

Office of Independent Oversight and Performance Assurance
Office of Security and Safety Performance Assurance
U.S. Department of Energy

Independent Oversight
Emergency Management Inspection
of the

Argonne National
Laboratory - West

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Abbreviations Used in This Report

ANL-W	Argonne National Laboratory - West
ASO	Argonne Site Office
ASO-W	Argonne Site Office - West
BED	Building Emergency Director
CAT	Consequence Assessment Team
CFR	Code of Federal Regulations
CH	Chicago Operations Office
DOE	U.S. Department of Energy
DOT	Department of Transportation
DSA	Documented Safety Analysis
EAL	Emergency Action Level
EAM	Emergency Action Manager
ECC	Emergency Command Center
EMG	Emergency Management Guide
EOC	Emergency Operations Center
EPIP	Emergency Plan Implementing Procedure
EPHA	Emergency Planning Hazards Assessment
EPZ	Emergency Planning Zone
ERAP	Emergency Readiness Assurance Plan
ERG	Emergency Response Guidebook
ERO	Emergency Response Organization
FCF	Fuel Conditioning Facility
IC	Incident Commander
INEEL	Idaho National Engineering and Environmental Laboratory
INL	Idaho National Laboratory
LPSO	Lead Program Secretarial Office
NE-40	NE Office of Nuclear Facilities Management
NE-70	NE Office of Integrated Safety and Project Management
NE	DOE Office of Nuclear Energy, Science, & Technology
NE-ID	Idaho Operations Office
OA	Office of Independent Oversight and Performance Assurance

(Continued on inside back cover.)

OVERSIGHT

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA), within the Office of Security and Safety Performance Assurance, conducted an inspection of the emergency management program at the U.S. Department of Energy (DOE) Argonne National Laboratory - West (ANL-W) site in October 2004. The inspection was performed by the OA Office of Emergency Management Oversight.



Aerial View of ANL-W

The DOE Office of Nuclear Energy, Science and Technology (NE) is the cognizant secretarial office (CSO) for ANL-W. As such, it has overall Headquarters responsibility for programmatic direction, performance accountability, and funding of landlord activities and infrastructure operations, including emergency management. Line management responsibility for operation of the ANL-W site falls under the Argonne Site Office (ASO) through its local site office, Argonne Site Office-West (ASO-W). ASO is responsible for providing emergency management guidance and oversight for ANL-W and reports directly to the DOE Office of Science (SC), which is the lead program secretarial office (LPSO) for ANLW. SC has responsibility for management overview, as well as policy guidance and direction, for the site. Currently the University of Chicago, as prime contractor for ANL-W, has responsibility for operating the ANL-W site and for implementing the site's emergency management program. Coordination of ANLW site management is carried out under the February 2000 Management

Agreement among NE, SC, and DOE Chicago Operations Office (CH).

DOE is in the process of consolidating the management and operation of ANL-W and Idaho National Engineering and Environmental Laboratory (INEEL) under one contract, and plans to issue a separate contract for environmental remediation under the Idaho Cleanup Project. Under an ongoing Idaho Operations Office (NE-ID) solicitation, with the award of the management and operating contract expected early in calendar year 2005, ANL-W will be consolidated with other facilities, missions, and programs at INEEL to form the Idaho National Laboratory (INL). The mission of the INL will be to become a preeminent, internationally recognized nuclear research, development, and demonstration laboratory and a center for national security technology development and demonstration. The management and operating contractor for INL will have responsibility for the entire site emergency management program, including the current ANL-W site. NE is currently the LPSO for INEEL and will remain the LPSO after the formation of INL (which will include the former ANL-W). When ASO-W fully transitions into the NE-ID organization and when the new management and operating contract is in place, ASO and SC will no longer have line management responsibilities for ANL-W. As CSO until contract transition and as LPSO after transition, NE will be responsible for review and approval of the corrective action plan for this inspection.

The ANL-W site is physically located on the INEEL reservation, which is under the line management of the NE-ID. Because the ANL-W facility is located on property that is under NE-ID direction, the ANL-W emergency management program is implemented and maintained with direction from both NE-ID and ASO. Several agreements detailing emergency response arrangements between the various entities (ANL-W, ASO-W, ASO, CH, INEEL, SC, and NE) are in place. By agreement, Bechtel BWXT Idaho, LLC (BBWI), the INEEL prime contractor, provides most of the sitewide emergency-response resources utilized by ANL-W, such as the INEEL

Warning Communications Center, emergency operations center, Joint Information Center, and Fire Department. However, ANL-W provides its own security forces. The INEEL prime contractor is also responsible for establishing and maintaining offsite emergency-response interfaces with the State of Idaho, the counties surrounding INEEL, tribal agencies, and local municipalities. ANL-W participates in an emergency preparedness coordinating committee that involves these parties in coordination of the site's emergency management.

ANL-W supports the National Energy Policy goals by maintaining and operating important facilities required for advanced nuclear energy technology research and development. The site's mission is to lead the development of advanced, sustainable nuclear power systems, and the Advanced Fuel Cycle Initiative is the principal program at the site. This program focuses on developing and demonstrating pyroprocessing separation technologies for treating and reducing spent nuclear fuel and high-level waste. Site missions also include collaboration in the development of the next generation nuclear reactor, storage and treatment of DOE spent fuel, storage of special nuclear material, fuel manufacturing, and waste characterization. Additionally, activities were recently completed to transfer radioisotope power system operations, which support space programs, from the Mound site in Ohio to ANL-W. Significant facilities at ANL-W include the Hot Fuel Examination Facility, Zero Power Physics Reactor, Fuel Conditioning Facility, Fuel Manufacturing Facility, and Sodium Process Facility. The Experimental Breeder Reactor II has been deactivated in a safe condition pending ultimate disposition and remains as a treatment and storage facility under the Resource Conservation and Recovery Act. Activities at the site involve the use of various forms of hazardous radiological and chemical materials.

