform such critical response functions as emergency notifications, protective action formulation and communication, and ERO activation. However, EM&R has not established formal provisions to ensure that individuals with the necessary expertise, and in sufficient numbers, are available at all times to assist in completing these tasks. Furthermore, the ability to perform these critical functions promptly would be further complicated if an emergency occurred after normal working hours, when the emergency operations center is not staffed. As a result, during performance tests, initial decision-makers were generally unable to use their response tools to readily determine the correct emergency classification and appropriate protective actions for postulated emergency conditions.

The LANL emergency management program has recently received significantly increased oversight and assistance from AL and the DOE Office of Emergency Operations. In August 2001, AL conducted a baseline needs capability study of the LANL program as mandated by the AL Manager. The depth and quality of that study is a marked improvement over previous AL evaluation activities and identifies many of the weaknesses reflected in this OA report. The increased assistance from AL is particularly important since OLASO has not dedicated sufficient resources to maintain operational awareness of the LANL program and to ensure that DOE personnel are proficient in their assigned emergency response duties.

LANL internal assessment activities have not been effective in identifying emergency management program or performance weaknesses, most notably with regard to the procedures and training necessary to execute time-urgent response functions. The periodic assessments performed by the LANL Audits and Assessment Group do not evaluate decision-making skills and have not identified many of the weaknesses contained in this report. Semiannual safety function manager assessments conducted by EM&R have not identified any program or performance weaknesses in the past two years. Furthermore, the laboratory's internal assessment program has not ensured that programmatic weaknesses identified by OA in 1998 were adequately addressed and corrected. Some aspects of almost all of the LANL weaknesses identified in 1998 were evident during this current inspection.

The LANL emergency management program continues to be strong in the areas of emergency facilities and equipment and offsite response interfaces, and the program is now supported by a thorough and

technically sound hazards assessment. Recent responses to locally confined chemical events have been generally well managed, and the massive response effort demanded by the Cerro Grande fire was managed effectively without any serious personnel injuries. However, repeated responses to these types of events have cultivated a belief among LANL managers that an expert-based system is sufficient to handle all laboratory emergencies and a diminished recognition of the need for prompt decision-making in the case of an airborne hazardous material release. Most importantly, the need for timeliness and accuracy is not reflected in response plans and procedures or addressed through training and drills. Both OLASO and LANL management attention, and continued program monitoring by AL, are necessary to ensure that the laboratory's emergency management system is fully capable of responding to all types of potential emergencies.

4.0 RATINGS

This inspection included an assessment of ten elements of the LANL emergency management program. The individual element ratings reflect the status of those elements at the time of the inspection. No overall rating of the program is assigned.

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

Hazards Survey and Hazards Assessments ..... EFFECTIVE PERFORMANCE
Program Plans and Procedures..... NEEDS IMPROVEMENT
Offsite Response Interfaces..... EFFECTIVE PERFORMANCE
Emergency Facilities and Equipment ..... EFFECTIVE PERFORMANCE
Training, Drills, and Exercises..... NEEDS IMPROVEMENT
Emergency Public Information..... NEEDS IMPROVEMENT
Response Decision-Making..... NEEDS IMPROVEMENT
Consequence Assessment..... EFFECTIVE PERFORMANCE
DOE Performance Monitoring..... NEEDS IMPROVEMENT
Contractor Assessments and Issues Management ..... NEEDS IMPROVEMENT

APPENDIX A
SUPPLEMENTAL INFORMATION

A.1 Dates of Review

	Beginning	Ending
Planning Meeting (Germantown)	March 11, 2002	March 15, 2002
Onsite Review	March 18, 2002	March 28, 2002
Report Validation and Closeout	April 9, 2002	April 11, 2002

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

A.2.2 Quality Review Board

Michael A. Kilpatrick
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A.2.3 Review Team

Patricia Worthington, Team Leader
James O'Brien
David Schultz
Thomas Rogers
Kathy McCarty, Topic Lead
Alan Cerrone
Steven Simonson

A.2.4 Administrative Support

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APPENDIX B
SITE-SPECIFIC FINDINGS

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

FINDING STATEMENT	REFER TO PAGES:
1. LANL has not ensured that the emergency preparedness hazards assessment is reviewed and updated prior to significant changes in hazardous material inventories or operations involving hazardous materials as required by DOE Order 151.1A, *Comprehensive Emergency Management System*, Chapter IV, Section 3.a(2).	9-10
2. The Emergency Management and Response System (EM&R) group plans, procedures, notification systems, decision-making aids, and response expectations do not ensure that critical, time-urgent decisions and actions are implemented in a timely and accurate manner to minimize exposures to employees and the public in the event of a hazardous material release as required by DOE Order 151.1A, Chapter IV, Sections 3.b and 5, Chapter V, Chapter VIII, Sections 1 and 2, and Attachment 1, paragraph 9.	12-14
3. EM&R has not ensured that emergency response organization members are capable and proficient in fulfilling their assigned response functions and duties through a systematic training and drill program as required by DOE Order 151.1A, Chapter IV, Section 4, and the LANL emergency management Laboratory Performance Requirement.	22-23 29-33
4. OLASO and LANL have not implemented current, approved plans and procedures to ensure that timely and accurate emergency public information is provided to site workers and the public in a rapidly unfolding emergency as required by DOE Order 151.1A, Section 4.c(1)(b)3, Chapter I, Sections 8.f and 9.b, Chapter IX, Sections 2 and 4, and Attachment 1, paragraph 12.	24-26
5. OLASO is not adequately monitoring the effectiveness of the LANL emergency management program, ensuring appropriate and capable DOE involvement in emergency response, and maintaining agreements with offsite agencies and organizations to support response to a LANL emergency as required by DOE Order 151.1A, Sections 4.b(1)(b) and 4.c(1)(b), Chapter I, Section 8, and Chapter XI, Section 1.	38-39
6. Annual emergency management program assessments are not being conducted in accordance with DOE Order 151.1A (Chapter I, Section 9.g, Chapter X, Section 4.a, and Attachment 1, paragraph 5), the LANL emergency management plan, and the LANL emergency readiness assurance plan. Furthermore, actions taken in response to a 1998 Independent Oversight evaluation were not sufficient to address identified weaknesses or prevent recurrence.	40

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 that are needed to assure an effective emergency response. Key elements of emergency planning include developing hazards surveys and hazards assessments 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) sites and facilities must establish an emergency management program that is commensurate with the hazards identified. 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 must then be 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 are the recipients of DOE emergency response recommendations.

This inspection included an evaluation of the Los Alamos National Laboratory (LANL) hazards survey and hazards assessment (HA) development and maintenance process; HAs for the Chemistry and Metallurgy Research (CMR) facility, Radioactive Liquid Waste Treatment Facility (RLWTF), and hazardous material transportation; emergency management plan and implementing procedures with a focus on the emergency response organization (ERO), event classification, protective action guidance, and consequence assessment; and laboratory and Office of Los Alamos Site Operations (OLASO) efforts to coordinate the site's emergency management program with offsite agencies.

C.2 STATUS AND RESULTS

C.2.1 Hazards Surveys and Hazards Assessments

The LANL Emergency Management and Response (EM&R) group appropriately uses authorization basis documents as the primary source of information on the maximum quantities of hazardous materials that may exist at a given facility. This information is supplemented by data from the sitewide Automated Chemical Inventory System (ACIS) and building run sheets to verify that all hazards are identified. Building run sheets are required to be completed annually by facility line managers and are expected to provide information on typical and maximum quantities of the most hazardous chemicals in a facility. The use of this supplementary information is particularly important for hazardous chemicals that may not be fully addressed in authorization basis documents.

EM&R utilizes multiple sources of information to identify hazardous materials. Although the existing process identifies most hazardous materials, it has not ensured that all hazardous materials have been accurately identified for screening and, if necessary, evaluated in the hazards assessment. LANL has identified a number of problems with the accuracy of ACIS and has an initiative underway to upgrade the system as part of a contract performance evaluation measure. Discrepancies in ACIS that were identified during this evaluation were that it did not identify 100 gallons of hydrogen peroxide stored at the RLWTF, and it inaccurately identified the amount of hydrochloric acid stored at RLWTF (20,000 pounds

are identified in ACIS whereas facility personnel state that only about 1000 pounds are stored there). The building run sheets may currently be the more accurate source of data on hazardous materials; however, the building run sheets did not identify the hydrochloric acid at RLWTF and many building run sheets do not clearly identify the typical and maximum quantities of hazardous materials located at a facility. The most significant weakness is that although the LANL emergency management plan (EMP) states that facility management is responsible for informing EM&R of significant changes in facility operations or quantities of hazardous material, processes and tools are not in place to ensure that this occurs. Although reflected in the EMP, this responsibility is not clearly identified in the emergency management Laboratory Implementing Requirement (LIR), and thresholds for reporting such changes have not been formally established. In addition, ACIS currently does not include provisions for notifying EM&R when inventories exceed screening thresholds at a facility or, as was identified in a 1998 Independent Oversight evaluation, when threshold planning quantities may have been exceeded. A recent example wherein a significant change in operations occurred prior to EM&R being informed is the operation of the Dual Axis Radiographic Hydrodynamic Test Facility. LANL has a web-based environment, safety, and health hazard identification (ESH-ID) process to provide for multidisciplinary reviews of changes in operations. While this process might facilitate EM&R notification of such changes, use of this system is not currently mandated by a LANL LIR.

Finding: LANL has not ensured that the emergency preparedness hazards assessment is reviewed and updated prior to significant changes in hazardous material inventories or operations involving hazardous materials as required by DOE Order 151.1A, *Comprehensive Emergency Management System,* Chapter IV, Section 3.a(2).

The next step in the hazards survey and assessment process is the screening of materials to determine whether the types and quantities of hazardous materials at a given location warrant further evaluation. The screening of radiological materials at LANL is appropriately based upon 10 CFR 30.72 schedule C limits. The LANL process for screening hazardous chemicals goes beyond comparing quantities against the regulation-based thresholds dictated in DOE Order 151.1A such that much smaller quantities of hazardous chemicals are reviewed for emergency planning purposes. EM&R has developed a noteworthy technical document that establishes screening thresholds based upon a conservative calculation of the quantity of hazardous materials that, if released, could exceed emergency response planning guidelines or temporary emergency exposure limit values beyond the immediate event scene.

Although the screening process has some noteworthy attributes, the screening process and results are not documented, and the process has not been fully implemented. There is no procedure that describes the screening process and, in particular, the sources of hazardous material data to be used and how hazardous materials that exceed the LANL-developed chemical screening thresholds are to be further evaluated. As mentioned previously, several sources of data can and are being used to identify hazardous materials and quantities, but this process has not been defined. In addition, although EM&R staff state that further evaluation of hazardous materials exceeding screening thresholds is performed to determine whether development of a quantitative hazards assessment is warranted, neither the process nor the screening results is documented. An example where this became a particular concern was the lack of documentation justifying the screening of 100 pounds of lithium hydride even though this amount of material equals the 40 CFR 355 threshold planning quantity. In addition to the lack of documentation, EM&R has not completed the hazard screening process. Specifically, EM&R has not completed the evaluation of hazardous materials that are above the screening thresholds to determine whether a quantitative hazards assessment should be performed. This part of the screening process involves facility walkdowns and is labor intensive. EM&R recognizes the need to complete the screening process and has recently acquired the assistance of two staff members from the Facility and Waste Operations Division to support this effort.

