Volume II

Inspection of
Emergency
Management
at the

Lawrence Livermore National Laboratory

July 2002

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

INDEPENDENT OVERSIGHT
INSPECTION OF
EMERGENCY MANAGEMENT AT THE
LAWRENCE LIVERMORE NATIONAL LABORATORY

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Acronyms

DOE	U.S. Department of Energy
EAL	Emergency Action Level
ECC	Emergency Communications Center
EMT	Emergency Management Team
EOC	Emergency Operations Center
EPHA	Emergency Preparedness Hazards Assessment
EPI	Emergency Public Information
EPIP	Emergency Plan Implementing Procedure
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
FY	Fiscal Year
HS	Hazards Survey
JIC	Joint Information Center
LLNL	Lawrence Livermore National Laboratory
LSOD	Livermore Safety Oversight Division
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
OAK	Oakland Operations Office
OSC	Operations Support Center
PAO	Public Affairs Office
PMP	Project Management Plan
SO-40	Office of Emergency Management
UC	University of California

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VOLUME II

1.0 INTRODUCTION

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA) conducted an inspection of environment, safety, and health and emergency management programs at the Department of Energy (DOE) Lawrence Livermore National Laboratory (LLNL) in June 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 LLNL emergency management program. The results of the review of the LLNL environment, safety, and health programs are discussed in Volume I of this report and the combined results are discussed in a summary report.

The National Nuclear Security Administration (NNSA) Office of the Deputy Administrator for Defense Programs is the cognizant secretarial office for LLNL. As such, it has overall Headquarters responsibility for programmatic direction, funding of activities, and emergency management at the site. At the site level, DOE line management responsibility for LLNL operations and safety falls under the Oakland Operations Office (OAK) Assistant Manager for National Security, of which the Livermore Safety Oversight Division (LSOD) is a subordinate office. LLNL is operated by the University of California (UC), under contract to DOE. For LLNL, the Department's emergency management responsibilities are divided among LSOD, OAK, and UC.

In accordance with the changes in line management directed by the NNSA Administrator in March 2002, OAK is planning for a reorganization of line management responsibilities. Current plans call for establishing a Livermore Site Office that will be a direct report to the NNSA Administrator. This office will be given increased responsibility and accountability for managing and directing the LLNL contractor, including contract administration. Concurrently, OAK will transition to a support office for the Livermore Site Office and selected other DOE site offices.

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

To support these activities, LLNL operates numerous laboratories, test facilities, and support facilities at two major sites, the LLNL main site and Site 300. The LLNL main site, located in Livermore, California, encompasses approximately 800 acres. Site 300 occupies approximately 11 square miles and is about 15 miles east of the LLNL main site. LLNL activities, which include facility maintenance and waste management, involve various potential hazards that need to be effectively controlled, including exposure to external radiation, radiological contamination, nuclear criticality, hazardous chemicals, and various physical hazards associated with facility operations (e.g., machine operations, high-voltage electrical

equipment, pressurized systems, noise, and construction/maintenance activities). Significant quantities of radiological and chemical hazardous materials are present in various forms at LLNL.

Throughout the evaluation of emergency management programs, OA reviews the role of DOE organizations in providing direction to contractors and conducting line management oversight of the contractor activities. OA is placing more emphasis on the review of contractor self-assessments and DOE line management oversight in ensuring effective emergency management programs. In reviewing DOE line management oversight, OA focuses on the effectiveness of OAK in managing the LLNL 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-assessments, which DOE expects to provide comprehensive reviews of performance in all aspects of emergency management.

In addition to the OA review of OAK's emergency management oversight and operational awareness activities, this portion of the inspection evaluated progress since the August 2001 emergency management program status review on upgrading the site emergency management program, which is managed and administered by the LLNL Hazards Control Department's emergency preparedness section, particularly as applied to selected facilities within the Engineering and Defense & Nuclear Technology directorates and at the Hazardous Waste Management Facility. In addition, OA evaluated the site's emergency public information and exercise programs. Finally, 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 when responding to postulated emergency conditions.

The results of this review indicate that, overall, OAK and LLNL continue to make progress in improving the technical basis and implementing structure of the site emergency management program. During tabletop performance tests, responders demonstrated effective initial decision-making and command and control principles. However, the OA team identified a number of programmatic and implementation concerns, including important procedural and performance weaknesses and lapses in corrective action management processes. In addition, OAK and LLNL face significant challenges in implementing all of the expected near-term improvements in the site's emergency management program. OAK and LLNL line management attention is necessary in two key areas to ensure that (1) potential challenges to the interim fiscal year (FY) 2002 upgrade objectives and the overall goal of implementing a comprehensive emergency management program by the end of FY 2003 are addressed, and (2) appropriate direction is provided to efforts to integrate and formalize OAK and LLNL emergency public information plans and response procedures.

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

2.0 RESULTS

2.1 Positive Program Attributes

OAK and LLNL continue to make progress in implementing an emergency management program that meets the Department's expectations. Positive attributes of the emergency management program are cited below.

OAK is proactively engaged in oversight and improvement of the site's emergency management program. OAK has implemented a well structured approach for conducting and documenting line management oversight of the site's emergency management program and is effectively using a variety of operational awareness activities, which are integrated with an LLNL programmatic upgrade plan, to monitor the status of LLNL's efforts. OAK is also making effective use of a performance metric in Appendix F of the contract to provide incentive for and convey expectations regarding LLNL's improvement efforts in the emergency management area. As part of its efforts to improve OAK response readiness, as well as that of LLNL, OAK emergency preparedness staff developed, conducted, and critiqued an extensive tabletop drill involving both OAK and LLNL emergency response personnel. In addition, OAK devoted considerable time to observing the process by which the OA team prepared for and conducted the tabletop performance tests that were part of this inspection in order to improve future OAK oversight efforts.

LLNL is making progress in all areas evaluated during this inspection. LLNL continues to institutionalize various aspects of the emergency management program, as indicated by improved structure in the emergency preparedness hazards assessment (EPHA) development and maintenance process, enhanced response procedure content in event classification, and improved breadth and definition of procedures and processes that govern such program administrative functions as the conduct of exercises and the handling of corrective actions. LLNL has also continued efforts to enhance the capabilities of its emergency preparedness staff by defining three core positions and staffing them with personnel who have extensive emergency preparedness experience outside of LLNL. LLNL is meeting the aggressive deliverable schedule established by the programmatic upgrade plan, with 18 of 37 important technical basis, response, and other documents delivered to date. The exercise program has been structured to promote further program improvements. Even in the emergency public information (EPI) area, which has several important weaknesses, there is a positive trend in terms of program definition, approach, and implementation.

LLNL emergency responders demonstrated effective initial decision-making during the performance tests, and LLNL devoted considerable resources to the OA tabletop performance test process. During tabletop performance tests conducted as part of this inspection, LLNL emergency response personnel effectively prioritized initial response actions at the event scene, including protecting emergency responders; implemented appropriate initial predetermined protective actions for site workers and the public; and demonstrated effective command and control. LLNL's commitment to improving its response readiness is evident by the involvement of management, emergency preparedness staff, and response personnel in preparing for and conducting these performance tests.

2.2 Program Weaknesses and Items Requiring Attention

Although the LLNL emergency management program currently provides assurance that initial emergency response decision-making will adequately protect responders, site workers, and the public, important weaknesses were noted in the systems in place to ensure the consistent formulation and dissemination of follow-on protective actions for affected populations and in the programmatic basis for the emergency

public information element. Concerns in the quality of documents delivered by LLNL to OAK as part of the upgrade program and in LLNL's corrective action identification and closeout process were noted as well. Specific weaknesses are cited below.

Procedures for formulating, disseminating, and implementing protective actions and protective action recommendations do not ensure timely and accurate response. The LLNL response procedures and tools currently in place have several notable weaknesses that collectively hinder effective protective-action decision-making. Clearly-defined processes for communicating onsite protective actions and identifying protective action recommendations for affected offsite sectors are absent from the emergency plan implementing procedure (EPIP) for protective actions. The emergency action level tables lack clear instructions for rapidly identifying the appropriate areas in which protective actions should be taken. In addition, LLNL has not established adequate procedures and job aids to ensure that consequence assessment calculations and plume dispersion plots are accurately determined. As a result, emergency responders experienced difficulty in performing protective action decision-making and consequence assessment tasks during tabletop performance tests after the initial decision-making phase was complete. Furthermore, facility-specific emergency plans do not contain any guidance regarding the process for implementing a shelter-in-place protective action order.

OAK and LLNL have not developed and implemented an integrated, fully developed set of EPI plans and procedures. Both OAK and LLNL are currently working to finalize their respective EPI plans and procedures. However, both programs are still evolving, there are no firm milestones for document completion and approval, and the documents contain significant inconsistencies, particularly with respect to joint information center activation, staffing, and operation. In addition, the LLNL EPI implementing procedure lacks adequate definition in several areas, including the overall press release approval process, the role of OAK in press briefings conducted at the onsite or alternative offsite media briefing centers, and public/media education strategies. Finally, because LLNL has not implemented an approved procedure with document control provisions, no formal mechanism exists to ensure that in-place response documents, such as the position checklists in the public affairs office operations support center, are current.