This evaluation included a review of corrective actions developed and implemented in response to previously identified programmatic weaknesses, and included reviews of hazards survey and assessment documents, the ANL-W emergency plan, and associated sitewide and facility-specific implementing procedures. The inspection focused on emergency planning by ANL-W through examination of the processes for development, review, and approval of hazards surveys and hazards assessments, as well as



Fuel Conditioning Facility

the products themselves. In addition, the processes for the preparation, review, approval, and distribution of program plans and procedures were evaluated. In evaluating the area of emergency response, the inspection team conducted limited-scope exercises with a sample of the site's key emergency response decision-makers to determine their ability to employ the available procedures, data sets, equipment, and skills when responding to postulated emergency conditions.

In the evaluation of emergency management programs, OA is placing more emphasis on DOE line management oversight in ensuring effective emergency management programs, and has been reviewing the role of DOE organizations in providing direction to contractors and conducting line management oversight of the contractor's activities. In reviewing DOE line management oversight at ANL-W, OA concentrated on the effectiveness of ASO in managing ANL-W, including such management functions as setting expectations, providing implementation guidance, monitoring and assessing contractor performance, and monitoring and evaluating laboratory self-assessments.

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

2.0 Results

2.1 Positive Program Attributes

ANL-W has established an emergency management program plan and implementing procedures that support a comprehensive emergency management program commensurate with the hazards present at ANL-W. The emergency management plan documents the ANL-W concept of emergency operations, which is implemented through a set of procedures, including facility-specific and event-specific emergency procedures and position-specific checklists, detailing the actions to be taken by ANL-W personnel during an emergency. Positive attributes of the emergency management program are discussed below.



Preparing Spent Fuel for Safe Disposal (1998)

ANL-W has prepared and implemented a procedure governing the development, review and approval of hazards surveys and assessments. Responding to recommendations of the 2001 OA evaluation, the site completed preparation of an emergency plan implementing procedure (EPIP) to direct and standardize performance of the hazards surveys and assessment. The EPIP includes most attributes required by DOE Order 151.1B as further articulated by the emergency management guide. A strength of the document is its clearly defined roles and responsibilities throughout the ANL-W organization. Since the 2001 OA evaluation, ANL-

W has completed nine hazard survey reports for all fixed facilities, including balance of plant buildings, and updated the emergency preparedness hazards assessment (EPHA) in July 2004. The EPHA provides a good description of the ANL-W site characteristics in the document body, and eight appendices provide descriptions of the hazardous material facilities and their operations.

ANL-W has reduced the risks to workers and the public through conscientious efforts to minimize hazardous materials used and stored on the site. During interviews and facility walkthroughs, facility managers demonstrated good knowledge of their facilities and the associated hazards, giving clear evidence of their active participation in the hazards survey process. Facilities are clean (given their operating status) and generally free of combustible material and other accident initiators. Chemical inventories in facilities, including the site warehouse, are minimal, and effective just-in-time procurement ensures that future inventories will not increase.

ANL-W emergency response personnel in the emergency command center demonstrated adequate knowledge of their roles and responsibilities to protect site workers during day-shift emergencies. During limited scope exercises for events during normal working hours, members of the emergency response organization (ERO) arrived on scene or at the emergency command center (ECC), as appropriate, within minutes of the activation of ERO recall systems. Emergency action managers demonstrated cognizance of their responsibility for performing categorization and classification duties in a timely manner, and were adequately supported by the teamwork of ECC members in making these determinations. The notification specialists were proactive in preparing notification forms, and notifications were timely, accurate, and complete. Decisions and actions taken to protect site workers were implemented early in the events, in order to provide immediate worker protection while the ERO gathered further data for protective action decision making.

2.2 Program Weaknesses and Items Requiring Attention

Although ANL-W has established an emergency management program and implementing procedures, weaknesses were noted in the hazards surveys and assessments and the associated emergency action levels, which are used for event classification and protective action formulation. During the limited scope exercises, weaknesses were observed in the response to emergency events, particularly those occurring during off-normal hours. Finally, concerns with the rigor and effectiveness of the DOE oversight activities were noted. Specific weaknesses are discussed below.

Hazards survey and assessment weaknesses collectively diminish the rigor of the foundation for the ANL-W emergency management program. The hazards surveys do not identify all hazardous materials, and the process for developing the EPHA does not address the evaluation of hazardous materials that do not have Code of Federal Regulations-published screening quantities. Thus, in several instances, hazardous materials stored in significant quantities, including beryllium and uranium, had not been evaluated for their potential toxicological impact on site workers and the public. Although the EPHA has improved since the previous OA inspection, it still does not assess the full spectrum of events that could impact affected populations, address events involving inter- and intra-site transportation activities, analyze barriers to releases, or make the analyses necessary to support use of specific plant indicators for event classification and protective action formulation. The collective impact of these weaknesses is that the technical basis for the ANL-W emergency management program does not have the rigor necessary to ensure the adequacy of the predetermined protective actions and associated event classification tools for all emergencies that may occur at the site.