The LANL HA covers 21 facilities and the onsite transportation of hazardous materials. The HA appropriately utilizes information about event scenarios derived from authorization basis documents and includes the attributes necessary to provide the technical foundation for the operational emergency hazardous materials program. Furthermore, EM&R has made some noteworthy improvements to the HA, such as adding an analysis of the chemical toxicity of uranium and including a concise discussion of changes made from the previous revision that simplifies review and use of the document. Some concerns were identified in the HA. In particular, the HA has not been revised to address significant reductions in hazards that have occurred at some facilities (e.g., the Radioactive Materials Research Operations Demonstration Facility). It is important that the HA provide an accurate basis for emergency response tools, such as emergency action levels (EALs), and does not contribute to confusion during an event. The LANL HA only evaluates the maximum amount of hazardous materials allowed at a facility. While it is necessary to analyze maximum amounts of materials for planning purposes, the analysis of typical amounts can provide important information for ensuring an effective emergency response. Under the existing process, depending on the nature of the emergency, the EALs indicate that an Alert, Site Area, or General Emergency declaration may be required for a facility that does not currently house any operations and contains minimal amounts of hazardous materials. While this situation does not have the same impact as an unidentified increase in hazards, the issuance or recommendation of unwarranted protective actions still presents an unnecessary risk to those who take such actions.

A major improvement in the 2001 revision of the HA was the addition of a very detailed description of the technical basis for the EALs, including a good description of the scenarios that were used to develop the laboratory-wide and facility-specific EALs. EM&R analyzed a wide spectrum of events in the HA, including the different sizes and locations of building fires and the status of ventilation systems. The HA also provides useful data for establishing predetermined protective actions. For example, the estimated time for a hazardous material plume to travel to different receptor locations is provided. Based upon this data, shelter in place is recommended as the preferred protective action, which is appropriate considering the geographic setting of the laboratory and its inventory of hazardous materials. Finally, the HA provides the technical basis for both facility-specific and composite laboratory EPZs. The technical rationale used in developing the facility-specific EPZs is consistent with DOE expectations. The composite EPZ is based on an assessment of all facility-specific EPZs and consideration of geographical and jurisdictional factors. However, it is not clear how EM&R considered these same factors when developing a revised EPZ, and there are some inconsistencies in the manner in which the HA results were used to define the composite EPZ. For example, a recommended change identified in the November 2001 HA increased the size of the EPZ to include all of Los Alamos County. However, as part of this change, some of the eastern portions of the site were removed from the EPZ. In addition, a January 2002 HA addendum increased the EPZ to include portions of Bandelier National Monument south of LANL, but did not include portions of Bandelier located east of LANL that are subject to the same potential hazards. Furthermore, neither OLASO nor LANL has discussed the latest EPZ changes with the National Park Service even though these changes added Bandelier National Monument to the laboratory EPZ.

In conclusion, LANL has established very conservative thresholds for screening hazardous chemicals and with few exceptions an HA that is comprehensive. However, the screening process and results are not documented and the process has not been fully implemented. In addition, sufficient processes and tools are not in place to keep HAs current with respect to significant changes in facility operations or quantities of hazardous materials.

C.2.2 Program Plans and Procedures

The LANL LIR and Laboratory Performance Requirement for emergency management and the LANL EMP establish the basis for the laboratory's emergency management program. The emergency

management LIR identifies high-level program responsibilities, requirements, and expectations of the LANL line organizations (i.e., division directors and facility managers) and the EM&R group. However, since it provides only a limited summary of responsibilities, the LIR provides direction to consult the EMP for more detailed requirements. The EMP describes the site's overall concept of emergency operations and necessary planning activities based on the site HA. The EMP addresses most of the requirements set forth in DOE Order 151.1A as well as the expectations provided in associated DOE guidance.

More detailed information and ERO position-specific instructions are contained in the emergency management plan implementing procedures (EMPIPs) and a set of field response operating guidelines. The EMPIPS address topics such as emergency operations center (EOC) activation and operation, event categorization and classification, and protective actions. The field response operating guidelines address response actions for members of the incident command staff. The EMPIPs and field response operating guidelines are generally comprehensive and provide appropriate instructions on roles and responsibilities and response actions, with some notable exceptions. Positive attributes include thresholds for declaring non-emergency significant events, such as serious fires, and the inclusion of thresholds for operational emergencies not requiring further classification for categorizing less severe, higher probability events. Also positive is the fact that the timely initial assessment (TIA) document, which is a consequence assessment tool developed by EM&R, compiles much of the hazards assessment information and can aid initial decision-makers in classifying events and identifying protective actions. For example, it lists consequences as a function of distance from release points, consequences at critical receptor locations, such as the Los Alamos Medical Center, and highlights those release scenarios that result in emergency classification.

However, the LANL EMP, EMPIPs, and field guides have a number of weaknesses of varying importance that collectively inhibit the timeliness and overall adequacy of critical decision-making and response actions. The most significant weaknesses relate to the absence of consistently clear expectations in the EMP and EMPIPs for timely initial decision-making. Further, existing mechanisms for determining and then communicating protective actions to workers and the public and fully activating the ERO contain unnecessary delays and, therefore, might not be sufficiently prompt to be effective in protecting worker and public health and safety.

Neither the EMP nor associated EMPIPs provide expectations for the timeliness of protective actions and event categorization/classification decision-making even though the proximity of the public to many of the laboratory's hazardous facilities means little time is available before some hazardous material releases can travel off site. For example, the EMP does not mandate that the emergency manager classify an event and issue predetermined protective actions prior to proceeding to the scene of an event for which prompt classification might be critical. While it may be desirable for the emergency manager to obtain first-hand information, this must be balanced against the potential impact on co-located workers and the public of the delays inherent in that process, particularly because critical information to permit prompt decision-making should be available by telephone from facility residents or nearby observers during the day or from observers calling in to the central alarm station after normal working hours. Furthermore, since the laboratory area is open to the public, the public must be excluded from the site within one hour after an event to ensure that they are not unnecessarily exposed to hazardous materials in the event of a release and that General Emergency conditions (versus site area emergency conditions) do not exist. Neither the EMP nor EMPIPs recognize this requirement, and no provisions have been established to ensure that exclusion can be achieved for such emergencies.

The EMPIP for protective actions and the TIA document do not provide adequate guidance for initial decision-makers to quickly determine affected areas where protective actions, such as sheltering-in-place, should be implemented. They also do not provide the necessary information for determining the

appropriate emergency classification level. The TIA document specifies the downwind distance to which protective actions should be implemented, and these distances were recently added to the revised EMPIP that was issued two weeks prior to this inspection. However, neither document provides information for determining the lateral distance (i.e., perpendicular to the plume centerline) where protective actions should occur. Furthermore, the EMPIPs do not provide any direction for deploying field monitoring assets, such as under what circumstances to deploy or how to conduct monitoring, to characterize a possible hazardous material release in order to validate the accuracy of dispersion models used for protective action determinations. Moreover, since the EALs provided in the protective action EMPIP do not identify any potentially impacted hazardous material quantities (only estimates of the release to the environment), they cannot be readily used by the incident commander to classify the emergency using information from the building run sheets. Thus, the incident commander must use the TIA document to determine the classification level. However, the TIA document is also of limited utility to the incident commander because it lists the source term (which is useful for dispersion modeling) rather than the potential material at risk, which, again, is the information available to the incident commander from the building run sheets. Finally, the TIA is not a controlled document, and use of the TIA is not identified in either the protective action or categorization/classification implementing procedure.

The categorization/classification EMPIP and EALs contain weaknesses that also impact timely and accurate decision-making:

- The generic EALs are not uniformly objective and unambiguous. For example, the high winds/tornado EAL requires an Alert declaration for high winds striking one or more hazardous material structures causing major damage and a Site Area Emergency declaration if high winds cause major damage to a hazardous material facility. A definition of "major" is not included within the EAL set, and other graded criteria, such as wind velocity and building design wind factors, are not available.
- The categorization/classification procedure does not direct the user to classification tools, such as the 2000 Emergency Response Guide, that would provide additional protective action information for a wider range of events, such as transportation events.
- The categorization/classification procedure directs consultation with local, state, Federal, and tribal authorities before upgrading emergency classification but does not clearly specify that this applies to an emergency declared by offsite authorities and not LANL. If event conditions warrant a classification upgrade for a LANL emergency, it should be done promptly by the individual with command and control authority without further consultation that could unnecessarily delay the upgrade.

Although the incident commander field operating response guide is the primary tool that the incident commander consults to direct the emergency response activities, the guide does not include all of the necessary response actions, and the actions listed are not properly prioritized. For example, the guide does not identify the need to determine protective actions for all population groups and directs emergency notifications to be performed before the emergency has been classified. Since the incident commander also does not have tools, such as isopleths and consistently scaled charts, for determining impacted areas following a hazardous material release and, therefore, must rely on EOC staff, the Independent Oversight team conducted a walkthrough of the consequence assessment systems available in the EOC. To formulate and communicate protective actions to co-located workers and the public, the EOC staff must first overlay a computer-driven dispersion analysis that represents the best approximate emergency conditions selected from a computer database onto a computer-driven demographical representation of the laboratory and adjacent town sites. Then, this representation must be correlated with another computer representation of the notification areas covered by the sitewide area notification system (SWANS) to determine which SWANS transmitters should be keyed. The process is unnecessarily time consuming

and requires a MIDAS computer operations expert and an EOC computer technician to determine the impacted release areas before SWANS can be activated.

Finally, the process for activating the EOC does not ensure that EOC response resources will be available in a timely manner. The two contributing deficiencies are uncertainty in the authority given to the incident commander to activate the EOC and the cumbersome process for notifying EOC personnel of the need to respond. The EMP states that until the EOC is activated, the LANL incident commander is the person in charge of all DOE emergencies occurring on LANL property, as designated by the LANL Director. However, the same section of the EMP requires the incident commander to obtain the concurrence of the Director of Security and Safeguards before activating the EOC, thus potentially delaying the support that EOC activation provides. The current emergency responder notification process is also problematic. During the day, some ERO personnel can be simultaneously notified using an EOC ring-down system, while many other emergency responders have to be either paged or called individually by EM&R personnel. After normal working hours, each individual on the ERO list must be individually called at their homes or paged. There is no system for rapidly notifying all primary and alternate ERO members. The current arrangement is inconsistent with the Department's expectations that recall procedures should facilitate rapid recall of primary responders (and alternates, as necessary), should be easily implemented by on-shift personnel, and should not be adversely affected by an event occurring after normal working hours or on holidays.

Finding: The Emergency Management and Response (EM&R) group plans, procedures, notification systems, decision-making aids, and response expectations do not ensure that critical, time-urgent decisions and actions are implemented in a timely and accurate manner to minimize exposures to employees and the public in the event of a hazardous material release as required by DOE Order 151.1A, Chapter IV, Sections 3.b and 5, Chapter V, Chapter VIII, Sections 1 and 2, and Attachment 1, paragraph 9.

This finding includes decisions and actions related to ERO call-out, emergency categorization and classification, onsite and offsite notifications, and formulation and communication of worker and public protective actions.

Building emergency plans have been developed for each facility to supplement the EMP. The building emergency plans are generally well conceived and their format and content reflect the guidance provided in the EMP. The RLWTF and CMR plans appropriately identify the emergency actions that are required to be taken by facility residents and responders. For example, RLWTF actions are limited to first responder incident reporting and taking directed protective actions. CMR has developed supporting guidance for their personnel through a roles and responsibilities document and an implementing procedure, and has established some additional training requirements due to the facility size and hazards. CMR has also developed an excellent set of response instructions for the various types of incidents that might occur in the facility. For example, alarm response procedures clearly identify the priority actions of initiating facility protective actions and notifying EM&R. CMR has established good facility-level accountability procedures that describe the mechanisms for establishing positive accountability for both residents and visitors. However, some weaknesses were noted in these documents that will be corrected by revisions that are underway. For example, CMR has not yet implemented shelter-in-place provisions and other changes deemed appropriate from evaluations made following the September 11 attacks. Necessary revisions to the RLWTF plan include assigning notification responsibilities and using consistent site terminology. The RLWTF draft plan revisions are comprehensive and well planned, but their successful implementation is predicated on having the necessary personnel and equipment, as described further in Appendix D of this report.