Institutionalization of the LLNL emergency management protocols and processes is still in progress, and significant challenges remain to completing the FY 2002 program upgrade milestones. The OA team noted a significant number of instances where follow-through on process linkages between programmatic plans, procedures, and previously identified weaknesses was not thorough. For example, several weaknesses identified in past OA appraisals have not been effectively addressed, and commitments made in program documents and corrective action plans to proceduralize or define self-assessment processes and the emergency press release approval process were either absent or inadequately described in the referenced EPIP. The recently implemented administrative EPIPs are not specific enough to ensure that corrective actions are consistently identified, captured, tracked, and effectively addressed, and in several instances, peer or quality assurance review of documents, such as EPHAs and EPIPs, lacked rigor. Furthermore, the large number of OAK comments generated to date on the first four EPHAs delivered, combined with the OAK document review backlog and the fact that 19 additional documents are due for delivery in the 3 remaining months of FY 2002, places the contract Appendix F emergency management performance metric at risk.

3.0 CONCLUSIONS

OAK and LLNL continue to make progress in improving the site emergency management program. OAK is expending significant effort in conducting line management oversight of LLNL's program upgrade efforts and implementing improvements in the OAK response protocols. These activities were planned and are being implemented through a well-defined and structured process that was developed and implemented since the August 2001 OA status review. LLNL is improving EPHAs, EPIPs, and other program elements via a schedule specified as part of the Appendix F emergency preparedness FY 2002 project management plan (PMP), which was also developed and implemented since the last OA visit, and to date approximately half of the required deliverables have been submitted to OAK. When the FY 2002 PMP is completed, all of the EPHAs, major EPIPs, and key programmatic documents will have been upgraded, and other important activities will have been completed, such as the planning, conduct, and reporting of the FY 2002 exercise.

Also as part of the upgrade project, LLNL has improved the administrative structure that provides the framework for continuous improvement processes, such as self-assessments, exercises, and their associated corrective action processes. Furthermore, OAK and LLNL are in the process of developing EPI plans and procedures, and LLNL is working with local response agencies to develop a consistent public education approach and supporting materials. LLNL's involvement in the planning and conduct phases of the OA tabletop performance test process is laudable, and is indicative of LLNL's commitment to improving the site's response posture, both now and over the long term. During tabletop performance tests, responders demonstrated effective initial decision-making and command and control principles. The consistency and appropriateness of the observed initial decision-making are, to a significant degree, indicative of overall progress in moving from an expert-based response approach to one that is based on formally established emergency response protocols.

The OA team identified a number of programmatic and implementation weaknesses, many of which OAK and LLNL had already recognized. The most significant of these is in the area of protective action decision-making, where procedural weaknesses inhibit effective protective action formulation in a time-urgent environment. Performance weaknesses were also evident in the consequence assessment area, which is in part a function of the evolving nature of the approach used to conduct this activity. The EPI area has several important weaknesses, most notably the absence of a fully developed set of integrated OAK and LLNL EPI plans and implementing procedures. Finally, the OA team observed a significant number of instances where weaknesses previously identified both internally and by OA were not consistently identified and effectively addressed, as well as lapses in document peer and quality control review processes.

OAK and LLNL face significant challenges in implementing all of the FY 2002 improvements in the site's emergency management program that were initially expected when the PMP was approved. OAK and LLNL have different management perspectives on LLNL's ability to complete the FY 2002 PMP satisfactorily. In addition, as a result of past difficulties regarding the quality and timeliness of LLNL emergency preparedness initiatives, OAK's perception is that it must document in detail all comments generated during the deliverable review process and obtain LLNL's response to each comment. Given the large number of comments that OAK is generating, the process is cumbersome and negatively impacts both LLNL's ability to effectively consider the most significant comments in a timely manner and OAK's ability to address its review backlog, which is currently almost two months. If not resolved, such delays may ultimately impede the overall goal of both organizations, which is to implement a comprehensive emergency management program by the end of FY 2003.

OAK and LLNL line management attention is necessary to ensure that appropriate priorities have been placed on PMP document delivery and comment resolution activities; that adequate resources have been

assigned; and that expectations for acceptable document quality have been clearly communicated and understood by OAK and LLNL emergency preparedness personnel at all levels. In addition, OAK and LLNL management attention is necessary to resolve inconsistencies in approach and set expectations for formalizing the EPI program documents so that systems are in place to ensure that emergency information can be disseminated to the public and the media in a timely manner.

4.0 RATINGS

This inspection focused on a detailed assessment of eight key emergency management programmatic elements, divided into four major element categories. No overall program rating has been assigned. The individual element ratings reflect the status of the respective LLNL emergency management program elements at the time of the inspection. The rating assigned below to the contractor assessments and issues management subelement of readiness assurance is specific to those assessment and corrective action mechanisms applied to the emergency management area.

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

Emergency Planning

Hazards Survey and Emergency Preparedness Hazards Assessments..... EFFECTIVE PERFORMANCE
Program Plans and Procedures..... NEEDS IMPROVEMENT

Emergency Preparedness

Exercise Program..... EFFECTIVE PERFORMANCE
Emergency Public Information..... NEEDS IMPROVEMENT

Emergency Response

LLNL Response Decision-Making..... NEEDS IMPROVEMENT
OAK Emergency Response..... EFFECTIVE PERFORMANCE

Readiness Assurance

DOE Performance Monitoring..... EFFECTIVE PERFORMANCE
Contractor Assessments and Issues Management..... NEEDS IMPROVEMENT

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APPENDIX A

Supplemental Information

A.1 Dates of Review

	Beginning	Ending
Planning Meeting	April 15, 2002	April 18, 2002
Onsite Review	June 10, 2002	June 20, 2002
Report Writing	June 24, 2002	June 28, 2002
Validation and Outbriefing	July 8, 2002	July 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
Thomas Staker, Deputy Director, Office of Environment, Safety and Health Evaluations (Team Leader)

A.2.2 Quality Review Board

Michael A. Kilpatrick
Robert M. Nelson
Dean C. Hickman
Patricia Worthington

A.2.3 Review Team

Steven Simonson (Topic Lead)
James O'Brien
Tom Rogers

A.2.4 Administrative Support

Mary Anne Sirk

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APPENDIX B

Site-Specific Findings

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

FINDING STATEMENT	REFER TO PAGE
The LLNL protective action EPIP does not adequately support protective action decision-making in a time-urgent environment, as required by DOE Order 151.1.	17
LLNL emergency action levels do not adequately support prompt and accurate event classification, as required by DOE Order 151.1.	18
OAK and LLNL have not implemented an integrated set of fully developed EPI plans and procedures that ensure that timely and accurate information will be effectively communicated to site workers and the public during rapidly developing events, as required by DOE Order 151.1.	24
During tabletop performance tests, LLNL emergency responders in the EOC did not demonstrate the ability to continuously evaluate event conditions and provide updates to offsite protective action recommendations, as required by DOE Order 151.1.	30

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APPENDIX C

Emergency Planning

C.1 INTRODUCTION

Emergency planning consists of identifying hazards, threats, and hazard mitigation mechanisms; developing and preparing emergency plans and procedures; and identifying personnel and resources needed to assure effective emergency response. Key elements of emergency planning include developing hazards surveys (HSs) and emergency planning hazards assessments to identify and assess the impact of site and facility-specific hazards and threats, and establishing an emergency planning zone (EPZ). Based on the results of these assessments, Department of Energy (DOE) sites and facilities must establish an emergency management program that is commensurate with the identified hazards. The emergency management plan defines and conveys the management philosophy, organizational structure, administrative controls, decision-making authorities, and resources necessary to maintain the site's comprehensive emergency management program. Specific implementing procedures are then developed that conform to the plan and provide the necessary detail, including decision-making thresholds, for effectively executing the response to an emergency, regardless of its magnitude.

This Office of Independent Oversight and Performance Assurance (OA) evaluation of Lawrence Livermore National Laboratory (LLNL) included (1) a review of the development and maintenance process for HSs and emergency preparedness hazards assessments (EPHAs) and a detailed evaluation of EPHAs for selected facilities within the Engineering and Defense & Nuclear Technology directorates and at the Hazardous Waste Management Facility facilities and the transportation of hazardous material, and (2) a review of the LLNL emergency plan and implementing procedures, with a focus on response organization, event classification, protective action guidance, and consequence assessment. Oakland Operations Office (OAK) emergency response plans and implementing procedures are discussed in Appendix E.

C.2 STATUS AND RESULTS

C.2.1 Hazards Surveys and Emergency Preparedness Hazards Assessments

LLNL continues to make progress in upgrading its HS and EPHA documents. At the end of fiscal year (FY) 2001, LLNL completed an initial revision of each facility EPHA to meet a provision in Appendix O of its contract with DOE. Although LLNL met this requirement, both OAK and LLNL recognized that additional effort was needed for the EPHAs to serve as a comprehensive technical basis for the LLNL emergency management program. In particular, LLNL lacked a rigorous EPHA development process that could consistently produce fully developed and accurate EPHA documents. To support this effort, LLNL has established a new HS/EPHA development and maintenance process that is designed, in part, to incorporate programmatic changes needed to address comments made from the 2001 OA program status review, such as the need for facility manager involvement and the use of peer reviews. This process is described in a new emergency plan implementing procedure (EPIP) that specifies the HS and EPHA development and maintenance requirements. The development process also includes a protocol for OAK review and comment resolution.

To date, one EPHA (B322) has been essentially completed using this new process; this document served as the prototype for the EPHA upgrade process. Three more EPHAs (B131, B166, and B153) have been submitted to OAK, OAK has provided a detailed set of comments, and these comments are currently

under discussion. Approximately half of the remaining EPHAs are due to OAK by the end of June 2002 and the rest by the end of September 2002. The OA team focused its review on the B513/514 and B131 EPHAs (and to a lesser extent on B332 and transportation activities), which were two of the facilities evaluated during the overall OA inspection of emergency management and environment, safety, and health programs. Furthermore, these EPHAs represent two phases (i.e., FY 2001 and FY 2002) of the overall EPHA upgrade program and provide insight into the adequacy of the new upgrade process.