ANL-W has not effectively implemented the necessary program elements to ensure timely and accurate emergency response during off-normal hours and support decision makers with consequence assessment capabilities. During limited scope exercises, the OA team observed that during the day shift, event categorization and classification decisions and offsite notifications were timely, though not always accurate; however, these actions were not performed by backshift personnel. Backshift emergency action managers were unfamiliar with the tools required to make classification

determinations and notifications when on-call assistance from off site was not immediately available. Immediate actions taken to protect site workers were generally conservative, but follow-up actions to accurately account for personnel and to protect personnel sheltered in place were not fully effective. Weaknesses were observed in the protective actions afforded to emergency responders in half of the scenarios, and were significant for the two backshift scenarios. Weaknesses observed during the backshift exercises resulted in part from difficulties in understanding and implementing the unified command structure during off-normal hours, and resulted in the failure to keep emergency responders protected from the hazards presented in the scenario. Finally, although some actions have been taken to improve the capabilities of the site's consequence assessment teams, consequence assessment team members did not demonstrate the ability to provide a timely initial assessment for use in protective action decision-making.

DOE line management has not fully implemented a readiness assurance program for providing direction and oversight to the ANL-W emergency management program. Although the approved ASO-W emergency management system procedure establishes an appropriate set of roles, responsibilities, and guidance for overseeing the ANL-W emergency management program, NE, ASO, and ASO-W have not developed the implementation mechanisms necessary to ensure that the required activities are appropriately performed. ASO-W involvement in providing oversight and direction for the laboratory program is limited in that emergency management oversight is a collateral duty and the responsible personnel lack experience and technical qualifications in emergency management. Consequently, review and approval of important emergency management program documents, such as the emergency plan, emergency preparedness hazards assessment, and emergency planning zone, have not always been timely or technically rigorous. Assessments of the laboratory and ASO-W emergency management programs have not been performed as required, and performance metrics and incentives are not utilized to encourage program improvements. Finally, while NE, ASO, and ASO-W verification activities ensured that corrective actions in response to the previous OA inspection were completed, their verification activities were not sufficient to ensure that the corrective actions were effective in addressing the identified deficiencies.

3.0 Conclusions

Following the 2001 OA inspection, ANL-W completed a number of activities that improved the site emergency management program. ANL-W developed a formal process to direct the hazards surveys and assessment, and engaged facility management in developing the appropriate documents. Facilities are clean and generally free of combustible material and other accident initiators to the extent possible, and the site has actively reduced hazards through reduction of hazardous material inventories. The site has prepared hazards surveys for categories of facilities with common hazards. The EPHA provides a good description of the ANL-W site characteristics in the document body, and eight appendices provide acceptably detailed descriptions of the hazardous material facilities and their operations. The emergency management program plan and implementing procedures address the analyzed hazards present at ANL-W and provide emergency responders with an integrated set of facility- and event-specific emergency procedures, as well as position-specific checklists. During limited scope exercises for



Hauling a Reactor Fuel Transporter

events during normal working hours, members of the day shift ERO demonstrated effective teamwork in executing categorization, classifications, and notification duties. Emergency action managers were cognizant of their responsibility for performing categorization and classification duties in a timely manner, and were adequately supported by ECC team members in making these determinations. Decisions and actions taken for the protection of site workers were prompt and usually effective, and notifications during the exercises were timely, accurate, and complete.

The most important weaknesses identified during this inspection involve the hazards surveys and assessments, the ability of the backshift ERO to respond to emergency events, and the management and oversight activities of DOE line management through ASO-W. While the site has prepared and implemented a new procedure to perform the hazards surveys and assessment, in many cases the hazards surveys do not identify all site hazards and activities requiring emergency planning attention. Fundamentally, the process for identifying and screening hazardous materials for impact on affected populations is incomplete, and not all facility and activity hazards have been considered. Furthermore, while the EPHA has improved since the previous OA inspection, it still does not assess the full spectrum of events that could impact affected populations, address events involving inter- and intra-site transportation activities, analyze barriers to releases, or make the analyses necessary to support use of specific plant indicators for event classification and protective action formulation. The collective impact of these weaknesses is that the technical basis for the emergency procedures does not rigorously support the predetermined protective actions and associated event classification tools for all emergencies that may occur at the site. Although activities at the site are reduced during the backshift, significant weaknesses were also observed in the ability of the backshift ERO to work effectively together to categorize and classify events, make notifications, and implement effective protective actions, and in the ability of

consequence assessment team members to provide a timely initial assessment for use in protective action decision-making. Finally, NE and ASO involvement in oversight at ANL-W has been limited. Further, ASO-W involvement in providing oversight and direction for the laboratory program is limited by the fact that emergency management oversight is a collateral duty and the responsible personnel lack both experience and technical qualifications in emergency management. Consequently, review and approval of important emergency management program documents, such as the emergency plan and emergency preparedness hazards assessment, have not always been timely or technically rigorous. Assessments of the laboratory and ASO-W emergency management programs have not been performed as required, and performance metrics and incentives are not utilized to provide feedback to the laboratory and encourage program improvements.

Several other weaknesses were identified in the ANL-W emergency management program. The roles and responsibilities of key emergency management responders for command and control, which are described in the program plan, are not adequately implemented by the implementing procedures. During the limited scope exercises, immediate actions to protect site workers were generally appropriate, but followup

actions to accurately account for personnel and ensure protection for personnel sheltered in place were not fully effective. During the day shift, event categorization and classification decisions and offsite notifications were timely, though not always accurate, and weaknesses were also observed in the protective actions afforded to emergency responders.