To conclude, the EMPIPs and operating guides generally provide adequate direction regarding generic roles and responsibilities and response functions. The building emergency planning program is well conceived and supports effective facility-level response activities. However, fundamental weaknesses in emergency plans, procedures, and response expectations, particularly in the areas of protective action identification and communication, event categorization/classification, and EOC activation significantly inhibit the capability for timely decision-making and response in an emergency.

C.2.3 Offsite Response Interfaces

The integration of site emergency response plans and resources with those of local communities is an important element in establishing an effective site emergency management program. These arrangements also benefit local communities by permitting them to take advantage of resources not otherwise available to supplement their resources for combating local emergencies. Key to successful integration is the establishment of specific written agreements and the maintenance of continuing dialog with local entities to establish clear expectations regarding emergency response roles, responsibilities, capabilities, notification procedures, and information needs.

LANL has implemented several mechanisms to coordinate site emergency response plans with local offsite response agencies, including interfacing with local emergency planning groups and establishing formally documented agreements to ensure a clear understanding of response roles and responsibilities. Routine coordination between LANL and offsite agencies is primarily handled through the Los Alamos County local emergency planning committee, which meets monthly, is headed by the Los Alamos County emergency manager, and includes representatives from EM&R, various county emergency response agencies, the National Forest Service, the National Park Service, and other interested parties. According to local officials, there is excellent cooperation and dialog between EM&R and the local emergency planning committee, although there has been little OLASO involvement in the committee over the past 18 months. For example, county personnel are heavily involved in planning efforts for most LANL exercises, including discussions on scenario selection. In those instances where the LANL scenario does not meet the county's needs, the county runs their own scenario, and LANL provides assistance by simulating its response and associated communications.

LANL also uses the local emergency planning committee and the Interagency Wildfire Management Team, which is a public coordination and education forum in which LANL plays the lead role, to exchange emergency response information and share information about emergency response issues of interest to the community. For example, through the local emergency planning committee, LANL provided input to a *Wildfire Preparedness Update* pamphlet that will soon be distributed to all county residents by including it with their utility bills. Furthermore, LANL provides training at no cost to a variety of county-associated response entities, including members of the bomb disposal and crisis negotiation teams.

OLASO, with assistance from EM&R, is responsible for initiating, coordinating, reviewing, and renewing all written emergency response agreements. The LANL EMP identifies numerous policy letters, agreements, and memoranda of understanding that have been established with county and state agencies; local fire and law enforcement entities, and local emergency medical centers. For the most part, these agreements are comprehensive and form an effective basis for communicating roles and responsibilities, dispatching mutual aid, carrying out emergency operations, and providing for treatment and care of patients during an emergency event at LANL. However, some memoranda are not current, several have not been updated for many years, and there is no timetable or plan for their update.

In summary, EM&R is effectively maintaining open and active dialog with offsite response agencies to coordinate response plans and exchange information of interest with the community.

C.3 CONCLUSIONS

The planning aspects of the LANL emergency management program include an HA, which provides an effective technical basis for such response tools as EALs and protective actions, as well as an LIR and emergency plan that identify high-level program responsibilities and expectations. In addition, LANL is actively engaged with local response agencies to ensure that its program is well integrated with offsite programs. However, weaknesses exist in each of the three areas of emergency planning examined during this inspection that diminish the effectiveness of the LANL program. Specifically, processes are not in place to ensure that HAs will be reviewed and updated, as necessary, prior to significant changes in hazardous material inventories or operations. In addition, major weaknesses exist in the emergency plans and procedures that affect the ability of LANL to respond in a timely manner to an emergency commensurate with its potential threat to co-located workers and the public. Management expectations for the timeliness of decision-making relative to event severity have not been sufficiently defined or emphasized. Finally, memoranda of understanding with offsite organizations are not being maintained current. Of these weaknesses, the most important are those related to emergency plans, procedures, and response protocols as they most directly affect emergency response. Near-term action is needed to ensure that emergency plans and implementing procedures effectively support response to all potential hazardous material events that may occur at LANL.

C.4 RATING

With few exceptions, the LANL HA provides assurance that the consequences of events requiring an emergency response have been adequately evaluated to support the development of emergency response tools. A rating of EFFECTIVE PERFORMANCE is therefore assigned to the area of hazards surveys and HAs.

The LANL emergency management program plans and implementing procedures do not adequately support timely and effective initial decision-making and response, and their collective weaknesses contributed significantly to the poor performance demonstrated by many responders during tabletop evaluations, which are described in Appendix E of this report. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of program plans and procedures.

LANL has effectively integrated its emergency management program with that of local communities. A rating of EFFECTIVE PERFORMANCE is therefore assigned to the area of offsite response interfaces.

C.5 OPPORTUNITIES FOR IMPROVEMENT

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

OLASO

- Formalize and update memoranda of agreement and understanding with support organizations and other jurisdictions. Establish mechanisms to assure that such agreements are maintained current.

LANL

- Develop a laboratory procedure that defines the hazards survey, hazards screening, and HA processes. In particular, specify the sources of hazardous material data used in the hazard identification and evaluation process and ensure that the results of these processes are adequately documented.

- Procedurally define laboratory responsibilities at the facility and activity levels to support the survey and assessment process, and require facility involvement in document preparation and review to assure continuing accuracy in hazardous material information. Assure integrated safety management implementation mechanisms trigger formal notification to EM&R when quantities of material approach or exceed emergency preparedness planning thresholds and/or self-identified screening criteria.

- Revise the emergency management LIR to reflect the requirement that line managers must notify EM&R of significant changes in hazardous material operations or inventories and to better define line management requirements for the building emergency planning program. In addition, review other LIRs, such as those for authorization basis and chemical management requirements, to ensure that similar requirements are identified.

- In addition to authorization basis maximum allowable quantities, consider assessing maximum typical quantities of material at risk in the HA to increase the accuracy of emergency response decision-making tools such as the EALs and TIA document.

- Expand the scope of the hazards screening and assessment process to ensure that additional potential hazards have been adequately evaluated, such as the toxicity of explosives, the severity of possible malevolent acts, and transportation events involving fire.

- Expedite the ACIS upgrade to improve the accuracy and currency of chemical inventories. Assure that the database includes a trigger mechanism to inform EM&R when emergency planning threshold quantities are being approached or exceeded.

- Enhance building run sheets by ensuring that accurate listings of maximum and typical quantities of hazardous materials located at laboratory facilities are reflected and routinely updated.

- Fully document the basis for the laboratory EPZ and ensure that proposed EPZ revisions are promptly and effectively coordinated with OLASO and affected jurisdictions.

- Revise the EMPIPs and field response operating guidelines to reflect the emergency response activity precedence of event assessment, formulation and implementation of protective actions, categorization and classification, and notifications. Revise procedural steps for categorizing and classifying an emergency to go from the most severe to the least severe, since the time available to categorize/classify an event with accompanying protective actions decreases with increasing severity.

- Prepare and implement mechanisms to permit initial decision-makers to promptly determine the geographic area impacted by a hazardous material release within which protective actions should be taken. Three methods for consideration are:
  (1) Prepare a transparent wind rose divided into 22.5 degree sectors annotated with wind direction and distance rings that are consistent with the scale of LANL maps. In an emergency, position the center of the wind rose over the release point and align it for wind direction. Determine the

affected area under the center sector and one sector to each side, out to the impacted EAL distance.

(2) In conjunction with generating consequence assessment estimates using computer models, prepare transparencies of the dispersion isopleths appropriate to scale and stability class that can be used as map overlays. Include isopleths for Site Area and General Emergencies with each EAL table so that the affected areas can be readily determined based on the classification level.

(3) For each facility at which an airborne release could occur, develop tables that list affected facilities based on a spectrum of selected compass points and for several different critical distances downwind (e.g., 100, 250, 500, 1000 meters). Consult the table to determine the affected facilities based on wind direction and EAL distance.

- 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 people.

- Formally implement and control the TIA document if it is to continue as a primary decision-making tool. Enhance the TIA with material at risk inventory values for easy comparison to building run sheets.

- Coordinate the emergency classification EMPIP and other available classification tools, such as the 2000 Emergency Response Guide and the TIA document, to provide easy-to-use documents for initial decision-makers. Ensure that the generic laboratory-wide EALs clearly differentiate emergency severity levels.

- Couple predetermined protective actions that identify downwind and lateral distances with all EALs. Consider establishing predetermined protective action sectors based on major geographical features to facilitate communication and offsite recipient understanding of areas where protective actions are recommended.

- Expedite issuance of necessary building emergency plan revisions and verify that plan revisions are effectively implemented to achieve their intended results.

APPENDIX D

EMERGENCY PREPAREDNESS

D.1 INTRODUCTION

Based on the outcome of the hazards surveys and assessments, sites and facilities need to procure, install, and maintain sufficient facilities and equipment to support emergency response. A coordinated program of training, drills, and exercises is necessary to ensure that emergency response personnel and organizations are capable of responding effectively to emergencies impacting the site or facilities. This includes the ability to make time-urgent decisions and take action to minimize the consequences of an emergency and to protect the health and safety of responders, workers, and the public. To be effective improvement tools, exercises should be used to validate all elements of an emergency management program over a multi-year period using realistic, simulated emergency events and conditions. Finally, 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. In part, this is based on having in place a day-to-day program with the purpose of educating the public and the media about actions that may be required during an emergency response.

The Independent Oversight team evaluated the facilities and equipment and training and drill programs used to support the Los Alamos National Laboratory (LANL) emergency response organizations (EROs) at both the institutional and facility levels. This included facilities and equipment available at the emergency operations center (EOC) and in response vehicles, and facility equipment needed to support the Chemistry and Metallurgy Research (CMR) facility and Radioactive Liquid Waste Treatment Facility (RLWTF) building emergency plans. Training and drill plans, materials, records for key site and facility emergency responders, and records and processes associated with the LANL emergency management exercise program were also evaluated. Finally, the team evaluated the EPI plans and processes for responding to an emergency at the laboratory.

D.2 STATUS AND RESULTS

D.2.1 Emergency Facilities and Equipment

The EOC provides a centralized and controlled access facility for performing ERO activities. It consists of a primary area where the emergency director manages and directs a coordinated response; a secondary area where administrative and technical support staff are available to the emergency director; and an emergency technical support center where dispersion modeling is conducted. The primary area is well equipped with the audio and visual aids necessary for the emergency director to make decisions and perform his response duties as stipulated in the LANL emergency management plan implementing procedures (EMPIPs). The equipment is well maintained and its operability is assured through periodic testing required by the EMPIPs. The secondary area and emergency technical support center are also well equipped with all the necessary equipment to support emergency director decision-making. The equipment includes plume modeling programs, area maps, weather monitoring instruments, computers for maintaining a time line of the events, radios, dedicated phone lines for classified and unclassified discussions, recording equipment for radio and telephone transmissions, facsimiles, and a video conferencing capability among the LANL EOC, DOE Headquarters, and the Albuquerque Operations Office (AL).