The B513/514 EPHA was revised in May 2001 to meet the FY 2001 contract requirements, and it generally contains the appropriate attributes. However, the OA team noted one weakness that was not addressed as part of the FY 2001 upgrade effort. For this building, tritium was screened from further quantitative assessment even though the facility administrative limits remain significantly above the quantitative assessment threshold limit. However, because the actual tritium inventory is currently below the screening threshold by a substantial amount, this screening decision has no immediate safety impact.

Overall, the new B131 EPHA, which principally addresses the B131 High Bay, is an improvement over the previous version. Specifically, it contains additional detail, and its development benefited from significant involvement by the facility manager; the facility subject matter expert; and environment, safety, and health experts to ensure accuracy and completeness. The B131 EPHA uses material-at-risk quantities that are at 80 percent of their authorization basis document limits. These material-at-risk limits flow down into the B131 facility safety plan for facility implementation. The B131 facility manager controls all materials entering the facility by postings at the facility entrances and through the LLNL unreviewed safety question review process. The B131 facility manager is knowledgeable of these processes and his responsibility to notify the emergency preparedness section for hazards analysis updates before significant changes are made to hazardous material inventories. The facility manager routinely reviews facility inventories of hazardous materials requiring quantitative assessment in an EPHA on the basis of reports derived from two tracking systems: the Material Management database (radioactive hazards) and the Defense Technologies database (special material hazards). The B131 EPHA, facility safety plan, postings, change control processes, and material inventory surveillances satisfactorily address the concern identified during the 2001 OA program status review regarding establishing material-at-risk quantity limits and controls to ensure that the EPHA is updated before significant process or inventory changes are made at the facility.

The improvements in the B131 EPHA, in part, reflect improvements in the EPHA development process described in the new EPHA EPIP. This procedure provides a complete description of the HS screening process and the spectrum of events to be analyzed, which was agreed upon by LLNL and OAK. In addition, the EPIP requires facility manager involvement in developing and maintaining EPHAs. However, two concerns were identified in the process for maintaining and controlling EPHA documentation. The first concern is that the requirement for facility management involvement in this process is not contained in any facility manager procedures; hence, other than briefings by emergency preparedness section personnel, there is no mechanism to ensure that facility managers are cognizant of this responsibility. The second concern is that the B131 EPHA assigns EPHA maintenance responsibility to the emergency preparedness coordinator; this assignment is in conflict with the EPHA EPIP.

Although the current EPHA upgrade process is improving EPHAs, the process is resource-intensive, both for LLNL and OAK. Furthermore, the large number of comments generated by OAK during the review and comment process raises concerns about the quality of the EPHAs provided to OAK for their review and, in particular, with the recently instituted EPHA peer review process. Several factors contribute to the large number of comments on the EPHAs:

- Three different OAK reviewers provide comments on each EPHA, and OAK reviewers do not share a common understanding of the EPHA development process.

- Based on past difficulties with comment resolution, OAK uses a rigorous review and comment process to formally document each review comment, regardless of its significance or whether the same concern applies to several document sections.

- LLNL authors, peer reviewers, and OAK do not share a common understanding of OAK's expectations for the appropriate level of detail.

- The EPIP that addresses EPHA development does not in all cases provide sufficient detail for developing EPHAs that are consistent with OAK expectations.

- LLNL resources may not be appropriately allocated to develop the EPHAs to meet the specified deliverable schedule while simultaneously satisfying OAK's content expectations.

Some of these contributing factors will be mitigated as LLNL and OAK participants gain experience with the process. However, the volume of comments generated by OAK will likely not subside until the EPHA revision and peer review processes gain OAK's confidence, which is contingent on a clearly understood set of expectations on the part of LLNL emergency preparedness staff and, if necessary, the adjustment of priorities or applied resources.

The results of the facility EPHAs are now being used to develop a site composite EPZ. The description of the composite EPZ, the input used for its development, and the rationale for excluding extreme natural phenomena and extreme malevolent events are now documented in the HS/EPHA EPIP, which satisfactorily addresses the EPZ concerns identified in the 2001 OA program status review.

In conclusion, LLNL has implemented a set of EPHAs that forms an adequate technical basis for the site's emergency management program, and has embarked on a program to further improve the EPHAs so that they better meet OAK's (and Departmental) expectations regarding rigor, consistency, and level of detail. As part of this effort, LLNL has implemented an improved process for developing and maintaining HSs, EPHAs, and the site composite EPZ; this new process provides confidence that, over the long term, the EPHAs will be accurate and comprehensive. However, only one EPHA of a total of 16 has been essentially completed using the new process, and a review of OAK comments recently generated following the submittal of three EPHAs indicates substantial differences between OAK's and LLNL's sense of the quality of the EPHAs being produced by this process. Overcoming these challenges will require significant effort to satisfactorily complete the EPHA portion of the overall programmatic upgrade effort.

C.2.2 Program Plans and Procedures

The LLNL emergency plan describes the site's emergency management program, including the overall concept of emergency response operations. Supporting the emergency plan and providing response details are a number of procedures: (1) self-help plans maintained by facility personnel, (2) fire department procedures, (3) operations support center (OSC) procedures maintained by line management, and (4) EPIPs and emergency action levels (EALs) maintained by the emergency preparedness section. LLNL has made some improvements in these plans and procedures (in particular to the EPIPs and EALs) that address some of the concerns identified during the 1999 and 2001 OA assessments. However, many of these concerns still exist, and several new concerns were identified during this evaluation.

The self-help plans provide instructions for carrying out building evacuation and personnel accountability. These plans, which were originally developed to support sitewide emergency action in case of an earthquake, have since evolved to serve as the building emergency plans for all of the facilities evaluated. The plans are generally adequate for building evacuations, but they vary widely in the scope

and detail of guidance for implementing protective actions and identifying associated roles and responsibilities. A contributor to these plan variations is the absence of a single document that addresses the development and maintenance of the plans or that describes the interrelationship among them. In addition, the plans lack some important items, such as identification of an alternate assembly point in case the primary assembly point is not appropriate (e.g., in case it is downwind of a hazardous material release) and provisions for sheltering in place. The absence of sheltering-in-place provisions was identified during the 1999 OA follow-up review. At that time, LLNL had an investigative effort under way to evaluate appropriate actions for sheltering in place for each facility. This effort concluded that shelter-in-place was an appropriate protective action option under certain circumstances, and this conclusion was incorporated into the sitewide protective action EPIP. However, the shelter-in-place guidance was not carried down into facility implementing plans or procedures.

The fire department has developed a number of procedures, protocols, and response aids, including building run cards and a duty chief notebook, to support the response to significant onsite emergencies. The building run cards contain information useful in mitigating emergencies, such as building layout drawings, special instruction sheets (which provide information on building hazards), and a building personnel contact list. The run cards are updated annually by the fire department, and the special instruction sheets are updated quarterly by Hazards Control Department heath and safety technicians who are assigned to the building. The building run cards provide some very useful information; however, the OA team identified inconsistencies in the level of detail in the special instruction sheets, such as types and quantities of materials stored in facilities. LLNL had already identified this issue and has recently developed an action plan to correct it. The fire department duty chief notebook contains a number of aids to support the duty chief in responding to classifiable emergencies, including a duty chief checklist, EALs, and a site map that divides the site into sectors to support rapid identification of areas for implementing protective actions. This notebook (and, in particular, the newly added duty chief checklist) was utilized effectively during the tabletop performance tests. However, no procedure formally controls its content and maintenance, and currently the duty chief checklist does not accurately reflect expectations identified in the emergency plan for automatic activation of the emergency operations center (EOC).

LLNL has established six discipline-specific OSCs to provide technical support to the EOC emergency management team. Organizations responsible for these disciplines, such as environmental protection, develop and maintain a plan for each OSC. During the 1999 follow-up review, OA identified a concern about the quality and consistency of the OSC procedures. LLNL emergency preparedness staff have since improved the quality and consistency of these procedures by utilizing the environmental protection OSC procedure as the standard, which OA identified during the 1999 follow-up review as being satisfactory. However, there is no institutional protocol for reviewing these procedures to ensure that they are of an appropriate quality, are properly maintained, and are consistent with the LLNL emergency plan. Another improvement is the recent addition of a draft plan developed by the Hazards Control Department for deploying field monitoring teams. However, these plans have not yet been formalized, they lack some details, and they are not reflected in the LLNL emergency plan.

The LLNL emergency preparedness section staff have responsibility for developing and maintaining the emergency plan, EPIPs, and EALs, and this group has implemented numerous changes in plans and procedures to foster improvements in the overall emergency management program. For example, LLNL recently hired an emergency plan and procedures specialist who is responsible for maintaining, reviewing, and updating the emergency plan and EPIPs. In addition, LLNL developed a procedure guiding development and maintenance of the emergency plan and EPIPs that should serve to promote consistent format and quality of procedures. Furthermore, LLNL has made some improvements to address concerns about EALs, such as increasing the spectrum of events and adding information useful in formulating protective actions. Finally, LLNL has established an emergency preparedness management committee to ensure high-level management attention in the multiple disciplines affecting emergency preparedness.

However, the OA team noted a number of significant weaknesses in LLNL emergency plans and procedures, some of which were identified during the 2001 OA program status review and the 1999 OA follow-up review. The most significant procedural weaknesses are in the protective action EPIP and in the EALs. The LLNL protective action EPIP is poorly organized and is missing some key information needed to support development of onsite protective actions and offsite protective action recommendations. Specific concerns include:

- Most of the information related to protective actions is inappropriately contained in the "Post-Emergency Consequence Assessment" section rather than in the "Initial Consequence Assessment" or

- The emergency director's responsibility for evaluating offsite protective actions is not identified.