Immediate management attention is warranted to ensure that the hazardous materials and activities that have not been previously analyzed can be addressed by the discretionary emergency action levels until a comprehensive survey and assessment can be completed. Also, immediate attention is needed to improve the backshift and consequence assessment response capabilities. In addition, sustained line management attention at all organizational levels is warranted to ensure that adequate multidisciplinary resources are assigned for the timely upgrade of the hazards surveys and assessment and that, once completed, those documents are used as the bases for improving the implementing procedures. The development of programmatic corrective actions should be consistent with the anticipated incorporation of ANL-W facilities into the INL emergency management program and concept of operations under the direction of NE-ID.

4.0 Ratings

This inspection focused on a detailed assessment of five key emergency management program elements. No overall program rating has been assigned. The individual element ratings reflect the status of each ANL-W emergency management program element at the time of the inspection. The ratings assigned below to the DOE line program management category are specific to those assessment, corrective action, and performance monitoring mechanisms applicable to the emergency management area.

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

Emergency Planning

Hazards Surveys and Hazard Assessments SIGNIFICANT WEAKNESS
Emergency Plans and ProceduresNEEDS IMPROVEMENT

Emergency Response

Emergency Response Decision-MakingNEEDS IMPROVEMENT
Consequence Assessment SIGNIFICANT WEAKNESS

DOE Line Management Oversight.....SIGNIFICANT WEAKNESS

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APPENDIX A

SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Scoping Visit	September 14-16, 2004
Onsite Inspection Visit	October 12-20, 2004
Report Validation and Closeout	November 2-4, 2004

A.2 Review Team Composition

A.2.1 Management

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

A.2.2 Quality Review Board

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

A.2.3 Review Team

Charles Lewis, Team Leader
Carol Hanlon
Debbie Johnson
David Odland
Tom Rogers
Jesus San Agustin
David Schultz

A.2.4 Administrative Support

Kim Zollinger

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APPENDIX B

SITE-SPECIFIC FINDINGS

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

FINDING STATEMENTS	REFER TO PAGES
1. ANL-W has not ensured that all hazardous materials and activities are identified and referred for quantitative assessment, as appropriate, for potential impact on site workers and the public, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	14
2. ANL-W has not accurately and fully characterized hazardous materials or defined an appropriate spectrum of emergency events and conditions, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	15
3. ANL-W has not performed accurate analyses of event consequences for the correct spectrum of emergency events necessary for emergency response decision-making tools, including barrier failure indicators and predetermined protective actions used in the EALs, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	16
4. The roles and responsibilities of the incident commander established in the ANL-W emergency plan are not accurately implemented in the emergency plan implementing procedures, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	17
5. Mechanisms are not in place to enable prompt event categorization and classification and notifications to offsite authorities during off-normal hours, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	22
6. During limited scope exercises, emergency responders and key decision-makers were not adequately protected and actions implemented to protect workers from postulated hazards were not fully effective, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	23
7. Consequence assessment teams did not demonstrate the ability to provide assessments for postulated events, as required by DOE Order 151.1B, <i>Comprehensive Emergency Management System</i> .	25
8. ASO-W has not ensured that the ANL-W site emergency plan and emergency planning zone have been reviewed and approved, as required by DOE Order 151.1B and ASO-W procedures.	29
9. NE, ASO, and ASO-W have not ensured that the ANL-W site emergency management program has been assessed at least once every three years, nor have they conducted annual internal readiness assurance assessments of their emergency management programs, as required by DOE Order 151.1B and ASO procedures.	29
10. ASO-W has not ensured that the corrective actions resulting from previous assessments have been effectively implemented, as required by DOE Order 151.1B.	30

APPENDIX C

EMERGENCY PLANNING

C.1 Introduction

Emergency planning consists of identifying hazards, threats, and hazard mitigation mechanisms; developing and preparing emergency plans and procedures; and identifying personnel and resources needed to ensure an effective emergency response. Key elements of emergency planning include developing a hazards survey and emergency preparedness hazards assessment (EPHA) 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, U.S. Department of Energy (DOE) and National Nuclear Security Administration sites and facilities must establish an emergency management program that is commensurate with the identified hazards. The emergency management plan defines and conveys the management philosophy, organizational structure, administrative controls, decision-making authorities, and resources necessary to maintain the site's comprehensive emergency management program. Specific implementing procedures are then developed that conform to the plan and provide the necessary detail, including decision-making thresholds, for effectively executing the response to an emergency, regardless of its magnitude. These plans and procedures must be closely coordinated and integrated with offsite authorities that support the response effort and receive DOE emergency response recommendations.

This evaluation included a review of corrective actions developed and implemented by Argonne National Laboratory – West (ANL-W) in response to previously identified planning document weaknesses, and included reviews of hazards survey and assessment documents, the ANL-W emergency plan, and associated sitewide and facility-specific implementing procedures. The review focused on the guidance provided to initial decision makers in the areas of event categorization and classification, event notification, and protective action formulation. The Office of Independent Oversight and Performance Assurance (OA) inspection team conducted facility walkdowns to verify hazards survey and EPHA data and assumptions, and reviewed the development process for potential indicators for emergency action level (EAL)

development, predetermined protective actions, and the EPZ. The team also reviewed the emergency management plan and procedures that describe the strategy and implementing processes for the emergency management program at the site.