Several systems are employed at LANL to notify ERO members, laboratory employees, and the public of an emergency. During working hours, emergency directors and some other responders are notified

through a ring down telephone system and the remaining ERO members are paged or telephoned individually until the EOC is properly staffed. After working hours, all ERO members must be telephoned or paged individually. As discussed in Appendix C, these recall processes do not support timely activation of the EOC. Two systems are used to notify the public and employees of an emergency condition from the EOC. One is the sitewide area notification system (SWANS), which consists of radios that are located in most LANL facilities and at important local offsite locations, such as schools, the police department, and the Los Alamos Medical Center. The second notification system is the Community Alert Network, which provides emergency notifications to local residents by telephone. Irrespective of the timeliness issues associated with determining the SWANS locations to be notified, which are described in Appendix C, these systems provide comprehensive coverage for emergency notifications throughout the local area.

To establish the equipment and staffing needs of the Los Alamos Fire Department, a baseline needs assessment was performed in 1995 as required by DOE Order 420.1, *Facility Safety*. The baseline needs assessment identifies the types and quantities of equipment required to be maintained at each of the six fire stations, and the minimum number of personnel that are required be on duty at all times. Since then, there have been some significant changes in the types and number of facilities at LANL. New facilities, such as the Dual Axis Radiographic Hydrodynamic Test Facility and the Beryllium Technology Laboratory, have become operational, while other facilities have been decommissioned and/or removed. These changes may affect the type of equipment and staffing needed to respond to a LANL emergency but have not been systematically evaluated. A new baseline needs assessment will not be conducted until a new contract between LANL and Los Alamos County for fire and emergency medical response services is in place. Ideally, the new contract should be based on an updated assessment of staffing and emergency equipment response needs that reflect current laboratory conditions. In addition, the results of the baseline needs assessment have not been incorporated into the emergency management plan (EMP) as required by DOE Order 420.1. In partial compensation for the outdated baseline needs assessment, all equipment purchases currently being made using post-Cerro Grande fire funds are being reviewed by an independent assessor.

Firefighting apparatus and response equipment were observed to be well maintained. A noteworthy practice was identified in that the fire department first-response vehicles are equipped with computerized pre-fire plans developed for all laboratory facilities. These plans are easily accessed using a computer touch screen and contain critical information needed in a response, such as building occupancy, building construction features, facility hazardous material inventories by class, building floor plans, types of installed fire protection equipment, and building emergency contact numbers. These features provide for a well-informed fire department to support a safe and effective emergency response. The Emergency Management and Response (EM&R) group vehicles are well equipped with radios, building run sheets, EMPIPs, site maps, building diagrams, and other tools needed to perform incident command duties.

The LANL Hazardous Materials Response group performs hazardous material emergency responses for onsite and offsite events within Los Alamos County. This organization is well equipped to support their latest hazardous material emergency response plan. Equipment items are inventoried and maintained in a state of readiness. Examples of equipment include self-contained breathing apparatus, radiation detection instruments, combustible gas indicators, and oxygen meters. Large equipment items include all-terrain vehicles, generators, pumps, and overpacks for containing leaking gas cylinders. The group maintains a variety of response vehicles that are well equipped to respond to and sample for radiological, chemical, and biological events. This includes an incident command and response vehicle that is equipped with computer-based consequence assessment capabilities and a hazardous material reference database to assist in field identification of hazards and appropriate response actions. The group also maintains a decontamination trailer. The decontamination trailer is well equipped with showers, sinks, and liquid holding tanks and is adequately stocked with protective clothing and supplies needed to perform

decontamination activities. The LANL EMP identifies that the Hazardous Material Response group supervisor is responsible for conducting radiological field monitoring activities. However, no procedures or protocols have been established for performing this function, such as how and under what circumstances teams will be deployed to conduct plume tracking, or how field monitoring results will be communicated to the EOC as input for refined consequence assessments. Some air sampling data can be provided by the LANL Air Quality group by retrieving fixed environmental air sampling media stationed throughout the site, and the group has established a procedure for doing so in response to an emergency.

The LANL Occupational Medicine group and Los Alamos Medical Center provide medical support during an emergency. Both facilities are well designed to receive radiological, biological, or chemically contaminated and injured patients through specially equipped rooms that support decontamination, medical treatment, and collection of all liquid and solid wastes generated from these operations. The medical staffs work closely with the laboratory's ERO to plan for health effects resulting from identified hazards at LANL facilities, thereby providing some assurance that appropriate equipment and supplies are stocked, such as chelating agents and specific antibiotics.

At the facility level, the Chemistry and Metallurgy Research (CMR) facility has installed and staged equipment consistent with the missions of the facility operations center, facility incident commander, emergency response team, and spill team as stated in the building emergency plan. Placement of equipment has been well planned based on considerations of likely locations of equipment use, local (room and wing) and building evacuation paths, and separation between people wearing anti-contamination clothing and those who are not. Other positive features of the CMR program include situating equipment in a consistent place on each floor level so that it can be easily located, and designating equipment locations on building emergency maps. Staging of equipment in CMR-designated shelters is not yet complete but is under way.

Assurance of the availability and operability of equipment at CMR is provided through inspection, testing, and the use of tamper-indicating devices on storage cabinets. Installed systems that are used to warn and instruct personnel and portable survey instruments are tested periodically. Storage cabinets are inventoried monthly, and inventory records are attached to the cabinets. It was evident through building tours and equipment inspections that CMR has an effective program for keeping building emergency equipment available and operable.

At the RLWTF, the installed equipment associated with the building emergency plan is available and operable as verified through periodic testing, but other supplies and portable equipment are not. RLWTF has administrative requirements to periodically inventory staged equipment and supplies, but has not effectively implemented this process. No one has been assigned to perform this function; no records required by the building emergency plan are on file; and equipment and supplies, such as radios, spill kits, and shelter-in-place kits, were not in place. Although the RLWTF-required emergency response actions are limited, planned provisions for providing personnel protection and communicating internally and externally to the facility in an emergency remain important elements that warrant full and effective implementation.

The LANL emergency response program is well supported by facilities and equipment for responding to such events as fires and hazardous material releases. However, the emergency responder notification system is resource intensive; there are no established protocols for field monitoring activities; and some equipment discrepancies exist at the RLWTF buildings.

D.2.2 Training, Drills, and Exercises

The most comprehensive description of the institutional ERO training and drill program is documented in the LANL EMP. The plan provides a training matrix that describes the required topics for initial training, annual refresher training, and drill participation for key ERO positions. Training and drill program requirements are further defined by the emergency management Laboratory Performance Requirement, Laboratory Implementing Guides, and the computerized employee development system. The EM&R group, whose staff fill some of the ERO positions in an emergency, has developed training plans for ERO members using the employee development system to identify and track initial and refresher training completion. Course numbers identify requirements along with any acceptable substitute courses. Credit for course completion is gained through attendance, without an evaluation of a student's acquired knowledge and skills. The omission of an evaluation weakens the training and qualification process because it does not ensure that required knowledge and skills are achieved or identify any weaknesses that need to be corrected through remedial training.

The Independent Oversight team evaluated the training material and processes that are used to prepare personnel staffing the emergency director, EM&R emergency manager/incident commander, and technical support center positions. The initial training provided to emergency directors and emergency managers (who may also assume the role of the on-scene incident commander) consists of courses relevant to their duties but does not include formal position-specific training on their assigned response tasks. Some informal task-specific training is provided, but this training element is not yet documented or tracked. EM&R is currently developing a formal on-the-job training checklist to describe the training process. This additional training and tracking of satisfactory completion is necessary to ensure that key ERO members receive periodic training in important EOC functions, such as team interactions, data assimilation and analysis, and decision-making using the EMPIPs and associated tools. Training for emergency technical support center personnel is a one-time, live instruction activity. It does not include the overall EOC training, team interaction training, and refresher training, or require drill participation. As a result, the training does not ensure that ERO members will be effective in carrying out their assigned duties and, as was evident during the performance tests that are described later in this report, many decision-makers were not proficient in executing seldom used skills. The absence of performance evaluations during training, refresher training for emergency technical support center personnel, and drill participation requirements is contrary to the LANL EMP and emergency management Laboratory Performance Requirement.

Annual refresher training is required for the emergency director and incident commander positions, and the training plan suggests that it be satisfied through drill participation. However, substitutes for an annual drill are allowed by participating in an actual EOC activation, a facility-level drill or exercise, a site exercise, or by taking a computer-based training (CBT) course. While many of these activities may be satisfactory equivalents, the CBT course clearly does not provide the appropriate and necessary training and experience in team interactions, decision-making, and response procedure use and adherence. A review of annual refresher training records indicated that use of the CBT is frequent. This is likely due to the limited number of drill and exercise opportunities available during the year and the fact that the CBT course can be taken at any time, with a minimal expenditure of time. The annual site exercise only provides the desired benefits to one person in each EOC position. In addition, the facility-level drills and exercises are designed for the benefits of facility personnel and can involve limited role playing by EOC members, which does not critically test their response capabilities. It is noted, however, that EM&R developed and presented three tabletop drills earlier this year at the request of an emergency director. However, participation in two of these drills was limited to emergency directors and EM&R role players.

The third drill allowed expanded participation by ERO members filling positions in both the EOC primary and secondary work areas. EM&R has also credited multiple responders with drill participation for simply being present in the EOC to observe a drill being conducted. This practice significantly dilutes the effectiveness of the drill program. Periodic training that keeps personnel up to date with pertinent program changes and lessons learned between annual refresher training sessions is also an essential component of an effective training program. Although required by the emergency management Laboratory Performance Requirement, the implementation of this requirement and inclusion of these particular topics in annual refresher training were not evident.

Finding: EM&R has not ensured that emergency response organization members are capable and proficient in fulfilling their assigned response functions and duties through a systematic training and drill program as required by DOE Order 151.1A, Chapter IV, Section 4, and the LANL emergency management Laboratory Performance Requirement.

At the facility level, CMR response personnel are prepared by a rigorous and aggressive training and drill program. The program includes training plans for facility operations center personnel, facility incident commanders, the emergency response team, and the emerging spill team. The training materials used to support these training plans are developed by certified instructors or outside experts (e.g., the University of New Mexico, American Heart Association, and Occupational Safety and Health Administration Institute) and measure student achievement through written examinations or performance evaluations. The course subjects are consistent with the assigned missions of response personnel. Training sessions are also available on a monthly basis to keep personnel current on program changes, enhancements, and lessons learned, and to provide refresher training. Drill participation is required of each responder; one to three drills a year are required depending on the significance and complexity of the position and the likelihood of a person to be a responder. Many CMR responders exceed their drill participation requirements. This periodic training and drill participation is in addition to the mandatory annual and biannual refresher training that is required to maintain licenses and certifications issued by the Occupational Safety and Health Administration Institute and American Heart Association. Training records are maintained to document completion of these training requirements, but the records are not always quickly retrievable to ascertain a person's current training status. This should be alleviated when CMR completes their plan to enter drill participation records into the employee development system database.

RLWTF employee emergency response duties are limited to incident reporting and taking actions to evacuate or shelter in place. All RLWTF workers are trained in these requirements by a CBT program. The CBT satisfactorily addresses recognizing and responding to spills and alarms, taking protective actions, and implementing accountability procedures in accordance with the building emergency plan. The adequacy of student knowledge is validated through a written examination upon completion of the course. Proficiency is further maintained by subjecting residents to an annual facility evacuation drill and requiring them to complete periodic training on program changes and lessons learned. Records of training completion are adequately maintained on a computer database.