- The process (i.e., grid map) utilized by LLNL to identify onsite protective action areas is not discussed.

- The process for formulating onsite protective actions using the EAL tables is not discussed.

- The process used to identify the areas for recommending offsite protective action is not clearly identified.

These procedural weaknesses contributed to performance problems demonstrated during the tabletop performance tests in the area of protective actions, as discussed in Appendix E.

Finding: The LLNL protective action EPIP does not adequately support protective action decision-making in a time-urgent environment, as required by DOE Order 151.1.

Another significant procedural weakness is in the EALs. The most significant concern is that the transportation EALs are incomplete, do not support effective and accurate event classification, and may result in LLNL inappropriately recommending significant offsite protective actions that are not commensurate with the hazard. For example, the transportation EALs do not address events that may occur while transporting chlorine or arsine gas, even though these events are analyzed in the transportation EPHA. Although the transportation EALs generically direct the user to refer to facility-specific EALs for classifying these events, this process may cause a delay or error in classifying and formulating protective actions for these potentially significant events, particularly if the origin of the material is not readily available to initial responders. Another concern is that some of the transportation EALs are based upon very conservative assumptions related to the release of some toxic substances that, in conjunction with the manner in which transportation events are classified (i.e., based upon the quadrant of the site in which the spill occurs), could result in inappropriate offsite protective action recommendations. For example, a spill of one gallon of 38 percent hydrochloric acid could result in LLNL recommending sheltering or evacuation out to one mile beyond the LLNL boundary, even though conservative calculations would limit impact to well within the site boundary.

In addition to concerns about the transportation EALs, several instances of poorly defined, missing, or potentially confusing elements were identified in building-specific EALs. For example:

- The B131 EALs (which were recently revised based upon the new EPHA for this facility) includes indications such as "observation of powder spill" and "spill outdoors on a damp day" without providing definitive indicators of the size of the spill or direction on what constitutes a damp day.

- The B131 EALs did not list malevolent acts as an initiating condition (as was done in another recently revised set of building EALs).

- B131 EALs include some data (such as "present inventory") that is not needed to support event classification and may cause confusion during event classification.

- A number of building EALs still include the condition that the fire department duty chief's discretion is needed prior to classifying events.

Finding: LLNL emergency action levels do not adequately support prompt and accurate event classification, as required by DOE Order 151.1.

A number of weaknesses of lesser significance were identified in the emergency plan and EPIPs, including:

- LLNL does not have procedural guidance for categorizing operational emergencies that are not further classified.

- The emergency plan and EPIPs contain a different set of definitions for classification levels, and both sets of definitions are missing some key information, such as protective action criteria that trigger the classification.

- The LLNL emergency plan does not always clearly describe responder roles and responsibilities.

- There is no comprehensive index of emergency response procedures. In addition, there are no mechanisms in place to ensure that changes in various emergency response procedures, such as self-help plans, fire department procedures, OSC procedures, and EPIPs, are coordinated so that all response procedure are consistent.

To summarize, LLNL has established a set of plans and procedures that, in general, adequately supports the many response activities that may be needed during an emergency at LLNL. Furthermore, efforts are under way to further improve these plans and procedures, as demonstrated by the recently implemented duty chief checklist, which was used effectively during tabletop performance tests to support timely implementation of such response actions as classification, protective actions, and notification. However, the LLNL emergency response procedures still have significant weaknesses in the areas of protective action determination and event categorization and classification that may adversely affect emergency response. These procedural weaknesses contributed to performance weaknesses during the tabletop performance tests involving the duty chiefs and emergency directors.

C.3 CONCLUSIONS

The LLNL EPHA documents in place form an adequate basis for the site's emergency management program. In addition, LLNL has improved its process for developing and maintaining HSs and EPHAs; the site composite EPZ addresses previously identified concerns; and the latest EPHAs improve on the previous versions. LLNL has also established an improved set of plans and procedures that, with some important exceptions, adequately supports emergency response. However, implementation of the FY 2002 EPHA upgrade process is still in a relatively early stage, and significant effort remains to complete this portion of the program in a timely manner while meeting OAK (and Departmental) expectations regarding EPHA quality. Furthermore, LLNL emergency response procedures still contain significant

weaknesses in the areas of protective action and event classification that may adversely affect emergency response.

C.4 RATING

The implementation of an adequate set of EPHAs, combined with the completion of one of 16 required EPHAs using an improved EPHA development and maintenance process, provides confidence that although substantial effort remains, the upgrade process will eventually produce a complete set of comprehensive and technically accurate EPHA documents. A rating of EFFECTIVE PERFORMANCE is therefore been assigned to the area of HS and EPHA documents.

The LLNL emergency management program plans and procedures are generally adequate to support many aspects of response to emergencies at LLNL. However, significant weaknesses exist in important areas of event categorization/classification and protective actions. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of program plans and procedures.

C.5 OPPORTUNITIES FOR IMPROVEMENT

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

Oakland Operations Office

- Consider differentiating EPHA comments that must be addressed as part of the FY 2002 Project Management Plan from those that are less significant and more appropriate for an FY 2003 EPHA effort in order to accelerate the EPHA review and comment resolution process. Alternatively, consider using less-formal methods of resolving EPHA comments that have less significance.

- Consider implementing a formal mechanism for capturing OAK and LLNL commitments and clarifications regarding program upgrade practices, assumptions, protocols, format, and content. Periodically review with LLNL emergency preparedness staff and update as necessary.

Lawrence Livermore National Laboratory

- Strengthen processes supporting the FY 2002 EPHA upgrade effort:

  - Consider reevaluating the allocation of resources applied to the EPHA upgrade portion of the FY 2002 Project Management Plan and relevant upgrade activity priorities to ensure that deliverables are both timely and of high quality.

  - Clarify inconsistencies between the EPHA EPIP and individual EPHAs regarding maintenance responsibilities.

- Strengthen institutional procedures and processes related to maintaining an effective site emergency management program:

- Identify all emergency response procedures and the corresponding departments responsible for their review and approval to ensure the appropriate review of plans and procedures by the many organizations involved in emergency planning.

- Establish an institutional procedure for developing and maintaining self-help plans to ensure consistency among zones regarding their content, their consistency with the LLNL emergency plan, and the relationship among zones.

- Consider revising facility-level procedures to include the following:

  - Facility manager responsibilities for developing and maintaining HS and EPHA documents

  - Instructions related to the control of ventilation systems to support shelter-in-place protective actions

  - Alternate assembly points (i.e., in self-help plans) for use when the primary assembly point is unavailable.

- Clarify the priorities of some initial decision-making activities discussed in the LLNL emergency plan and implementing procedures:

  - Revise the emergency plan and classification EPIP to clarify that the duty chief should complete event classification and notification before assuming the on-scene incident commander position.

  - Revise the notification EPIP to clarify that notification of offsite agencies of any protective action (e.g., particularly at the General Emergency level) is a higher priority that notification of the laboratory emergency duty officer.

- Revise the classification EPIP to include:

  - Guidance and criteria for categorizing operational emergencies that do not require further classification (based on DOE guidance).

  - A discussion of the use of duty chief and/or emergency director judgment in classifying events. Include the generic definitions of classification levels to support the judgments.

  - Reevaluate the current method for classifying transportation events, which is based upon the quadrant in which the accident occurs, and consider using one that is based on the distance to the site boundary.

- Consider modifying the offsite notification form to better reflect the duty chief's roles and responsibilities:

  - Modify the approval block to add the duty chief position and include the caveat that press release status is only provided when the EOC is activated.

  - Add instructions for the name that is to appear at the top of the form (i.e., person filling out the form, person making notifications, or person approving form).

APPENDIX D

Emergency Preparedness

D.1 INTRODUCTION

A site exercise program must be established to verify that the emergency response organization (ERO) can respond effectively to an emergency condition using available tools (i.e., procedures and job aids) and equipment and to provide ERO members an opportunity to practice their skills. To be effective improvement tools, exercises should be used to critically validate all elements of an emergency management program over a multi-year period using realistic, simulated emergency events and conditions. An effective emergency public information (EPI) program provides the public, media, and site employees with accurate and timely information during an emergency event. In part, effectiveness is based on having in place a long-term program that educates the public and the media about actions that may be required during an emergency response.

The Office of Independent Oversight and Performance Assurance (OA) team evaluated the exercise program used to support the emergency response organizations at the institutional and facility levels. Exercise plans, materials, and records for key site emergency responders and the records and processes that support the emergency management exercise program were also evaluated. Finally, the team evaluated EPI plans and processes applicable for an emergency at Lawrence Livermore National Laboratory (LLNL), which is an area that OA has not previously evaluated. Because of its rapidly evolving nature, EPI program documents that were reviewed were the most recent versions available at the start of the data collection phase, unless otherwise specified.

D.2 STATUS AND RESULTS

D.2.1 Exercise Program

LLNL has implemented an exercise program having several positive attributes that collectively provide most of the rigor noted as lacking during the 1999 OA follow-up review. These features indicate that this element has the potential to be effective in validating the site's emergency response capabilities and identifying programmatic improvement areas. The positive attributes include a newly implemented emergency preparedness drill and exercise emergency plan implementing procedure (EPIP), the establishment of a formally chartered drill and exercise planning committee, and a well conceived process for establishing exercise objectives and criteria.

The LLNL drill and exercise EPIP includes nearly all of the necessary components to facilitate an effective evaluation of the LLNL response capability. Such components include schedules for annual site exercises, triennial integrated exercises, and annual drill or exercises for all response elements of the emergency response teams; a requirement for developing a five-year drill and exercise schedule; guidance on the development of exercises, their execution, and reporting of results; and training requirements for all exercise participants.