C.2 Status and Results

C.2.1 Hazards Surveys and Hazards Assessments

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

The May 2001 OA evaluation determined that stand-alone hazards surveys were not prepared, appropriate materials at risk were not identified, potential barrier failures and indicators of barrier failure were not identified, and the full spectrum of accident initiators was not evaluated to determine event consequences. The facility boundary definition was incorrectly determined, and predetermined protective actions were not developed. Since that evaluation, ANL-W has developed a procedure for performing surveys and assessments, completed nine hazards survey reports for all fixed facilities (including balance of plant buildings), and updated the EPHA in July 2004. Each document type exhibits positive attributes; however, weaknesses in the hazardous material identification and screening process, the spectrum of events considered, aspects of the consequence assessment, and incomplete analysis to determine output products detract from the adequacy and effectiveness of the surveys and EPHA as emergency planning and response tools. These weaknesses adversely impact other elements of the emergency management program.

Responding to recommendations of the 2001 evaluation, the site prepared an emergency plan implementing procedure (EPIP) to direct and standardize performance of the hazards surveys and assessment. The EPIP includes most attributes required by DOE Order 151.1B as further articulated by the emergency management guide (EMG). A strength of the document is its clearly defined roles and responsibilities throughout the ANL-W organization. Facility management is required to identify and quantify hazardous materials, using facility survey forms, and the consequence assessment team (CAT) leader qualitatively screens materials according to standardized checklists and performs assessments of those materials not screened. The CAT leader prepares the survey and assessment documents, including EALs and the EPZ, and coordinates review and approval by facility managers and the deputy associate laboratory director for ANL-W. Completed hazards survey and EPHA documents are submitted to Argonne Site Office – West for approval. Although the EPIP requires facility managers to notify the emergency management coordinator of significant changes in hazardous material inventories and changes in facility operations that affect the EPHA, institutional mechanisms are not in effect to ensure that the emergency management coordinator is notified of such changes. Three other concerns regarding the implementing procedure are that it:

- Does not require a hazards survey summary of the planning and preparedness requirements, such as facility safety and worker protection programs, that apply to the facility (as required by DOE Order 151.1B)
- Does not require assessment of hazardous materials that lack Code of Federal Regulations (CFR)-published threshold planning quantities (TPQs)
- Directs the use of 200 meters as a facility boundary if no other physical boundary exists.

The latter two concerns are further addressed below.

To determine the effectiveness of the hazardous material identification and screening process, the OA team performed walkdowns of multiple facilities under the cognizance of several different associate laboratory directors. Facility managers demonstrated good knowledge of their facilities and the hazards therein,

giving clear evidence of their active participation in the survey process. Facilities were clean (given the operational status) and generally free of combustible material and other accident initiators. Chemical inventories in facilities, including the site warehouse, were minimal, and effective just-in-time procurement ensures that future inventories will not increase.

However, during the facility walkdowns the OA team noted several examples of hazardous materials that were not assessed, for several different reasons:

- A facility survey did not identify two large containers of hazardous material (sodium-potassium eutectic solution) that exceeded CFR-published TPQs and therefore required further assessment.
- Because the material was considered a “common hazardous material,” a facility survey improperly screened hazardous compressed gas (nitrous oxide) in quantities exceeding TPQs, which therefore required further assessment.
- The hazards survey does not identify the toxicological properties of large quantities of depleted/low enriched uranium located in several areas of the site. Although the survey checklist specifically addresses such toxicity issues, the hazards survey did not retain the material for further assessment in the EPHA.
- Although beryllium was identified on a facility checklist as a hazard, the hazards survey screened out large quantities of beryllium because the material does not have a published TPQ. This screening was consistent with the site EPIP discussed above; however, the screening was inconsistent with expectations in DOE Order 151.1B and the accompanying EMG—i.e., that EPHAs be developed for all materials that may pose a serious threat to affected populations so that the appropriate response plans and procedures can be developed. The OA team performed dispersion modeling and determined that an energetic release of modest quantities of beryllium would result in a classifiable emergency due to its significant toxicity.
- Although frequent inter- and intra-site moves of radiological hazardous materials are made, a hazards survey has not been performed for transportation activities, and events related to specific transportation activities are not addressed

in the EPHA. The OA team determined that a routine shipment of expended reactor fuel in a container not approved by the Department of Transportation, which was performed during the period of this inspection, contained more than one isotope in quantities exceeding the applicable TPQ by more than an order of magnitude, and therefore required a hazards assessment.

- Although Office of Safeguards Transportation (OST) shipments are conducted on site, coordination between ANL-W and the OST has not been performed to ensure that OST's emergency event decision-making tools are available to ANL-W decision makers, nor has ANL-W independently assessed the hazards associated with the OST shipments. Since OST shipments to ANL-W exceed radiological TPQs, hazards assessment is required.

Collectively, these weaknesses prevent the hazards surveys from functioning as effective emergency planning and response tools, and as a result, potential events involving the materials were not identified and retained for further assessment. Consequently, event-specific decision making tools are not available to support decision makers in case of an emergency involving these hazards or activities.