The exercise program, which is led and administered by EM&R to evaluate the LANL emergency response program, is adequate from a schedule and design perspective. Exercise scenarios and locations are varied; performance objectives previously identified as weaknesses are tested; and the planning process includes participation by numerous laboratory and offsite organizations that provides for integrating their objectives into each exercise. While the last site exercise, conducted in June of 2001, was appropriately developed, the results of the exercise were not adequately documented, and important exercise records have not been maintained to determine who participated in the exercise. Comments provided by controllers, evaluators, and exercise participants at post-exercise hot washes and formal

critiques were not recorded. Provisions were not established to ensure that all exercise evaluator forms were collected and reviewed following the exercise, which is necessary to fully ascertain which LANL exercise objectives were met, not met, or not observed. Some post-exercise comments were provided and included in a brief exercise after-action report as noteworthy practices, superior performances, weaknesses, deficiencies, and opportunities for improvement. Participating organizations outside of LANL may have additional evaluations on file, but these are not necessarily shared with LANL or used as input to the final report. The post-exercise final report does not include such important items as a narrative of the exercise scope, purpose, objectives, participating organizations, and evaluation process. The exercise plan also does not define the post-exercise critique and evaluation process or expectations for evaluators to provide their observations to a central location following the exercise. Complete post-exercise analysis and reporting is an essential element in determining the success of an exercise in achieving its overall objectives, ensuring that areas of weakness have been successfully demonstrated and corrected, and certifying that all emergency management elements are evaluated over a multi-year period. The Office of Los Alamos Site Operations (OLASO) and LANL post-exercise reporting requirements and processes do not meet these objectives.

To conclude, the institutional training and drill program is not sufficiently rigorous to provide the training and practice necessary to support effective responder performance. Formal, performance-based training and drills that test decision-making skills are not provided, and opportunities to demonstrate and maintain proficiency in responding to large-scale emergencies are limited. At the facility level, the training and drill programs effectively prepare emergency responders to perform their assigned duties.

D.2.3 Emergency Public Information

The LANL Communications and External Relations (CER) Division, which is responsible for disseminating information to employees, the public, and other stakeholders, consists of the Public Affairs Office (PAO), the Community Relations Office (CRO), and the Government Relations Office (GRO). In an emergency, PAO is responsible for releasing information, such as evacuation routes, to employees; managing employee inquiries; and disseminating approved information to the news media. CRO is responsible for public emergency preparedness education, as well as the accurate and timely release of approved emergency information to appropriate representatives of local and tribal governments and other organizations. GRO is responsible for informing the appropriate state and Federal organizations and the offices of state and Federal elected officials.

The June 2001 version of the LANL EPI plan (implemented, but not yet approved) describes the laboratory's approach to providing the public, media, and site employees with accurate and timely information following an emergency event. The plan appropriately incorporates the requirements of DOE Order 151.1A, *Comprehensive Emergency Management System,* and contains relevant attributes from the accompanying DOE emergency management guide. The plan contains several positive characteristics. It clearly describes EPI roles and responsibilities for CER personnel filling designated EOC positions and discusses in some detail the major EPI elements of employee communications, media relations, news releases and briefings, communication with offsite entities, and public/media education.

CER's emergency planning efforts include several EPI tools to facilitate rapid response to an emergency. The EPI plan includes preformatted, fill-in-the-blank news releases that facilitate the timely release of initial event information. PAO has also developed "media kits" that serve as a readily available source of information for media representatives, particularly those not based locally, in case of an event. Each kit consists of general fact sheets and charts that describe LANL's history, layout, and current activities, and includes a CD-ROM with electronic versions of the written material and photographs of selected lab facilities. PAO also has available facility-specific fact sheets for approximately ten key LANL facilities.

CER uses a variety of mechanisms to educate the public and media in EPI-related matters, such as procedures to follow and where to obtain additional information in an emergency. In the past, CRO developed informational pamphlets about the community alert network system and protective measures, and distributed them to the public via utility bills. Such distributions have not occurred in the past several years, and no other readily available measures are in place to educate new residents in these matters, such as an information page in the front of the community telephone book. CRO plans to develop and distribute new public educational materials on event preparedness to accompany the completion of the new LANL EOC. Current educational activities include participation in a variety of public forums, such as the annual Safety Days, in which general laboratory information is available, including telephone numbers for the public to call for information in the event of an emergency. In addition, LANL CRO publishes a monthly newsletter, *The Laboratory Connection,* which is distributed primarily to community leaders as a means to communicate LANL activities of general interest. The current issue includes a discussion of the new EOC, its capabilities, and the rationale for its construction as a lesson learned from the Cerro Grande fire. CRO maintains an electronic mail distribution list of the same individuals for communicating items of more immediate interest. LANL's participation in the Los Alamos County local emergency planning committee also includes a public education element.

The effectiveness of LANL's EPI program is being limited by several important deficiencies in the overall planning process. The most significant of these is that LANL does not have an up-to-date, comprehensive, approved EPI plan, as required by the EMPIP for the CER division representative. The most recent approved version of the LANL EPI plan that is available in the EOC is dated June 1999. That version was revised to reflect organizational and operational changes, and the newest version, although not approved, is available electronically in the EOC and is expected to be used by CER personnel in the event of EOC activation. The updated version contains several weaknesses. Most notable of these is the absence of specific information that describes the roles and responsibilities of joint information center (JIC) personnel, the process for staffing the JIC, and the execution of key JIC functions, such as liaison with the LANL EOC and CER component offices and monitoring of broadcast media reports. The lack of plans and procedures for activating the JIC remains an open finding from the LANL June 2001 exercise. The same finding was identified during the 1998 Independent Oversight evaluation at LANL. To address this issue, PAO is working to develop the necessary procedures and to define JIC equipment needs. More broadly, CER is developing a composite EPI plan that integrates the emergency response actions of the PAO, CRO, and GRO offices. These plans and procedures are intended to be in place in time for the LANL June 2002 exercise.

The LANL EPI plan and implementing procedures do not define clear expectations for the approvals required before disseminating press releases, timely issuance of news releases, and EPI training and proficiency activities. The LANL EMP, EPI plan, EMPIPs, and field response operating guideline for the information officer (on the incident command staff) are inconsistent regarding the approvals necessary for press releases. The EMP indicates that the emergency director can approve a press release if an OLASO representative is not available in the EOC. However, this is not consistent with the DOE Order 151.1A requirement that initial news releases be approved by the DOE or National Nuclear Security Administration official responsible for EPI review and dissemination; the Albuquerque Operations Office of Public Affairs (AL-OPA) expectation that there must be some type of local DOE concurrence for news releases, even if only by telephone; or statements in EMPIPs that require approvals of both the emergency director and OLASO to issue press releases. In addition, the information officer field guideline was not reviewed or approved by LANL PAO and does not make any specific reference to OLASO as being part of an approval process. Neither this guideline nor its contents are discussed in the CER representative EMPIP.

The June 2001 version of the EPI plan indicates that an initial news release and a more detailed follow-up should be issued as soon as possible, but does not provide any specific expectations regarding timeliness.

In contrast, the AL-OPA plan clearly states that the initial and first follow-up press releases should be developed, approved, and issued within one hour of the event. LANL PAO agrees philosophically with the AL-OPA expectations for timely issuance of press releases, and the draft objectives for the LANL 2002 exercise include an objective that requires the ERO to develop and approve an initial press release within approximately one hour of the event.

With respect to training and qualification of EPI personnel, the EPI plan indicates that training is provided to public affairs staff within the guidelines of LANL's emergency management system. However, the plan does not provide any details as to what is required by the system. The EPI plan provides a list of "performance-based training" topics, but does not indicate how they are or would be conducted, by whom, or whether they are intended for initial or refresher training. In addition, the EPI plan indicates that drills and exercises should be held at least annually. Given that there is only one annual exercise, the plan does not describe how this expectation can be realized for all EPI personnel.

Finally, there is no single document that clearly describes the relationship among OLASO, LANL EPI, and AL-OPA during a LANL emergency. OLASO has not developed an EPI plan and, other than OLASO's role in authorizing JIC activation, the LANL EPI plan does not refer to the specific functions of the AL-OPA organization or OLASO community affairs specialist. There is currently no procedure or other document that identifies OLASO EPI-related roles and responsibilities. In addition, certain EPI responsibilities were transferred from OLASO to AL-OPA approximately one year ago because of OLASO resource constraints, but this transfer was never formally documented. Clearly and formally defining these relationships would help to ensure that all appropriate LANL, OLASO, and AL-OPA EPI activities are effectively conducted when responding to a laboratory emergency.

Finding: OLASO and LANL have not implemented current, approved plans and procedures to ensure that timely and accurate emergency public information is provided to site workers and the public in a rapidly unfolding emergency as required by DOE Order 151.1A, Section 4.c(1)(b)3, Chapter I, Sections 8.f and 9.b, Chapter IX, Sections 2 and 4, and Attachment 1, paragraph 12.

To conclude, the draft LANL EPI plan adequately describes most aspects of the process for providing emergency information to the public, and effective mechanisms for educating the public are either in place or planned. However, there are no JIC activation and operations implementing procedures, and uncertainties exist in the areas of timeliness and approval of news releases. OLASO involvement in this program has not been sufficient to ensure that DOE public information expectations have been established and are effectively fulfilled.

D.3 CONCLUSIONS

LANL is providing emergency response personnel with the facilities and equipment needed to effectively implement emergency plans. At the institutional level, the absence of an easily operated system for rapidly recalling primary and alternate responders is a notable exception that was discussed in more detail in Appendix C of this report. At the facility level, the various equipment discrepancies found at the RLWTF buildings potentially limit the local response posture.

Significant weaknesses were noted in the other two emergency preparedness areas, particularly in training, drills, and exercises. Important elements of a comprehensive training program for EOC personnel have not been developed or implemented, including performance-based training on critical job tasks, an evaluation of the skills and knowledge attained to ensure individuals are capable of performing their assigned duties, and practice in an environment that simulates actual job performance conditions. Consequently, these individuals demonstrated a lack of proficiency in timely, critical decision-making

during tabletop performance tests, as discussed in detail in Appendix E. In the EPI area, with one major exception, the processes for providing emergency information to the public are adequately described in the draft June 2001 LANL EPI plan. Also, LANL has implemented or has plans to implement several effective methods for educating the public. However, a current, approved EPI plan is not in place, and most notably, there are no JIC activation and operations implementing procedures, both of which are self-identified weaknesses that have remained unresolved for an extended period of time. In addition, there are uncertainties regarding the timeliness of news releases and specific requirements for the approval of news releases. OLASO and LANL efforts, with continuing support from AL, are needed to strengthen the EPI program and to maintain public awareness of protective actions that might be required in case of an emergency.

D.4 RATING

With few exceptions, the facilities and equipment available at LANL provide assurance that emergency response personnel can adequately respond to emergency events. Significant weaknesses in the ERO, worker, and public notification systems are reflected in the rating and finding under the program plans and procedures section of Appendix C. A rating of EFFECTIVE PERFORMANCE is therefore assigned to the area of emergency facilities and equipment.

The emergency management training and drill program does not adequately prepare institutional-level ERO members to effectively execute their decision-making and response duties in a timely manner. Training and drill weaknesses were significant contributors to the poor performance demonstrated by a substantial number of responders during tabletop evaluations. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of training, drills, and exercises.

The EPI program does not adequately ensure that the media and the public will be provided with accurate, meaningful, and approved information in a timely manner following a LANL emergency. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of EPI.

D.5 OPPORTUNITIES FOR IMPROVEMENT

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

OLASO

- Increase local DOE engagement in planning and preparedness to ensure that DOE Order requirements and expectations pertaining to EPI activities are effectively implemented and include the necessary DOE involvement. Consider establishing an OLASO public information plan or an OLASO addendum to the AL or LANL plans to ensure that public information activities are adequately coordinated among responders.

LANL

- Evaluate the current numbers and types of fire apparatus and equipment to ensure their adequacy relative to the laboratory's current missions, operations, and facilities so that any potential events or response conditions not included in the last baseline needs assessment have been adequately

considered and evaluated. Establish mechanisms to assure reassessment occurs before new facilities are commissioned.