The drill and exercise planning committee is chaired by the emergency preparedness section exercise specialist, and its membership includes all site organizations with emergency response roles. It functions as a forum for site organizations to provide input regarding the exercise scenario and objectives so that their respective response capabilities can be evaluated. The committee is currently developing the fiscal year (FY) 2002 exercise package, scheduled to be conducted later this summer, and has just begun efforts

to develop a five-year exercise schedule. With some exceptions, the exercise objectives and criteria should adequately support the exercise evaluation efforts because they are derived from the generic objective set contained in the DOE Order 151.1 emergency management guide and they incorporate checkboxes as the mechanism for tracking and evaluating the stated evaluation criteria. The draft five-year schedule includes annual exercises alternating between radiological and hazardous material scenarios as well as plans to involve different facilities from year to year, and it is intended to provide a mechanism for ensuring that all program elements are tested on a periodic basis. Other important roles of this committee are to provide exercise programmatic recommendations and facilitate the identification of lessons learned following drills and exercises.

The OA team noted several weaknesses in the exercise program documents and processes that may limit the effectiveness of exercises as a continuous improvement activity. The drill and exercise procedure does not define the various categories of exercise observations (i.e., strengths, improvement items, weaknesses, and deficiencies) to be used and does not clearly indicate which records are to be retained. Clearly understood and consistently used observation definitions are important to the effective functioning of evaluation, reporting, and corrective action management processes. The designation of which types of records are to be retained, such as evaluator comments and participant critique comments, is currently left to the discretion of the emergency preparedness exercise specialist. This discretionary retention does not provide adequate assurance that the appropriate records are consistently retained for such purposes as planning for future exercises, as illustrated by the fact that important exercise records (such as evaluator comments and "hot-wash" critique comments from the FY 2001 exercise) were not retained. Finally, there is no mechanism in place to ensure that generic exercise objectives are appropriately tailored to validate corrective actions implemented for previously identified weaknesses. Although the draft FY 2002 exercise package includes an item to evaluate a past concern in the emergency medical area, EPI concerns are not comprehensively addressed by the draft objectives, as discussed in Appendix F of this report.

In conclusion, LLNL has implemented an exercise program that, with few exceptions, provides the structure necessary to function effectively as a process for validating the site's emergency response capabilities and facilitating continuous improvement. However, exercise observation categories have not been defined, record retention requirements lack specificity, and LLNL has not implemented a system that ensures that exercises will consistently examine the effectiveness of corrective actions.

D.2.2 Emergency Public Information

As with many aspects of the site emergency management program, efforts are under way to formalize the EPI element and move from an expert-based system to one that has better-defined processes and protocols. The fairly recent initiative to institutionalize the EPI element is an outgrowth of the overall programmatic upgrade program and increased attention by both Oakland Operations Office (OAK) and LLNL emergency preparedness personnel. With the exception of the "Public Information" section of the LLNL emergency plan, the OAK and LLNL EPI program documents are in draft form and are still evolving.

The current draft documents individually contain several important positive attributes. The OAK draft EPI plan includes fairly detailed discussions of program objectives and staff responsibilities, and emphasizes the importance of providing factually accurate and timely information to employees, the public, and the media. The LLNL draft EPI plan also identifies the roles and responsibilities of public affairs office (PAO) emergency response personnel, both at the emergency operations center (EOC) and at the PAO operations support center (OSC), and includes comprehensive, position-specific checklists. In addition, the public information section of the LLNL emergency plan contains a specific timeliness expectation for approval of the initial press release within one hour of EOC activation, and clearly reflects

the Department's requirement that press release approval must be obtained from both the LLNL emergency director and the OAK representative in the EOC. Beyond these items, the LLNL EPI program has other positive attributes. These include prepared media kits that discuss the operational emergency classifications and include an ERO diagram; the involvement of LLNL PAO personnel in exercise planning activities; and the availability of systems for rapidly communicating emergency event status to employees and the public.

Concurrent with the efforts to formally define EPI processes and protocols, LLNL has several initiatives under way to develop or improve important EPI elements. For example, LLNL is assisting in a cooperative effort by local governmental response entities (through a subgroup of the local emergency planning committee) to develop and implement a public education program that is consistent across local response boundaries and that is coordinated with the installation of new public communication equipment. LLNL emergency preparedness staff have been periodically briefing local emergency planning committee personnel on topics of interest, such as the LLNL emergency planning zone and release plume modeling, and LLNL is working with local response agencies to develop protocols for responding to LLNL's issuance of protective action recommendations during an emergency. In addition, LLNL has recently made arrangements with the Alameda County Office of Emergency Services to use a portion of their EOC as a joint information center (JIC), which has several advantages in terms of location, accessibility, and space.

Notwithstanding these positive attributes, OAK and LLNL have not implemented an integrated set of fully developed EPI plans and procedures that ensures that timely and accurate information will be effectively communicated to site workers and the public when necessary. Both OAK and LLNL public affairs personnel are working to draft documents, but the documents possess numerous weaknesses, including important elements that are either missing or not well developed, and inconsistencies in approach.

DOE Order 151.1 requires each site and cognizant DOE field element to prepare an EPI plan that includes certain key elements necessary for an effective and timely EPI response under a variety of conditions. LLNL public affairs staff consider the public information section of the LLNL emergency plan to be the overall EPI plan, but neither this section nor the working draft EPI implementing procedure provides the necessary detail in describing key EPI elements, including the JIC activation process, the site's public/media education approach, and EPI training and emergency response proficiency requirements. For example, although the LLNL PAO has developed a strategy for JIC activation (up to and including wholesale relocation of the onsite PAO OSC and related functions to the Alameda County JIC), the overall JIC approach is not clearly articulated in LLNL program documents, the activation procedures for LLNL and OAK personnel have not been developed, and there are inconsistencies between OAK and LLNL EPI documents regarding JIC activation and staffing. The OAK and LLNL EPI documents also do not clearly define the press release development and approval process; this shortcoming takes on added significance because this process may involve OAK and LLNL individuals located in three separate facilities: PAO OSC, OAK emergency communications center (ECC), and LLNL EOC. In addition, although LLNL PAO staff are clearly sensitive to the importance of (and potential roadblocks to) timely issuance of press releases during an emergency, the working draft EPI implementing procedure does not provide any guidance or expectations regarding the timeliness of news releases or specific direction that OAK approval is required.

Other important weaknesses include:

- The role of OAK as an active participant in the press briefing process has not been clearly defined.

- The LLNL one-hour press release requirement is based on EOC activation, and not event occurrence. However, LLNL EPI documents do not provide formal expectations for EOC activation timeframes or discuss how or whether the press release approval process would be modified if EOC activation is delayed, such as for an off-hours event.

- The OAK EPI plan does not include specific expectations for timeliness beyond "as soon as enough appropriate information about the event is available."

- JIC training has not yet been developed.

- The OAK and LLNL EPI-related position checklists are not controlled documents, resulting in potential inconsistencies between the most recent checklists and those currently in place in the OAK ECC and PAO OSC.

Finding: OAK and LLNL have not implemented an integrated set of fully developed EPI plans and procedures that ensure that timely and accurate information will be effectively communicated to site workers and the public during rapidly developing events, as required by DOE Order 151.1.

Finally, LLNL PAO efforts to formalize the EPI plan/procedure appear to have stalled due to uncertainty within the affected LLNL organizations regarding the desired final form. LLNL PAO staff indicated that they are awaiting guidance from emergency preparedness section staff regarding expectations and the process for formally approving the working draft EPI implementing procedure, but emergency preparedness staff have not provided a definitive path forward in this area. Furthermore, the OAK public affairs office does not have a specific milestone for approving their own EPI plan and has not conveyed a clear set of expectations to LLNL for developing an EPI plan.

To summarize, the OAK and LLNL EPI programs are in development and, based on their current status and stated intentions, should eventually define an appropriate strategy and approach for implementing the EPI element during an emergency. However, the OAK and LLNL EPI plans and procedures are in draft form, lack certain key elements, and contain significant inconsistencies, particularly with respect to the offsite JIC, that must be resolved in order to ensure that during a dynamic event, emergency information can be effectively conveyed to site workers, the media, and the public.

D.3 CONCLUSIONS

LLNL has improved the exercise program since the 1999 OA program status review by providing a well conceived and structured approach essential to effectively evaluating LLNL emergency response capability and promoting continuous improvement. These mechanisms, which include the recently chartered drill and exercise planning committee, appear to be working well for the upcoming FY 2002 exercise, which will be the first exercise under the new program, and progress in its development to date is satisfactory. In the EPI area, OAK and LLNL management attention is necessary to develop a strategy for implementing a coordinated, integrated, and fully approved site EPI program to ensure that a single authoritative source of information regarding the event response is established that effectively reflects the interests of both DOE and LLNL.

D.4 RATING

With few exceptions, the LLNL exercise program provides a structured approach to evaluate all elements of the LLNL response capability and provide the necessary feedback and improvement component. A rating of EFFECTIVE PERFORMANCE is therefore assigned to the area of LLNL exercises.

The emergency public information 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 an emergency event at LLNL. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of emergency public information.

D.5 OPPORTUNITIES FOR IMPROVEMENT

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

Oakland Operations Office

- Increase OAK public affairs engagement in planning and preparedness to ensure that DOE order requirements and expectations pertaining to EPI activities are effectively implemented and include the necessary OAK involvement.