Finding #1: ANL-W has not ensured that all hazardous materials and activities are identified and referred for quantitative assessment, as appropriate, for potential impact on site workers and the public, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

Hazards that are not screened out in the initial screening process are analyzed to determine the consequences of their release on affected populations. The EPHA provides a good description of the ANL-W site characteristics in the document body, and eight appendices provide acceptably detailed descriptions of the hazardous material facilities and their operations that comprise the site. However, some initial EPHA activities were inconsistent with the site EPIP for preparation of surveys and assessment and DOE expectations, and constitute weaknesses that impact the effectiveness of the EPHA as a planning tool. For example, the "site boundary" for differentiating between Site Area and General Emergency severity is correctly defined as 5000 meters, the Idaho National Engineering and Environmental Laboratory (INEEL) site boundary.

However, for each of the eight facilities, the "facility boundary" is defined in the EPHA as 200 meters, with no technical justification for the defined value. In several cases, this results in the facility boundary extending beyond the ANL-W physical boundary onto INEEL-controlled property, and in other cases, it extends well into other facility areas not under common management and with different programmatic missions. DOE Order 151.1B requires declaration of a Site Area Emergency (SAE) when consequences from an event are expected to exceed the protective action criteria (PAC) beyond the defined facility boundary. The EMG recommends that the facility boundary be not less than 100 meters and not greater than 200 meters, and provides additional criteria for selecting a final value. The rationale for this recommendation is twofold: it ensures that the relationship between emergency class and event consequences is reasonably consistent across the DOE complex, and it differentiates between events that have local impacts (Alerts) and those that have sitewide impacts (SAEs). Although the EPHA bases the event classification of Alert or SAE on the applicable PAC, it determines the consequences for each of the analyzed materials and accidents at the defined 200 meters distance; that is, if PACs are not exceeded at 200 meters, then the event is determined to be of Alert severity. As a result, the ANL-W criterion for classification of events and resulting protective actions does not correctly differentiate those events that have individual facility impacts from those with ANL-W sitewide impacts and those with impacts beyond the ANL-W physical boundary.

Hazards screening in the EPHA has also not always been performed correctly. For example, radiological materials handled in Building 792A exceed the applicable TPQ; however, the EPHA relies on the facility documented safety analysis (DSA) conclusion that there is no potential for release of the material, and therefore concludes with no further justification that an EPHA quantitative assessment is not required. Consequences of events with greater severity, but less probability, than accident scenarios analyzed in the DSA are required to be assessed in the EPHA. In addition, the conclusions arrived at by the facility vulnerability assessment (VA), which has not yet been approved by DOE, are inconsistent with those in the DSA. The VA analysis conclusions require additional quantitative assessment; however, the divergent conclusions between the DSA and VA have not been resolved and documented in the EPHA.

Another EPHA weakness is that most hazardous materials are not adequately described and quantified

to support development of scenarios and analyses of possible releases. Such characteristics as material-at-risk quantities, conditions of storage, physical form, and engineered and administrative controls are not documented. Thus, potential emergency events affecting the material can not be readily determined, and “non-mechanistic” events, such as fire or spill, are used as the sole descriptors for the scenarios that are assessed. These weaknesses impact the adequacy of output products (e.g., EALs) in the EPHA, as discussed below.

Finding #2: ANL-W has not accurately and fully characterized hazardous materials or defined an appropriate spectrum of emergency events and conditions, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

Once hazards are identified and characterized, combinations of events and conditions that could cause the release of each material are analyzed as part of the assessment process. Because the EPHA does not identify and document events covering the full range of possible initiators and severity levels, the effects of traditional accident initiators, such as corrosion, malfunctioning equipment or control systems, and procedural or human error, are not analyzed. External causes, such as impacts of natural phenomena, accidents at adjacent facilities, and vehicle or aircraft crashes, are not analyzed, nor are the additive effects of moderate and extreme malevolency to potential facility events considered. An OA team evaluation of events initiated by transportation accidents or malevolent acts indicated the potential for consequences greater than those analyzed in the current EPHA.

Of significance to development of emergency response tools is the identification of barriers to hazardous material release and the instrumentation available to indicate barrier integrity, and the establishment of thresholds for operator use in the EALs. The EPHA does not identify either barriers to the release of hazardous materials or instrument indicators (e.g., temperature, pressure, radiation levels) that may be used with the EALs to facilitate accurate classification and protective action formulation. The EPHA consequence results and the categorization and classification procedure’s EAL tables cannot be readily correlated. Although instrument indicators are included in some EAL tables, no technical basis for the accuracy

of the indicator value as a measure of event severity is provided.

In analyzing the potential consequences to site workers and the public, the EPHA analyses calculated and tabularized the results of potential hazardous material releases using both neutral (D stability) and moderately stable or severe (F stability) meteorology. However, the stability classes for analyzed fires were not adjusted to assure that worst-case consequences are included in EPHA results. Other release assumptions used in the dispersion analysis are not always documented to permit reconstruction by CATs during an event. Other important data, such as the elapsed time until plume arrival at the receptor of interest, duration of the release, and footprint of the event consequence for use in protective action determinations, are not documented. Incorrect, non-conservative protective action criteria based on 1995 data from another site were used for sodium fires at several facilities, rather than current published data available from the DOE Subcommittee on Consequence Assessment and Protective Actions (SCAPA). Distances at which PACs are exceeded may increase significantly upon reanalysis. Finally, protective actions based on event-specific criteria, such as type of release (short or long term), weather conditions (clear or snowing), and building integrity against air intrusion, are not evaluated and documented in the EPHA.