- Develop, document, and implement a consistent and methodical approach for assembling teams and performing radiological and chemical field monitoring to include the communication and coordination of monitoring activities and data with offsite, decision-making authorities.

- Examine existing mechanisms used to staff the EOC, and notify onsite and offsite personnel of emergency conditions in order to establish more timely processes. Performance test systems under varying conditions (e.g., day, night, peak vacation periods) to assure that prompt notifications can be performed and a sufficient number of responders are available to carry out necessary response tasks.

- Enforce existing emergency equipment audit requirements at the RLWTF.

- Consider performing a systematic analysis of the tasks to be performed by each ERO position using a simplified approach, such as a tabletop job analysis. Use the results of this analysis to develop position- and function-specific training and qualification requirements and course material.

- Enhance the effectiveness of the drill program by providing credit only to individuals who fill and successfully complete the functions of a specific ERO position rather than providing credit to all individuals who may observe a drill or training activity.

- Implement performance-based training evaluations for emergency responders, especially for staff members in critical decision-making positions.

- Maintain exercise evaluation records to permit tracking of evaluated objectives for use in planning future exercises, verifying that appropriate lessons learned are incorporated into programs, communicating to exercise participants how their comments and concerns were addressed, and ensuring that all emergency management program elements are evaluated over a multi-year period. Improve post-exercise reports by including sufficient information to determine the overall effectiveness of the exercise as a means of testing, evaluating, and improving LANL emergency response capabilities.

- Reevaluate the actions permitted of the incident command system information officer (e.g., issuing press information and hosting media representatives) to determine whether conducting such activities near the incident scene is prudent and to preclude any adverse affects on response efforts. Ensure that provisions for implementing emergency traffic control measures have been established to preclude media representatives from approaching the event scene.

- Identify specific expectations for the timely approval of news releases. Consider including guidance in the public affairs plan regarding situations where it may be appropriate (e.g., hostage situation) to restrict an initial news release if the announcement and subsequent involvement of the news media could negatively impact the response.

- Clarify and eliminate inconsistencies regarding required review and approvals of EPI intended for release to the media and public.

- Consider placing public emergency response information in the front of local telephone books and other publications as a handy source of information for local residents.

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 decision-making 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. Termination of an operational emergency is accomplished by meeting a predetermined set of criteria and coordinating the termination with offsite authorities.

In the event of an emergency, initial direction and control of the Los Alamos National Laboratory (LANL) emergency response organization (ERO) is provided by the duty emergency manager, who ultimately proceeds to the event scene and, depending upon the nature of the incident, usually assumes incident command. After activation of the emergency operations center (EOC), the LANL emergency director may assume some command and control authorities, including classification and notification responsibilities. The emergency director advisor, a senior Emergency Management and Response (EM&R) emergency manager, assists the emergency director in technical emergency management decision-making. The emergency management team, composed of managers in disciplines such as security and environment, safety, and health, is led by the emergency director and supported by members of the EOC secondary area and emergency technical support center, who perform such activities as notifications and consequence assessment.

The majority of the information provided in this section results from tabletop performance tests that were conducted with four EM&R group emergency managers/incident commanders, four emergency directors (each teamed with the same emergency director advisor), and two EOC consequence assessment teams. The scenarios were presented to these individuals by a LANL trusted agent to ensure scenario validity and delivery of accurate event cues. In addition, performance-based interviews were conducted with two Chemistry and Metallurgy Research (CMR) facility incident commanders and three Office of Los Alamos Site Operations (OLASO) duty officers. Computer applications and other tools for performing consequence assessment were also evaluated.

E.2 STATUS AND RESULTS

E.2.1 Emergency Response Decision-Making

EM&R Emergency Manager / Incident Commanders

Tabletop performance tests were conducted with four of the six EM&R emergency managers. The duty emergency manager typically becomes the incident commander at a hazardous material event scene. In accordance with the LANL emergency management plan, when the EM&R duty emergency manager assumes incident command, he has sole authority and full responsibility for all actions at the event scene, for making appropriate emergency notifications, and for activating the ERO. In this capacity, he is expected to be capable of making time-urgent response decisions without consultation and assistance from other ERO members. The objective of the tabletops was to verify the incident commanders'

knowledge of their assigned responsibilities and authorities, and ability to use their procedures, checklists, and other response tools effectively to assess postulated emergency event conditions; determine protective actions for responders, co-located workers, and offsite jurisdictions; categorize and classify operational emergency events; and perform notifications. Two different pairs of emergency scenarios (i.e., a transportation event and facility waste handling event in Technical Area-50; and a security event and facility waste handling event at CMR) were presented to the incident commanders by a LANL trusted agent.

The incident commanders who were evaluated are motivated individuals who indicated a desire to perform well. All of the incident commanders recognized the postulated events as operational emergencies, and most demonstrated good knowledge of their responsibility for the safety of workers and the public. They generally demonstrated good command and control in delegating response actions to members of the incident command staff and employed their checklists, guidelines, and other tools to ensure that required activities were accomplished. Initial scene size-up and assessment were generally performed well, and adequate protection distances for initial responders were implemented based on incident commander experience and knowledge of potential event consequences. However, only one of four incident commanders was able to correlate event cues with the appropriate timely initial assessment (TIA) document scenario and correctly determine the distance to which protective actions should be applied for both scenarios presented to him.

The incident commanders demonstrated a number of significant knowledge and performance weaknesses during the tabletop evaluations. Some incident commanders were hesitant regarding the limits of their authorities to mitigate the emergency, as demonstrated by their need to consult EOC staff in making decisions and activating response resources. One incident commander expressed an unwillingness to accept the greater roles and responsibilities of initial emergency manager, a position he is required to fulfill until relieved by another authority. The same incident commander completely relied on EOC staff to make critical decisions regarding protective actions and emergency classification. One of the two incident commanders reacting to the postulated security event did not employ either the incident commander field response operating guideline or the suspicious object response checklist to orchestrate the response to a credible bomb threat and, consequently, experienced difficulty in performing several response actions in a timely manner. Neither of the incident commanders who were presented the transportation scenario were able to satisfactorily employ the 2000 Emergency Response Guide to determine isolation zones for personnel protection. Once the affected areas were established by the tabletop participants, only one of the incident commanders used the site and facility maps available in his command vehicle to determine which downwind facilities needed to be protected and where to set control zones and perimeters.

Concerns were also noted in the accuracy of incident commander decisions regarding categorization and classification. Only one of the four individuals correctly classified both of the scenarios presented, and one incident commander was not able to classify either event without significant prompting from the trusted agent. Another incident commander declared a classification that was not conservative. Most notably, only one of the four commanders clearly understood the correlation between exceeding protective action criteria at specified distances from the release point and emergency classification levels indicating event severity.

The incident commanders demonstrated significant weaknesses in formulating protective actions for co-located workers and the public. These include the following:

- One incident commander was unable to formulate protective actions for either scenario presented and required significant assistance from the trusted agent to ultimately determine acceptable protective measures.

- Most incident commanders required about 15 minutes after all event conditions were known to identify protective actions and begin implementation through the EOC.
- Two of the incident commanders correctly declared a General Emergency for the scenarios presented but did not issue protective action recommendations to local jurisdictions as necessary for an emergency of this severity (even if the recommended protective actions are "none").
- One incident commander implemented overly conservative protective measures affecting the public due to a misinterpretation of event cues and without inquiring further about the event status.
- One incident commander incorrectly issued orders to the county to shelter in place, rather than issue a protective action recommendation.
- All but one incident commander relied on the EOC to determine the area affected by a hazardous material release, and all of them needed the EOC to formulate and transmit notifications to co-located workers and offsite jurisdictions. Despite having command and control authority, none of the commanders confirmed the accuracy of the event notifications made by EOC staff.
- Only one of four incident commanders recognized the need to determine the status of personnel accountability for affected facilities in accordance with the incident commander field operating response guideline.

To better gauge the timeliness of response activities in the areas of formulating and implementing protective actions, the Independent Oversight team also reviewed the official EOC time line for a "no notice exercise" conducted by the U.S. Department of Energy (DOE) Office of Emergency Operations on February 20, 2002. The postulated event involved a fire at CMR occurring during the regular workday. Nineteen minutes were required to minimally staff the EOC, but the EOC was activated by the EM&R group leader without consulting either the incident commander or the Director of Security and Safeguards, which is a departure from the normal protocol that artificially accelerated EOC activation. After sufficient information was available to the incident commander to permit the classification and formulation of protective actions, it took 58 minutes to generate the sitewide area notification system announcement (simulated) communicating that personnel in affected facilities within one mile downwind should shelter in place. This performance casts significant doubt on the timeliness and effectiveness of the LANL processes for formulating and communicating protective actions in a timely manner to prevent or minimize exposure to hazardous materials.

Emergency Director and Emergency Director Advisor

Tabletop performance tests were performed with four emergency directors accompanied by an emergency director advisor. The same emergency director advisor was used for all tabletops. Most emergency directors demonstrated good command and control presence, decision-making capability, procedure and checklist use, and knowledge of concepts related to timely, conservative decision-making, even for situations where precise event information was not yet available. Most emergency directors also demonstrated good technical knowledge of emergency management subjects to permit them to interpret recommendations from their staff, such as conditions under which a hazardous material release continues to the point where shelter-in-place protective actions may become untenable.

Two operational emergency scenarios were presented to each emergency director/advisor team; one was an offsite event requiring either onsite protective actions or an emergency declaration (as this scenario was varied among participants), and the other was an onsite event at CMR, with significant consequences. Initial input provided to the participants for the latter scenario was a non-conservative classification and protective actions. In two cases, recognition of conditions mandating declaration of an operational emergency not requiring further classification did not occur. However, this situation was not unexpected for the emergency directors because the EOC is not normally activated for events of this severity. Nevertheless, the advisor should have reviewed the applicable declaration thresholds and confirmed his

observations with the emergency director. Three of the emergency directors, supported by the advisor, quickly recognized General Emergency conditions from a displayed dispersion plot and determined that the previous decisions (provided by the trusted agent at the start of the scenario) regarding protective actions and classification were not appropriate. Correct protective actions and classifications were then made and transmitted to the proper jurisdictions. One emergency director experienced difficulty in correlating postulated conditions with the correct protective actions and classification. In this case, the advisor finally recognized the severity of the event after much input from other (simulated) EOC staff members.

Facility Incident Commanders

Two CMR facility incident commanders were interviewed about their roles and responsibilities during emergencies within their facility. Both personnel were knowledgeable in facility response mechanisms, and their responsibilities related to timely communication of facility status to the EM&R duty emergency manager. The facility incident commanders demonstrated good knowledge about briefing the oncoming EM&R incident commander in a timely manner on items such as building integrity, material at risk for a release, building personnel status, and needed support.

However, a few questionable items were identified in observing the response to a small spill of an unknown organic chemical at CMR that occurred during this inspection. Shortly after the spill, the facility incident commander ordered evacuation of CMR Wing 3. Although there are no timeliness requirements or guidelines regarding when to notify EM&R, EM&R was not notified until about 25 minutes after the spill had been identified to facility managers. In addition, the event was not declared as either an operational emergency not requiring further classification or a non-emergency significant event. DOE Order 151.1A, *Comprehensive Emergency Management System,* and the applicable LANL emergency management plan implementing procedure (EMPIP) state that "any facility evacuation in response to an actual occurrence that requires time-urgent response by specialist personnel, such as hazardous material responders or mutual aid groups not normally assigned to the affected facility" is an Operational Emergency. In this case, the site Hazardous Materials Response group was called to respond to the incident, but there was no consideration of the potential that this event might meet the threshold for emergency categorization. Although EM&R indicated that the Los Alamos Fire Department and the Hazardous Materials Response group are not considered specialist personnel not normally assigned to the affected facility, this interpretation appears to be inconsistent with laboratory procedures and the intent of the DOE Order.