Lawrence Livermore National Laboratory

- Strengthen the exercise program enhancing the objective development and validation processes:
  - Consider developing a set of exercise objectives tailored to the needs of the site and establishing a library of objectives that can be used for future exercise planning.
  - Incorporate exercise finding definitions and their applicable evaluation and disposition requirements into the exercise program EPIP.
  - Through the drill and exercise committee, identify specific corrective actions and program changes that need to be validated during annual exercises. Include specific criteria for these items in the exercise package.
- Given the LLNL expectation that news releases will be developed in the EOC, consider requiring PAO emergency management team personnel to take the "Classification and Protective Action Decision-Making" course.
- Revise the LLNL EPI plan/procedure to include the following:
  - Develop a flowchart to depict the public information approval process to reflect every activity and the individual responsible. Develop supporting procedures or job aids, as appropriate, for information development, coordination for accuracy and approval, handoff to support staff, and distribution to the media, the public, employees, DOE Headquarters, and stakeholders.
  - Given the range of possible conditions under which the JIC might be activated, consider identifying several JIC activation options (contingent on event severity) with accompanying procedural direction.

- Identify specific expectations in the EPI plan/procedure for the timely approval of news releases. Consider including guidance 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.

- 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 categorizing and classifying the emergency, formulating protective actions, and notifying onsite personnel and offsite authorities. Concurrent response actions include reentry and rescue, provision of medical care, and ongoing assessment of event consequences using additional data and/or field monitoring results.

In the event of an emergency, initial direction and control of the Lawrence Livermore National Laboratory (LLNL) emergency response organization is provided by the LLNL fire department duty chief. After activation of the emergency operation center (EOC), the laboratory emergency duty officer serves as the emergency director and assumes overall command and control authority, including emergency classification, protective action decision making, and notification responsibilities. The emergency director is assisted by support personnel located in the EOC and remote operations support centers. One of the critical support groups is the consequence assessment team, which LLNL has recently relocated from an operations support center to the EOC.

Most of the information in this section results from tabletop performance tests that were conducted by the Department of Energy (DOE) Office of Independent Oversight and Performance Assurance (OA) with three duty chiefs and three EOC teams. Three operational emergency scenarios were presented to each duty chief and EOC team: a traffic accident resulting in a release of a hazardous material, a malevolent act at B513/514, and an operational event at the B332 complex. The scenarios, which were developed by OA in conjunction with an LLNL trusted agent, were presented to these individuals by the trusted agent to ensure scenario validity and delivery of accurate event cues. In addition, performance-based interviews were conducted with two Oakland Operations Office (OAK) emergency managers and two OAK duty officers.

E.2 STATUS AND RESULTS

E.2.1 LLNL Emergency Response Decision-Making

Duty Chiefs

All the duty chiefs who were evaluated demonstrated effective command and control; promptly and accurately classified events; identified appropriate onsite protective actions and offsite protective action recommendations; and made notifications in a timely manner. Upon event initiation, the duty chiefs promptly identified a safe approach to the event scene and appropriately balanced priorities for responder safety, rescue of injured personnel, and implementation of site protective actions. Furthermore, the duty chiefs effectively utilized the duty chief checklist to ensure that all response actions, such as classification and notifications, were performed. The duty chiefs are very familiar with the emergency action levels (EALs) and made conservative decisions when faced with events that did not exactly match a specific EAL (e.g., a postulated security event at a hazardous waste facility). Onsite protective actions were

promptly formulated using information in the EAL tables and an LLNL site map that was divided into a series of building sectors (corresponding to those loaded into LLNL's computer-driven emergency warning system). The specific site sectors where protective actions were to be implemented were promptly communicated to fire department dispatch for site notification. In addition, the duty chief promptly identified offsite protective action recommendations, filled out notification forms, and performed the notifications utilizing LLNL's "Communicator" system.

A potential vulnerability in the method for communicating onsite protective actions to the dispatch center was identified during the performance tests. The verbal notification can include a number of designated sectors, as many as ten for the scenarios utilized in these performance tests, and even though the duty chief requests verbal verification from dispatch, this process could result in miscommunications during stressful situations. During the tabletop tests, this vulnerability was tested by injecting errors into the verbal verification provided by dispatch. On four separate occasions during the tabletop test, errors injected into the dispatch repeat-back were not identified by the duty chiefs.

Several additional concerns in the duty chief response were identified during the tabletop test. For example, although all the duty chiefs were given the same event scenario and used the same EAL, each identified a different set of onsite sectors in which to implement protective actions. All the duty chiefs protected the sectors that were closest to the event scene and directly downwind (and therefore most likely to need protective actions); however, they identified different sets of sectors outside of those directly impacted. This variation resulted, in part, from the lack of specific guidance on how to translate information in the EAL tables to onsite protective actions. In addition, for one scenario all the duty chiefs had different interpretations of which geographic areas should be affected by the offsite protective action recommendation that they identified. LLNL is working with offsite officials to better define geographic locations around the site to support clear communication of protective action recommendations. Another concern is that the duty chief checklist does not provide clear guidance on the priority of completing offsite notifications. This shortcoming was demonstrated when one of the duty chiefs inappropriately briefed the laboratory emergency duty officer before completing offsite notifications for a General Emergency condition. Lastly, although the duty chiefs were familiar with the definition of an operational emergency not further classified, they were not able to determine whether certain postulated events should be categorized as operational emergencies. LLNL has not developed guidance and criteria to support the duty chiefs in this task.

EOC Team

Tabletop performance tests were performed with three EOC teams that included the emergency director, the EOC manager, and the consequence analyst, who hold the three technical/managerial positions comprising the EOC minimum staff. In addition, two of the EOC teams included the full consequence assessment team in the EOC. This report section focuses on the ability of the EOC team to effectively control the event response and perform such duties as event classification and protective action formulation. The next section provides details on the performance of the two consequence assessment teams.

Generally, the emergency director demonstrated good command and control and effectively used his procedures (e.g., emergency director checklist) and personnel to support response actions. The EOC teams appropriately reviewed initial event response actions performed by the duty chief, including event classification, protective actions, and notification. The EOC promptly identified and corrected classification errors that had been injected into some of the scenarios. In most cases, the emergency director effectively utilized the consequence analyst and EOC manager to support the review of EALs and to prepare notification forms, respectively. In simulated interactions with other emergency responders and subject matter experts, the emergency director demonstrated a good knowledge of site resources to

support response efforts. Noteworthy was the clear communication by most of the EOC teams when they assumed emergency response responsibility and activated the EOC. However, this degree of communication was not demonstrated by all the EOC teams in every scenario presented.

Although the EOC teams generally demonstrated a thorough understanding of their roles and responsibilities and performed well in most of the scenarios, two significant weaknesses were identified during the tabletop tests. The first weakness is in the area of confirming onsite protective actions. The EOC staff did not have available the site map used by the duty chief to identify onsite protective actions. Therefore, when the duty chief informed the EOC of the sectors where onsite protective actions had been taken, the EOC team did not understand which areas were affected and did not pursue evaluating whether the protective actions were adequate. The second weakness concerns the failure of the EOC staff, in several instances, to continually assess accident conditions to ensure that offsite protective action recommendations were appropriate. For example, on one occasion the consequence assessment team inappropriately (due to an error in a calculation) recommended increasing the protective action recommendation from two miles to approximately nine miles. Neither the consequence analyst nor the emergency director questioned these results. In another case, neither the consequence analyst nor the emergency director recognized that a change in nature of the event, from an explosion at the hazardous waste facility to an explosion with a fire, warranted a change in the protective action recommendation. Lastly, on two occasions, an EOC team did not identify that a change in wind direction warranted a change in the protective action recommendation.

Consequence Assessment Team

The consequence assessment team supports the EOC response by defining and evaluating the consequences of the event hazards, performing dose projections, and evaluating protective actions. Each team consists of a team leader (the consequence analyst), an atmospheric dispersion modeler, an industrial hygienist, and a health physicist. In response to a weakness identified during a February 2002 no-notice exercise conducted by the Office of Emergency Operations (SO-40), LLNL recently relocated the consequence assessment team from the Hazards Control Department operations support center into the EOC to facilitate communications with persons responsible for event classification and protective action development, a feature that was demonstrated during the tabletop test, and to provide redundant and more reliable consequence assessment capability. In addition, as part of the LLNL emergency management upgrade program, new procedures were developed that describe consequence assessment team responsibilities. A field monitoring plan procedure is also being developed as part of the consequence assessment team procedures.

Although some improvements have been made in the consequence assessment function, significant deficiencies were identified in the teams' abilities to provide timely, accurate, and continuously updated assessments to the emergency directors during the tabletop performance tests. For example, modelers were unfamiliar with the available emergency preparedness hazards assessment (EPHA) and the methods for accessing and inputting the appropriate data into the various modeling programs. This lack of familiarity (and equipment problems, to a lesser extent) caused significant delays in performing consequence assessment. As a result, the consequence assessment teams were unable to produce a plot of the potential dispersal of hazardous material to support the EOC teams. Furthermore, one consequence assessment team made a number of errors in their consequence assessments as a result of performing informal and undocumented calculations and utilizing incorrect model inputs. In one instance, these errors caused the consequence assessment team to estimate that offsite consequences might extend to approximately nine miles, a distance that substantially exceeds the two-mile emergency planning zone radius, which is itself based upon conservative calculations documented in the EPHA. These errors went unnoticed for the most part because the team leaders did not check or question the assessments before providing them to the EOC emergency directors. In addition, the consequence assessment teams did not

update their assessments as event conditions changed. For example, in the security scenario, one consequence assessment team performed an initial assessment based on dispersion of hazardous material by an explosion but did not update the assessment when the explosion subsequently ignited a fire. The absence of procedural guidance, the informality of some guidance, and the reluctance of the consequence assessment teams to use available procedures contributed to the observed errors.