These weaknesses prevent the EPHA from being an effective planning tool for the preparation of EALs and predetermined protective actions. EPHA analysis results were not used as the basis for determining the relative benefits of shelter-in-place rather than evacuation for use in the EALs and EPIPs, although evacuation may not always be the most effective protective action except in the immediate area (e.g., isolation zone) of the event. For example, in the EAL tables, all Alert classifications require evacuation of the affected facility “and evacuate or shelter personnel in the immediate area downwind of the building” but include no further event-specific criteria, and all SAE classifications require the same action with the addition of a “Site Take Cover” alarm, but include no further event-specific criteria. Collectively, these weaknesses result in EAL tables that do not include integrated, event-specific, predetermined protective action orders and recommendations. EAL tables are discussed further Section C.2.2.

Finding #3: ANL-W has not performed accurate analyses of event consequences for the correct spectrum of emergency events necessary for emergency response decision-making tools, including barrier failure indicators and predetermined protective actions used in the EALs, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

The EPHA determined a conservative emergency planning zone (EPZ) of 2000 meters for facility events as analyzed. The EPZ may require adjustment after revised consequence assessment is performed using corrected input data and analysis of events not previously considered.

In summary, ANL-W has developed a formal process to direct the hazards surveys and assessment, and has engaged facility management in developing the appropriate documents. Given their operating status, facilities are clean and generally free of combustible material and other accident initiators, and the site has actively reduced hazards through reduction of hazardous material inventories. The site has prepared hazards surveys for categories of facilities with common hazards and qualitatively identified generic emergency conditions that apply. However, in many cases the surveys do not identify all site hazards and activities requiring emergency planning attention, and the process for identifying and screening hazardous materials for impact on affected populations is incomplete. Furthermore, the EPHA does not clearly identify and assess all emergency events, characterize hazards, evaluate potential barrier failures, or make the analyses necessary to support use of specific plant indicators to facilitate accurate and prompt event classification. Because protective actions have not been developed based on event-specific criteria, assessment conclusions are not available for establishing emergency response decision making tools and procedures. Many of these weaknesses were observed during the previous OA inspection. The result of these weaknesses is that the technical basis for the ANL-W emergency management program lacks the rigor necessary to ensure the adequacy of predetermined protective actions and associated event classification tools for all emergencies that may occur at the site.

C.2.2 Emergency Plans and Procedures

The ANL-W emergency management plan and implementing procedures support a comprehensive

emergency management program commensurate with the analyzed hazards present at ANL-W and consistent with a graded approach. The emergency management plan documents the ANL-W concept of emergency operations that is implemented through a set of procedures, including facility-specific and event-specific emergency procedures and position-specific checklists, which provide detailed actions to be taken by ANL-W personnel during an emergency. In accordance with the emergency plan, ANL-W and INEEL operate under an integrated response to emergencies at the ANL-W site. INEEL provides ANL-W with emergency response support, including a multi-faceted emergency communications system providing rapid initial notification and callout to ANL-W and INEEL emergency response organizations, as well as to local and state agencies and DOE Headquarters. Additionally, the emergency plan and supporting procedures address the topical areas discussed in DOE Order 151.1B and the associated emergency management guide.

The ANL-W emergency plan appropriately establishes a graded response to events in which the level of response increases as the event significance increases from an event affecting a single facility with a single problem to an event involving multiple facilities and/or multiple problems. Under this strategy, an on scene commander (OSC), as incident commander (IC), establishes unified command at the affected facility and is supported by the building emergency director (BED), senior fire officer, and security officer in charge (OIC). As the severity of the event escalates, the emergency command center (ECC) may be activated and incident command passed to the emergency action manager (EAM). The emergency plan indicates that at the initial stages of the response, the IC is responsible for categorization, classification, protective actions, and notifications. The inspection team observed a number of weaknesses in the implementation of this command and control plan. For example:

- While the emergency plan assigns the IC responsibility for categorizing and classifying the emergency event and ensuring that offsite notifications are made, the position-specific EPIP for the OSC (the initial IC) does not include instructions for event categorization and classification decisions and offsite notifications.
- While the security OIC is designated as the IC for security events, the position-specific EPIP does not

provide instructions for categorization and classification decisions and offsite notifications.

- The BED’s position-specific EPIP indicates that the BED is the IC initially, without providing instructions for event categorization and classification or notifications.
- Only the EAM has the responsibilities for event categorization and classification decisions and offsite notification in both the plan and the position-specific checklist procedure.
- The security event EPIP is written from the perspective that the EAM, rather than the security OIC, is the IC.

Finding #4: The roles and responsibilities of the incident commander established in the ANL-W emergency plan are not accurately implemented in the emergency plan implementing procedures, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

These weaknesses may have contributed to some of the performance weaknesses that were observed during the limited scope exercises, which are discussed in Appendix D.

The EPIPs generally reflect the integration of facility response into the overall site response. Once the decision has been made to activate the ECC and establish the EAM as the IC, coordination of responsibilities for decision-making and response actions, such as for categorization, classification, notifications, and protective actions, is clearly established by the procedures and understood by emergency response organization personnel. Emergency response organization personnel, both on scene and in the ECC, are provided with position-specific checklists that are comprehensive and user friendly, as well as with event-specific response procedures that govern the response to specific hazards. ANL-W has implemented effective procedures and processes for notifying facility workers of the need to take protective actions, such as sheltering or evacuation. However, ANL-W has not developed a specific procedure governing the process for achieving accurate accountability for facility and site personnel (see further discussion in Appendix D).