OLASO Duty Officers

Performance-based interviews were conducted with three OLASO duty officers to determine their ability to implement the duties, roles, and responsibilities defined by the EMPIP for the DOE area office representative. Duty officer activities defined in this procedure as a first responder to the EOC include receiving event status information, approving requests for Federal assistance, and ensuring contractor emergency response actions adhere to DOE policies and directives. OLASO standing instructions supplement the EMPIP.

OLASO duty officers were generally unaware of the requirements placed on them by the EMPIP and perceived their role solely as one of notifying their management in accordance with the standing instructions. The duty officers were unprepared to assess event consequences, determine the adequacy of protective actions, evaluate the accuracy of event categorization and classification, and could not correlate the importance of timely response actions with event severity. Consequently, the duty officers could not perform effective monitoring of the contractor emergency response as required by DOE Order 151.1A.

Emergency Technical Support Center Staff

Tabletop performance tests were performed with two EOC consequence assessment teams to determine whether they could perform a prompt initial assessment, conduct ongoing consequence assessments, and incorporate field monitoring data into dispersion models to refine the accuracy of initial determinations. Each team was presented with a CMR fire scenario and at the start of the scenario were provided initial categorization/classification and protective action information that was incorrect for the postulated conditions.

One consequence assessment team immediately detected initial decision-making errors and made recommendations to the EOC management team to upgrade the emergency classification and adjust protective actions in accordance with the TIA document. The team readily demonstrated the capability to perform ongoing assessment using real-time dispersion modeling and postulated event parameters such as facility integrity and material at risk. Based on the dispersion modeling, the team continued to adjust their recommendations concerning protective actions. The team initiated the process for incorporating field data into the dispersion analysis, but mechanisms to readily convert field readings into usable input parameters for the dispersion code have not been prepared. As a result, laborious manual calculations were needed to accomplish this scenario objective. Overall, this team performed effectively, which can be attributed to the fact that they have performed this role many times during drills and exercises.

The second consequence assessment team was unable to effectively employ the TIA document to evaluate event consequences. Thus, they did not detect the errors in initial decision-making or make recommendations to the EOC management team to upgrade the emergency classification and provide more appropriate protective action recommendations. The team was not able to assess facility conditions or modify dispersion calculations to perform ongoing consequence assessment for the postulated event conditions. The team was able to begin incorporating field data into the assessment process by converting field readings into input parameters for the dispersion model, but was unsure of the iterative processes necessary to refine the model results. Although he is on the ERO callout list for this position, the consequence assessment team leader did not consider himself qualified for the function because he had never performed the role prior to the tabletop exercise.

Within each group of tabletop performance tests, there were notable examples of one or more individuals who were unable to demonstrate adequate proficiency in performing important, time-critical emergency response tasks. To a large extent, this can be attributed to significant weaknesses in the response tools developed for their use and in the training and practice they have been provided. In addition, the OLASO duty officer interviews indicated that these individuals are not adequately prepared to fulfill their DOE line management oversight role during a LANL emergency.

E.2.2. Consequence Assessment

With regard to the programmatic aspects of the LANL consequence assessment program, EM&R has developed useful tools to support these assessments. Specifically, the TIA document based on the hazards assessment results to support initial assessment and appropriate computer models are available to refine consequence assessments once the emergency technical support center is staffed. The TIA has many noteworthy attributes. For example, it is directly correlated with the hazards assessment, is based on both conservative and average meteorology, and includes numerous scenarios for comparison to actual event conditions, thereby providing a useful initial assessment of the potential extent of event consequences. In addition, the TIA provides estimates of consequences at critical locations, such as the Los Alamos Medical Center, that could occur if the released material is traveling in that direction.

The MIDAS model, which is the primary model used to update initial consequence assessments, also has some noteworthy features. For example, the TIA scenarios have been preloaded into the model so that the potential consequences of an event can be readily evaluated using real-time meteorological conditions. MIDAS is a puff model and utilizes input from LANL's four meteorological towers to predict plume dispersion and travel. However, some concerns were identified with the MIDAS model. Specifically, the model is somewhat slow and cumbersome to use, in particular when making changes to the source term. Also, there is no procedure for configuration control (e.g., for ensuring that the source term parameters match the TIA parameters), and the model has not been assessed relative to other models, including those used to develop the hazards assessment. EM&R has the HOTSPOT, EPICode, and ALOHA models to backup and supplement MIDAS, and has established a connection to the National Atmospheric Release Advisory Capability to supplement its own consequence assessments. However, EM&R has identified some shortcomings in its current arrangements with that capability that limit its utility for LANL.

In summary, EM&R has implemented several useful tools for performing consequence assessment. However, weaknesses were noted in the areas of procedural guidance and computer model configuration control. Additionally, EM&R has not compared the output from the dispersion models used to develop the hazards assessment with those used during a real emergency to determine whether any significant discrepancies among these data sources exist that might impact decision-making.

E.3 CONCLUSIONS

Overall, the individuals evaluated during the tabletop performance tests demonstrated a level of performance that reflects the significant deficiencies in the rigor and usability of their decision-making tools and the extent of training and practice in their use. Although the performance of one LANL incident commander was strong, the other three exhibited significant performance deficiencies in differing aspects of the required response functions, including accepting and executing assigned roles and responsibilities, procedure and response guide use, and basic principles of event classification. Of utmost importance is that none of the incident commanders could formulate protective actions in a timely manner to protect workers and the public from exposure to hazardous material. The performance of most of the emergency directors was satisfactory, but one experienced significant difficulty in correlating event conditions with the appropriate protective actions and classification, which is a critical component of the emergency director's duties. Facility incident commanders performed well during interviews, but performance did not necessarily meet the intent of site procedures for EM&R notification and event categorization during an actual spill event. Finally, OLASO duty officers are unaware of their critical role in monitoring the performance of contractor response personnel and are not prepared to do so. In the consequence assessment area, the tools that have been developed and implemented to support this function are useful and, with few exceptions, could adequately support consequence assessment personnel. However, of the two consequence assessment teams, one was not able to recognize errors in initial decision-making or refine dispersion calculations because training did not adequately prepare them to perform their assigned response functions.

E.4 RATINGS

OLASO and LANL emergency responders do not have the necessary tools or proficiency for responding to a hazardous material emergency. As described in previous appendices of this report, these performance deficiencies are a direct result of collective weaknesses in the emergency management plan, EMPIPs, training, drill, and exercise program, and management expectations, which do not promote or facilitate timely and accurate responder decision-making. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of emergency response decision-making.

The processes and tools for performing consequence assessment generally provide adequate assurance that available real-time event and meteorological information can be used to develop estimates of event consequences. A rating of EFFECTIVE PERFORMANCE is therefore assigned to the area of consequence assessment.

E.5 OPPORTUNITIES FOR IMPROVEMENT

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

OLASO

- Increase the rigor and frequency of performance-based training and drill activities for OLASO personnel to ensure that responders understand and are capable of implementing their responsibilities defined in DOE Order 151.1A, OLASO standing instructions, the LANL emergency management plan, and applicable EMPIPs.

LANL

- Enhance emergency manager acceptance of command and control decision-making through performance-based training that emphasizes their ability to function under all circumstances, including when significant support may not be available initially from EOC staff or other emergency managers.

- Enhance mechanisms to increase the timeliness of reporting facility off-normal conditions to the EM&R emergency manager on duty.

- Conduct performance-based training in using and implementing the 2000 Emergency Response Guide as another tool for performing prompt formulation of protective actions and emergency classification.

- Evaluate why previous training of emergency managers was ineffective in clearly communicating assigned roles and responsibilities and assuring proficiency in formulating protective actions. Conduct performance-based training for initial decision-makers that focuses on weaknesses observed during the OA tabletop performance tests, such as determining protective actions for all affected population groups.

- Verify capabilities for performing timely classification, notifications, and protective actions both during and after normal working hours through limited-scope, timed drills.

- Consider using LANL security personnel for after-hours emergency notifications, ERO call-out, and communication of protective actions and protective action recommendations.

- In coordination with OLASO and the Albuquerque Operations Office, request clarification from the Headquarters Office of Emergency Operations regarding the Operational Emergency categorization threshold related to facility evacuations that include a response by entities not associated with the affected facility to ensure that the intent of the DOE requirement is being met.

- Consider performing a comparison of MIDAS consequence assessment results with HOTSPOT, EPICode, and ALOHA to ensure that any discrepancies among model outputs are understood prior to the occurrence of a hazardous materials release emergency. Develop mechanisms, in concert with offsite response authorities, to assure that real-time consequence assessments performed by LANL can be readily compared against models used by offsite entities so that there is no ambiguity when evaluating ongoing protective measures.

- Coordinate with the National Atmospheric Release Advisory Capability to obtain the latest personal computer-based version of their consequence assessment model and establish connectivity to LANL meteorological stations. Determine what, if any, role the National Atmospheric Release Advisory Capability serves in the LANL consequence assessment program and during emergencies in accordance with DOE Notice 153.1, *Connectivity to the Atmospheric Release Advisory Capability*.

- Conduct performance-based training for consequence assessment teams.

APPENDIX F

READINESS ASSURANCE

F.1 INTRODUCTION

The readiness assurance program provides the Department-wide framework and multi-year planning mechanism for assuring that program plans, procedures, and resources are adequate and sufficiently maintained to mount an effective response to an emergency. Readiness assurance activities include the annual development of an Emergency Readiness Assurance Plan and implementation of a coordinated schedule of program evaluations, appraisals, and assessments. Key elements of the readiness assurance program include the active involvement of U.S. Department of Energy (DOE) line organizations in monitoring program effectiveness, contractor self-assessment programs, timely implementation of corrective actions for identified weaknesses, and lessons learned from training, drills, exercises, or actual events. For exercise evaluations, readiness assurance includes assessment of the effectiveness of the exercise as a means of demonstrating and continuously improving a site's integrated emergency response capability.

This inspection examined the processes by which the Albuquerque Operations Office (AL) and Office of Los Alamos Site Operations (OLASO) provide line management guidance and direction, and maintain operational awareness of the laboratory's emergency management program. The inspection also included a review of Los Alamos National Laboratory (LANL) self-assessments and reviewed the status of actions taken to address previously identified program weaknesses.

F.2 STATUS AND RESULTS

F.2.1 DOE Assessments and Performance Monitoring

Two DOE offices have responsibility for maintaining operational awareness of and providing guidance to the LANL emergency management program. Based on location and knowledge of site operations, OLASO has primary responsibility for providing programmatic line management oversight. As the cognizant operations office, the AL Emergency Management Branch (AL-EMB) also has responsibility for oversight activities at LANL as described in the AL process guide for conducting emergency management program assessments. Involvement of AL-EMB is particularly important in light of the limited OLASO resources available in the emergency management area.

Over the past few years, AL-EMB has performed a variety of operational awareness activities related to the LANL emergency management program. These include monthly visits to discuss program status, staff assistance visits that have included limited-scope performance tests, exercise planning and evaluation assistance, and the conduct of a baseline emergency response capabilities study that was directed by the AL manager in 2000 to be conducted at all National Nuclear Security Administration (NNSA) sites under AL cognizance. With few exceptions, reviews of the AL-EMB comments from the 2001 LANL exercise and the baseline capabilities study, which has not been formally transmitted to the site, indicate an appropriate level of rigor and, overall, these assessments were comprehensive, value-added oversight activities. For example, the baseline study identifies several of the problems and concerns that are conveyed in this report, including the current level of OLASO staffing, the absence of observable indicators in emergency action levels, and outdated memoranda of understanding. However, the Independent Oversight team found additional weaknesses in the areas of training and drills and communication of protective actions that were either not addressed in the AL study, or their extent was

not clearly recognized or described. For example, the AL baseline study indicates that the LANL training program qualifies members of the emergency response organization (ERO). As discussed in Appendix D of this report, the Independent Oversight team concluded that the LANL training and drill program for ERO members is not adequate to ensure responder preparedness and does not include some critical elements, such as evaluating responder proficiency. The impact of this weakness on decision-making was clearly evident during the tabletop performance tests conducted during this inspection.