Finding: During tabletop performance tests, LLNL emergency responders in the EOC did not demonstrate the ability to continuously evaluate event conditions and provide updates to offsite protective action recommendations, as required by DOE Order 151.1.

In conclusion, LLNL demonstrated the ability to take prompt initial actions to protect emergency responders, site workers, and the public when presented with a series of emergency scenarios during tabletop tests. The fire department duty chiefs, who have the initial responsibility for event response, appropriately utilized their tools, such as the duty chief checklist and EALs, to support their response efforts; demonstrated good command and control; and appropriately balanced response priorities. The EOC teams, who assume overall emergency response responsibility after the EOC is activated, also demonstrated effective command and control. However, a number of weaknesses in identifying protective actions and protective action recommendations may have adversely affected the demonstrated emergency response. Most importantly, the consequence assessment teams did not effectively support evaluation of the potential impact of hazardous material releases in that they did not provide the EOC with timely, accurate, and continuously updated assessments, and an EOC team did not appropriately revise offsite protective action recommendations to reflect changes in event conditions that occurred after their initial assessment.

E.2.2 OAK Emergency Response

Performance-based interviews were conducted with two OAK emergency managers and two OAK duty officers to determine their understanding of assigned duties, roles, and responsibilities defined by the OAK emergency communications center (ECC) operations plan, the OAK ECC staffing plan, and the OAK duty officer procedure. These documents were also reviewed for the adequacy of direction and guidance.

During an emergency event at LLNL, the primary OAK function is to ensure that the LLNL emergency response organization implements the actions necessary to mitigate the emergency and protect site workers, the public, and the environment from the effects of adverse events. This function is clearly articulated in the OAK ECC operations plan, which, together with an accompanying ECC staffing plan, effectively describes the activation and operation of the OAK emergency management team. The OAK emergency responder checklists, which are derived from these documents, are comprehensive and reflect a set of DOE field element responsibilities that is consistent with the emergency management concepts identified in DOE Order 151.1.

OAK emergency managers and duty officers are knowledgeable of their specific roles and responsibilities during a site event. In particular, OAK emergency managers understand the need to monitor LLNL's execution of key EOC response items, such as protective action identification and dissemination, while allowing the LLNL emergency management team (EMT) to manage the event. In addition, OAK emergency managers are generally sensitive to the importance of timely press releases and OAK's role in their approval. OAK duty officers understand their primary role as points of contact for OAK notification until ECC activation and are aware of the steps necessary to accomplish this function. One weakness noted was that not all duty officers have been thoroughly trained in how to accomplish their functions.

For example, one duty officer accurately described how he would respond to the "Communicator" system during an emergency, but he has never actually used the system, even in a monthly test.

The OA team identified several weaknesses in the OAK emergency response plans, checklists, and duty officer procedure and familiarization program that could negatively impact the OAK response in case of a less serious (but more likely) emergency event. Most notable of these is that OAK has not formally defined a mechanism for monitoring the early stages of an off-hours LLNL emergency event, particularly if the ECC is never activated, such as would occur for an operational emergency not requiring classification. Currently, OAK anticipates the early involvement of the OAK emergency management program manager (by telephone, if necessary) and experienced OAK personnel qualified as duty officers living near the site. However, OAK duty officers are not trained beyond familiarity with response to a General Emergency event and are not expected to be able to recognize errors in categorization/ classification or notification. In addition, there is currently no source of expertise within OAK comparable to that of the emergency management program manager if she is unavailable, and there is no procedure or guidance regarding near-term oversight of the LLNL emergency response if the ECC is not staffed. This item takes on added significance in light of the still-maturing nature of the LLNL emergency management program and the fact that if the decision is made to activate the ECC for an off-hours event, the recall process will not begin until the ECC coordinator arrives at the ECC.

Other procedure weaknesses were noted as well. The OAK duty officer procedure indicates that he/she is required to ensure that LLNL has made the required notifications, but the expectation for how to accomplish this step has not been conveyed to the duty officers. The procedure also does not clearly indicate how (or whether) the duty officer is expected to maintain communications with DOE Headquarters for off-hours events when the duty officer may have an extended travel time to the site. In addition, the ECC operations plan is inconsistent with the ECC staffing plan, the ECC position checklists, and other response documents regarding roles and responsibilities. For example, the ECC operations plan states that a major function of the OAK EMT is to "reclassify or terminate an emergency," which is a responsibility of the LLNL EMT after the EOC is activated. Finally, because the ECC checklists are not controlled documents, the current status of certain position-specific roles and responsibilities, particularly in the area of emergency public information, may not be adequately reflected in these checklists.

To summarize, OAK emergency managers and duty officers are prepared to fulfill OAK's emergency response role for an LLNL emergency event. However, OAK response during situations where ECC staffing is either delayed or will not occur has not been adequately defined. In addition, inconsistencies were noted among ECC response plans, the OAK duty officer procedure, and various position checklists.

E.3 CONCLUSIONS

During the tabletop performance tests, LLNL emergency responders serving in key positions demonstrated the ability to utilize their tools and training to make appropriate decisions and to properly execute actions to protect emergency responders, site workers, and the public during the critical initial phase of the postulated events. However, LLNL emergency responders did not demonstrate the ability to continuously assess accident conditions to ensure that initial protective actions and protective action recommendations remained appropriate. OAK is generally prepared to effectively monitor LLNL's response to an emergency event, but OAK's response to a less severe operational emergency where the ECC is not activated may be hindered by incomplete response protocols.

E.4 RATING

Overall, LLNL demonstrated the ability to take prompt initial actions to protect emergency responders, site workers, and the public when presented with a series of emergency scenarios. However, LLNL did

not demonstrate the ability to continuously evaluate event conditions to provide appropriate updates to protective action recommendations. A rating of NEEDS IMPROVEMENT is therefore assigned to the area of emergency response decision-making.

OAK is generally prepared to respond to an emergency at LLNL. A rating of EFFECTIVE PERFORMANCE is therefore assigned to the area of OAK emergency response.

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 NNSA and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Oakland Operations Office

- Strengthen OAK response plans and procedures to better support OAK emergency response:
  - Revise the ECC operations plan to better communicate the purpose of the OAK duty officer program consistent with current OAK expectations.
  - Consider consolidating the ECC operations plan and staffing plan to eliminate duplication and the need for multiple corrections/revisions, particularly regarding the content of ECC position checklists. Consider including the checklists as an attachment to the composite plan.
- Strengthen OAK emergency responder training and proficiency elements:
  - Consider the use of additional tabletop drills, similar to the March 2002 activity, to provide additional opportunities for enhancing emergency responder proficiency and validating the content of response procedures.
  - Consider developing an OAK duty officer job task and training matrix to ensure that OAK duty officers have received all necessary training to respond effectively to an emergency event.
  - Evaluate the feasibility of providing backup to the response expertise of the OAK emergency management program manager. Consider developing and using an OAK "response briefcase" that would include the information necessary for OAK to respond effectively from a remote location to a less severe operational emergency when the ECC may not be activated.

Lawrence Livermore National Laboratory

- Strengthen procedures, job aids, and processes for formulating and communicating protective actions:
  - Develop tools and a process to ensure that onsite protective action areas are properly communicated to fire dispatch. For example, fire dispatch might utilize a checklist of the plant areas that correspond to those on the duty chief site map, and a process might be established so that the duty chief marks off protected areas on the site map.
  - Develop a process, such as a call-back procedure, to ensure that all affected, occupied buildings (including trailers) have received protective action notification.

- Consider placing in the EOC a copy of the site map that the duty chief uses to make onsite protective action decisions.

- Develop additional procedures and/or job aids to guide the consequence assessment team in accessing data for input into dispersion models and methods for performing and documenting the results of refined calculations.

- Conduct additional training for LLNL emergency responders related to protective action decision-making:

  - Sensitize EOC EMT personnel to the need to keep protective actions current.

  - Conduct a drill with health physics support personnel to ensure that onsite field monitoring will be effective if needed during an actual event involving the release of radioactive materials.

- Consider conducting additional tabletop drills with laboratory emergency duty officers who were not evaluated during this inspection to provide them with response training and to identify any program weaknesses and areas for improvement.

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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 implementation of a coordinated schedule of program evaluations, appraisals, and assessments. Key elements of the readiness assurance program include the active involvement of Department of Energy (DOE) line organizations in monitoring program effectiveness, contractor self-assessment programs, and timely implementation of corrective actions for identified weaknesses. For exercise evaluations, readiness assurance includes assessment of the effectiveness of the exercise as a means of demonstrating and continuously improving a site's integrated response capability.

This inspection examined the processes by which the Oakland Operations Office (OAK) line management provides guidance and direction and maintains operational awareness of the laboratory's emergency management program. The inspection also included a review of Lawrence Livermore National Laboratory (LLNL) 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

During the August 2001 program status review, the Office of Independent Oversight and Performance Assurance (OA) team noted that OAK had taken significant actions to improve the rigor and quality of its line management oversight of the LLNL emergency preparedness program. Since then, OAK has further strengthened the framework for conducting this oversight function by developing and implementing the OAK emergency preparedness program management plan, which provides a logical and well organized structure for systematic oversight of the site emergency management program. This plan describes the overall goals, philosophy, general process, and responsibilities for executing the Livermore Safety Oversight Division's role of conducting line management oversight of the LLNL emergency management program, and includes specific oversight implementation activities for fiscal year (FY) 2002 in each of the 15 emergency preparedness elements. Evaluation criteria referenced in the OAK program management plan were essentially drawn intact from the evaluation volume of the DOE Order 151.1 emergency management guide. These criteria are being used as benchmarks for OAK activities and for determining the acceptability of LLNL deliverables.

OAK continues to be proactively involved in facilitating improvements in the site's emergency management program through document reviews, program status monitoring, frequent meetings among OAK and LLNL emergency preparedness staff, and selected closure verification of items in the Department's corrective action tracking system. The OAK emergency management program manager manually tracks the status of each outstanding item through a combination of handwritten notes/reminders and entry annotations in the OAK issues management and action item tracking system. This system is being appropriately used to document the status of various "operational awareness" activities, including comments on LLNL document deliverables, and OAK duty officer briefings/training, but there is a

backlog of nearly two months in entering emergency management status items and documenting operational awareness activities.

In addition, OAK had a significant role in LLNL's implementation of the FY 2002 Emergency Preparedness Project Management Plan (PMP), which is a performance metric in Appendix F of the contract that is intended to guide the "completion" of the LLNL emergency management program. The FY 2002 version was implemented in October 2001; there will also be an FY 2003 version that is supposed to continue the process of developing and implementing a comprehensive program by the end of FY 2003. Furthermore, OAK emergency preparedness staff proactively developed an extensive, challenging tabletop drill designed to increase the proficiency of OAK emergency communications center (ECC) staff. The drill included specific supporting objectives in all of the key response elements, and LLNL emergency responders had significant involvement.

The most significant concern in this element is that OAK resource constraints are limiting OAK's ability to improve the effectiveness of emergency management programmatic oversight. Several FY 2002 assessment items, including an assessment of the LLNL emergency public information program, were deferred to FY 2003 to avoid impacting the review of LLNL PMP deliverables. In addition, OAK's review of each LLNL PMP deliverable has required approximately one month, in large part because of OAK's perception that it must document in detail all comments generated during the deliverable review process and obtain LLNL's response to each comment. Because OAK is generating a large number of unprioritized comments, this process is negatively impacting OAK's ability to address its review backlog, which is approaching two months. As the rate of receiving deliverables from LLNL increases, the rigor of OAK's review and the frequency and quality of communications with LLNL emergency preparedness staff may be at risk, as discussed in more detail in Section F.2.2. Finally, OAK oversight of the emergency management programs at other OAK sites (i.e., Stanford Linear Accelerator, Lawrence Berkeley National Laboratory) has been deferred until personnel resources can be identified, although recent changes in the National Nuclear Security Administration (NNSA) structure may relieve the OAK emergency management program manager of this responsibility.

In conclusion, OAK is actively engaged in providing line management oversight of the site's emergency management program through a variety of operational awareness activities. These activities have been identified and scheduled through a comprehensive program management plan developed to dovetail with the LLNL upgrade project. OAK resource constraints and the aggressive deliverable schedule contained in the LLNL PMP are limiting the effectiveness of OAK emergency preparedness staff in conducting the necessary array of operational awareness activities and providing real-time feedback to LLNL emergency preparedness staff.

F.2.2 Contractor Assessments and Issues Management

LLNL continues to make progress in institutionalizing the site's emergency management program through the implementation of the FY 2002 PMP and more-disciplined processes for conducting and tracking training, drill, and exercise preparation and for handling administrative issues, such as performance assurance. In early FY 2002, LLNL implemented the contract Appendix F emergency management performance metric for FY 2002, which provides the description, deliverables, working schedule, and evaluation/closure criteria necessary to achieve LLNL's stated goal of "substantial compliance" with DOE Order 151.1 by the end of FY 2003. The FY 2002 PMP identifies five major objectives and the corresponding implementation activities within 11 major emergency management elements. To date, LLNL has delivered 18 of 37 important technical basis, response, and other documents on or before their milestone dates.

Other improvements include additional personnel enhancements to the LLNL emergency preparedness section over the past year, including the designation and staffing of three core specialist positions in the key areas of plans and procedures; training and drills; and exercises, facilities, and special projects. The LLNL emergency preparedness action tracking system has several positive attributes. It is being used to track several major groups of action items: PMP deliverables, external audit weaknesses, and exercise weaknesses. The system is also being used to track the completion status of several items associated with the emergency preparedness section for which the group does not have direct implementation responsibility. Emergency preparedness staff are assigned responsibility for specific items, and the emergency preparedness performance assurance specialist keeps staff members current on action item status.

The OA team noted several weaknesses in the rigor and content of various program elements. These weaknesses include missing or poorly-developed considerations or processes in emergency preparedness hazards assessments (EPHAs) and emergency plan implementing procedures (EPIPs), most of which are discussed in earlier sections of this report. Other examples include: (1) the absence of any significant planning or implementation details for a drill program in the EPIP that covers drills and exercises, although the quality control check indicated that these details were included; and (2) the fact that the only reference to a self-assessment plan appearing in the EPIP that covers program administration is for an annual third-party review of the program. The latter item clearly does not meet the intent of the commitment within the performance assurance section of the PMP, which indicates that the FY 2002 self-assessment will be conducted in accordance with a self-assessment plan that will be incorporated into the program administration EPIP.

Weaknesses were noted in emergency preparedness corrective action processes as well. For example, the September 2001 LLNL emergency management self-assessment report critically evaluated the status of the program at the time, but no corrective actions were developed because the PMP was considered adequate to address the weaknesses. However, several weaknesses identified in that report are either outside the scope of the PMP, such as complete consideration of the emergency public information program, or were not adequately addressed by PMP deliverables, such as ensuring that shelter-in-place guidance was developed for site workers. Other weaknesses in the LLNL process for capturing and addressing identified weaknesses and improvement items in the site emergency management program include:

- The weakness from the FY 2001 LLNL exercise related to the absence of a clearly defined press release review and approval process was inappropriately closed based on a deficient, draft EPI procedure.

- The FY 2002 LLNL exercise package does not contain any objectives that evaluate meeting the one-hour press release approval requirement specified in the LLNL emergency plan, although public affairs roles and responsibilities and the press release approval process were identified as a concern several times in the past year.

- No weaknesses or improvement items have been entered in the emergency preparedness action tracking system from the February 2002 SO-40 no-notice exercise, the March 2002 tabletop drill, or the April 2002 self-help drill.

- Weaknesses previously identified by OA in the areas of event categorization guidance and emergency action level structure have not been effectively addressed.

These weaknesses reflect institutional-level problems noted by the OA team regarding LLNL issues and corrective action management systems, as described in detail in the "Feedback and Continuous

Improvement" section (Appendix D) of the environment, safety, and health volume (Volume I) of this report.

Also significant is OAK's perception that a large percentage of the LLNL contract Appendix F performance metric points are at risk because many documents submitted to date by LLNL do not meet the criteria established by the DOE Order 151.1 emergency management guide, which is the standard established in the LLNL programmatic upgrade project plan. This concern about the quality of PMP deliverables indicates that despite the frequent interactions between OAK and LLNL emergency preparedness staff, the communications protocols in place do not possess adequate structure to ensure that document quality expectations and commitments are clearly identified and understood. This issue is discussed in more detail in Appendix C of this report.

To summarize, LLNL continues to make progress in improving the emergency management program through implementation of the PMP and other initiatives. In addition to document upgrades, the details of which are discussed in other sections of this report, LLNL has enhanced the staffing and expertise of the emergency preparedness section. However, numerous instances were noted where weaknesses previously identified during self-assessment activities and past OA appraisals were either not captured or not effectively resolved. In addition, certain weaknesses in some of the EPIPs indicate that the quality control processes are not adequate to ensure that the acceptance criteria are consistently satisfied.

F.3 CONCLUSIONS

OAK oversight of the LLNL emergency management program remains a strength and is a significant contributor to LLNL's efforts to improve the site's emergency management program. These efforts have required a substantial investment in time and resources on the part of both organizations, and they are achieving positive results in terms of enhanced rigor and content of programmatic plans, procedures, and processes, and most importantly, effective response capability. However, OAK resources are being challenged by the current workload, and LLNL emergency management corrective action processes remain a concern. Ultimately, the ability of LLNL to achieve its goal of full implementation of the site emergency management program by FY 2003 and then maintaining and further improving that status will depend on LLNL's commitment to and success with systems that identify the need for improvement and result in the implementation of effective corrective actions.

F.4 RATING

The extent of DOE line management involvement in and oversight of the LLNL emergency management program provides assurance that the LLNL program will meet DOE expectations. A rating of EFFECTIVE PERFORMANCE is therefore assigned to the area of DOE assessments and performance monitoring.

Overall, the LLNL emergency management program is improving in all areas that were evaluated. However, the rigor of assessment and corrective action activities conducted by LLNL 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.

Oakland Operations Office

- Consider conducting an analysis of the current workload of emergency preparedness staff to: (1) understand which tasks are most resource intensive, and why; and (2) determine whether the workload is amenable to short-term augmentation. Also, consider using the workload analysis to estimate the resources necessary to support the estimated workload resulting from the FY 2003 LLNL PMP.

Lawrence Livermore National Laboratory

- Strengthen emergency management corrective action and issues management systems and related processes to promote continuous improvement in the emergency management program:

  - Establish a corrective action baseline to accurately capture weaknesses identified over the past several years and reflect the status of any corrective actions that were originally signed off as complete. Critically evaluate each item to verify that all weaknesses have been appropriately addressed, and formally document the evaluation results.

  - Consider performing a detailed causal analysis of weaknesses in program plans and procedures to determine what additional details are necessary in the administrative EPIPs to ensure a consistently effective document quality control process.

  - Consider enhancing the LLNL issues management process for closing and validating completed corrective actions by including a requirement for the LLNL Assurance Review Office to validate a sample of corrective actions.

- Consider including specific elements within the FY 2003 PMP that focus on the resolution of previously-identified weaknesses.

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