OLASO has clearly defined expectations for performing line management oversight of LANL's emergency management program. These are conveyed by a February 2000 OLASO standing instruction on performing oversight by the safety and health team that outlines the major responsibilities for the emergency management team lead. However, no individual has been formally assigned to this position, although it is apparently being filled by the OLASO emergency management technical representative. While lacking some details, the standing instruction describes an appropriate strategy for performing oversight of LANL's program, including such key elements as establishing a systems-based approach to LANL assessments, ensuring the adequacy of LANL emergency management program plans, and ensuring that OLASO personnel have current training and qualifications to meet emergency response requirements. OLASO is also using certain limited contract performance incentives to convey expectations for making programmatic improvements. For example, Appendix F of the University of California contract contains an item directed at improving the accuracy of the LANL chemical inventory system.

The OLASO emergency management technical representative conducts a variety of oversight and guidance activities, including status discussions, document reviews, exercise planning, and an occasional assessment (e.g., self-assessment of OLASO following the Cerro Grande fire). He has frequent interactions with both LANL Emergency Management and Response (EM&R) and AL-EMB staff, much of which is documented via electronic mail. A review of activities conducted in calendar year (CY) 2001 and planned for CY 2002 indicates that the choice of activities is consistent with the expectations identified in the standing instruction. To aid in performing these activities, the emergency management technical representative has developed several "Guidance Cards" that identify evaluation methods and criteria. He uses an OLASO issues/corrective-action management system specific to the OLASO Office for Facility Operations for tracking items for which he has responsibility. At present, this system is populated with very few emergency management items.

Although OLASO has clearly documented expectations regarding what line management oversight activities need to be performed in the emergency management area, OLASO has not provided or designated the necessary resources to accomplish the job or adjusted the oversight expectations to match available resources. Currently, the OLASO emergency management technical representative has been verbally directed to spend approximately 20 percent of his time on emergency management matters. However, a recent analysis of the time required in CY 2002 to perform these activities indicates that the job will require approximately 1.2 full-time equivalents. Since that analysis, an August 2001 memorandum from the OLASO director to the AL manager forwarded a staffing plan that identified the need for one full-time emergency management specialist. Current plans call for the hiring of a fire protection engineer, who would devote 50 percent of his time to emergency management. This position has recently been authorized but has not yet been advertised. In response to this staffing constraint, OLASO management has provided only limited, verbal direction for prioritizing OLASO activities relative to emergency management.

The impact of this resource constraint is that many of the strategy elements identified in the standing instruction are either poorly implemented or not implemented at all. Hence, the level and rigor of OLASO line management oversight is not adequate to ensure that either LANL or OLASO has implemented an effective emergency management program. For example, OLASO has not conducted

and documented a review of the hazards assessment or approved the LANL emergency planning zone as required by DOE Order 151.1A, *Comprehensive Emergency Management System.* Other weaknesses include the absence of an effective training and qualification program for OLASO duty officers and lapses in maintaining memoranda of understanding current. Finally, OLASO has not ensured that all of the concerns identified in the 1998 Independent Oversight emergency management evaluation at LANL have been effectively addressed and corrected. This review found that, although progress has been made in most areas, the majority of the 1998 weakness statements remain valid. In some cases, the specific details of the supporting facts and conditions underlying those weaknesses have changed. Weaknesses identified during this inspection that remain from the 1998 review include:

- Mechanisms for tracking significant changes in chemical inventories or facility operations that could affect the hazards assessment
- Management processes for ensuring that OLASO duty officers have received required training
- The effectiveness of the LANL emergency management training and drill program
- Procedural inconsistencies regarding approvals of emergency public information releases.

Finding: OLASO is not adequately monitoring the effectiveness of the LANL emergency management program, ensuring appropriate and capable DOE involvement in emergency response, and maintaining agreements with offsite agencies and organizations to support response to a LANL emergency as required by DOE Order 151.1A, Sections 4.b(1)(b) and 4.c(1)(b), Chapter I, Section 8, and Chapter XI, Section 1.

In conclusion, AL-EMB has increased the frequency and rigor of its line management oversight activities. However, the overall effectiveness of DOE line management oversight activities is being significantly impacted by OLASO resource constraints such that important emergency management functions for which DOE is responsible are not being adequately performed.

F.2.2 Contractor Assessments and Issues Management

Internal assessments of the LANL emergency management program are conducted by the LANL Audits and Assessments (AA) division. Self-assessments are conducted by the EM&R group leader in his role as the LANL safety function manager for emergency management. A June 2001 emergency management assessment conducted by the AA division was planned and performed in accordance with a well-developed process that included selecting the appropriate subject matter experts, conducting assessment team training, discussing assessment objectives with the EM&R group leader, and developing an assessment review plan/worksheet. The assessment objectives were based on a previously developed set of broad emergency management self-assessment criteria that encompass approximately half of the key emergency management programmatic and response elements identified in DOE Order 151.1A and associated emergency management guide. The results of the assessment indicate that, with the exception of the limited breadth and depth of the assessment criteria, the AA group has an effective mechanism in place to identify positive elements and weaknesses at the institutional and facility levels of the LANL emergency management program.

A review of the corrective actions developed to address weaknesses identified during the LANL June 2001 full-participation exercise indicates that EM&R is effectively using the LANL corrective action system to capture and track corrective actions in the EM&R domain. Most of these corrective actions have been closed as a result of implementing appropriate corrective actions. For example, the exercise weaknesses involving the operation of the control cell were addressed by developing and implementing a new emergency plan implementing procedure that formalizes and directs control cell operations. This procedure is likely to be effective, but has not yet been tested during an exercise.

Despite the quality of the June 2001 assessment conducted by AA and the performance of semiannual safety function manager self-assessments, the LANL emergency management program internal assessment process is not meeting the requirements of either DOE Order 151.1A or the LANL emergency management plan. DOE Order 151.1A specifically requires that the program be assessed annually by site contractor personnel and, although the LANL emergency management plan is unclear as to who must conduct the assessment, it indicates that annual reviews are conducted to verify compliance with DOE orders and to determine the readiness assurance of the laboratory emergency preparedness program. The AA division did not perform an annual assessment in either 1999 or 2000 and is not scheduled to perform one in CY 2002 despite the fact that the current LANL Emergency Readiness Assurance Plan indicates that AA performs a programmatic assessment annually. Furthermore, the semi-annual self-assessments performed by the LANL emergency management safety function manager do not meet the intent of these requirements. These assessments do not identify new programmatic weaknesses or improvement items; instead, they are intended to use existing metrics and performance data to convey program status to senior lab management. In addition, as discussed above, a review of the 1998 Independent Oversight evaluation of emergency management at LANL indicates that several of the weaknesses identified were not effectively addressed. The results of this current inspection confirm that condition. The absence of rigorous, systematic programmatic assessments on a consistent, periodic basis is limiting the ability of EM&R to improve the effectiveness of the LANL emergency management program.

Finding: Annual emergency management program assessments are not being conducted in accordance with DOE Order 151.1A (Chapter I, Section 9.g, Chapter X, Section 4.a, and Attachment 1, paragraph 5), the LANL emergency management plan, and the LANL emergency readiness assurance plan. Furthermore, actions taken in response to a 1998 Independent Oversight evaluation were not sufficient to address identified weaknesses or prevent recurrence.

Annual assessments of the LANL emergency management program are not being conducted as required, and the LANL AA assessments lack the scope and structure necessary to identify breakdowns in certain key emergency management programmatic elements.

F.3 CONCLUSIONS

AL-EMB has implemented effective mechanisms for providing programmatic guidance and identifying weaknesses but, given the relatively recent increase in the frequency and rigor of these activities, their overall effectiveness has yet to be determined. OLASO has established a basic structure for providing line management oversight, and LANL has mechanisms available to identify programmatic concerns and areas needing improvement. However, OLASO has not provided the resources necessary to implement the oversight structure envisioned, and LANL assessments are not conducted with the frequency or depth necessary to ensure that significant institutional program weaknesses are identified and effectively addressed.

F.4 RATINGS

The extent of DOE line management involvement in and oversight of the LANL emergency management program is not adequate to provide assurance that the LANL program meets DOE expectations and that DOE can effectively fulfill its responsibilities during an emergency at LANL. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of DOE assessments and performance monitoring.

The rigor and frequency of continuous improvement activities conducted by LANL is not adequate to systematically identify and effectively address weaknesses in the site's emergency management program.

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

F.5 OPPORTUNITIES FOR IMPROVEMENT

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

AL

- Consider formally transmitting draft versions of programmatic assessments in those cases where delays are anticipated in producing a final report to minimize loss of momentum in resolving and addressing areas of weakness or improvement items. Also consider formally transmitting to both OLASO and LANL EM&R significant items identified during AL staff assistance visits. Such reports should clearly convey AL expectations regarding contractor and OLASO actions to address identified weaknesses or improvement items.

- Consider developing a formal, structured assessment plan to ensure that all elements of the LANL emergency management program are reviewed, at an appropriate level of detail, on an established periodic basis.

- Consider devoting portions of formal and informal site visits to determine and document the status of actions taken to address previously identified weaknesses.

- Consider increasing the frequency and breadth of operational awareness and oversight activities in the emergency management area to partially compensate for limited OLASO resources.

OLASO

- Develop a plan that describes how each of the emergency management-related line management oversight elements identified in OLASO Standing Instruction No. 11 will be satisfied. Obtain advice and assistance from AL as necessary.

- Obtain formal line management agreement regarding the nature and extent of emergency management oversight duties that will be conducted under current resource constraints. Where appropriate, prioritize the actions identified in OLASO Standing Instruction No. 11 to make optimal use of available resources.

- In cooperation with EM&R, develop thresholds that define the specific mechanisms by which feedback (e.g., document review comments, drill observations) will be provided to EM&R. These mechanisms should include a mix of formal and informal communication channels.

- Solicit assistance from AL in devising challenging tabletop scenarios to evaluate duty officer qualification and proficiency. These activities should emphasize duty officer responsibilities related to oversight of LANL emergency response actions in the areas of conservative decision-making, protective actions, emergency categorization/classification, and notifications.

LANL

- Consider developing programmatic evaluation criteria based on the October 1999 draft of Volume VI, *Emergency Management Evaluations*, of the DOE emergency management guide for use by internal and external auditors who may lack in-depth knowledge of DOE emergency management requirements and expectations.

- Expand the list of generic emergency management program assessment objectives to specifically include the critical areas of categorization/classification, notifications and communications, consequence assessment, and protective actions and reentry.

- Consider including emergency management subject matter experts from other sites as periodic participants on LANL self-assessment teams or as part of the process by which LANL personnel prepare for assessment activities.

- Consider developing an overall programmatic assessment plan that divides annual assessment activities between AA and EM&R. Consider incorporating the emergency management safety function manager self-assessments into the overall assessment plan.

- Modify the Emergency Readiness Assurance Plan to provide at least summary-level information on the results of exercises and programmatic assessments to provide reviewers a realistic perspective on the current status of the program and the ability of the organization to self-identify areas for improvement.