While the EALs contained in the event categorization and classification EPIP include several positive attributes, a number of weaknesses in the EALs

were identified. Each EAL contains a description of the initiating event, together with the confirming conditions and protective actions. A number of EALs are symptom based, facilitating prompt classification without the need to determine the event initiators; for a number of facilities, installed instrumentation is used to determine EAL thresholds, thus minimizing the need for additional interpretation or investigation in order to classify events. Weaknesses identified in the EALs during the OA inspection include:

- Separate events in the Fuel Conditioning Facility with the same stack release indications result in different emergency classifications, one an Alert and the other an SAE, with no apparent analysis or explanation for the difference.
- EAL thresholds using installed instrumentation appear to have been determined based upon the facility safety analysis rather than the hazards assessment analysis, and thus are not correlated to the specified classification or protective actions.
- EAL tables lack the specificity necessary to rapidly determine and implement the protective actions; for example, direction may be given to “evacuate or shelter downwind” without specifying how to differentiate between sheltering and evacuating, or the distance or sectors that should be considered.

The EAL tables and event-based EPIPs provide emergency managers with wide discretion for implementing protective actions for workers. However, the lack of specificity regarding protective actions may result in broad application of protective actions, such as site evacuation, when a more specific “take cover” action would be appropriate, as discussed in Section C.2.1 and addressed in Finding #3 above.

Following event categorization and classification, the emergency notification process, implemented by the ECC notification specialist using a position-specific EPIP, was found to be effective, timely, and consistent with the requirements of the DOE order. The notification specialist assists the EAM in preparing the required notification form and is responsible for orally contacting and transmitting the approved INEEL notification form to the warning communications center, which in turn provides the required notice to the emergency operations organizations, site and facility personnel, and designated offsite agencies.

ANL-W has established an effective, formal document control process for managing and tracking the distribution and maintenance of individually issued copies of controlled emergency management plans and implementing procedures and checklists. Under the ANL-W document management system, the ANL-W procedures group is responsible for managing, controlling, and tracking the distribution of the controlled copies to all users and designated custodians for immediate incorporation into the controlled document set when the document becomes effective. Review of several emergency response organization-controlled copy sets found them to be the same as the original set.

To summarize, ANL-W has established an emergency management program plan and implementing procedures that address the analyzed hazards present at ANL-W. Emergency responders are supported by an integrated set of facility- and event-specific emergency procedures, as well as position-specific checklists. However, differences between the roles and responsibilities described in the plan and those implemented in the EIPs can result in difficulties in command and control during emergency events. Additionally, weaknesses were observed in the EAL tables, including the lack of connectivity between the analyzed hazards and the symptoms and the recommended protective actions in the tables.

C.3 Conclusions

ANL-W has developed and implemented a formal process to direct the hazards surveys and assessment, and has engaged facility management in developing the appropriate documents. Additionally, ANL-W has established an emergency management program plan and implementing procedures that provide emergency responders with an integrated set of facility- and event-specific emergency procedures, as well as position-specific checklists. The site has actively reduced hazards through the reduction of hazardous material inventories, and to the extent practicable, facilities are clean and generally free of combustible material and other accident initiators. Although the site has prepared an integrated emergency management plan and procedures, differences between the roles and responsibilities described in the plan and those implemented in the EIPs can result in difficulties in command and control during emergency events, such as those observed during the limited scope exercises. Additionally, weaknesses in the analytical foundation

of the response procedures were identified. ANL-W has completed nine hazards survey reports and updated the EPHA; however, in many cases the hazards surveys do not identify and consider all the hazards and activities that require emergency planning attention. Furthermore, the EPHA does not characterize hazards, clearly identify and assess all emergency events, evaluate potential barrier failures, or make the analyses necessary to support use of specific plant indicators to facilitate accurate and prompt event response. Weaknesses observed in the procedural EAL tables result from making categorization and classification decisions based on monitoring barrier failures using setpoints established in the documented safety analyses, rather than analyses associated with the EPHA events. Also, rather than providing specific protective actions based on analyses of events in the EPHA, the EALs contain generic protective actions, such as “shelter or evacuate downwind,” with no guidance on how to choose between these actions. The collective impact of the weaknesses in the technical basis for the program is that emergency management decision-makers do not have a comprehensive and definitive set of emergency decision-making tools and procedures.

C.4 Ratings

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

A rating of NEEDS IMPROVEMENT is assigned to the area of emergency 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 DOE and laboratory line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Argonne Site Operations - West

- Consider establishing a process for the timely review and approval of documentation to establish the EPZ, emergency plan, and emergency readiness assurance plan (ERAP).

- Establish clear requirements for technical reviews and approvals and develop a protocol for reviewing the EPHA to ensure that ANL-W facility managers, Facility Representatives, and the appropriate technical disciplines, such as safety and security analysis experts, support the review.
- Define a timeframe, included in the ANL-W annual ERAP submittal, for completing the reviews and approval.
- Consider addressing issues related to the response to onsite events involving OST shipments through formal correspondence from senior line management to provide the visibility and accountability necessary to facilitate timely resolution.

Argonne National Laboratory – West

- Improve the hazards survey and assessment development and maintenance process by incorporating survey activities and providing additional specificity to the survey and assessment development procedure (EPIP 1.6). Specific actions to consider include:
 - Perform a detailed review of the survey and assessment related sections of DOE Guide 151.1-1, *Emergency Management Guide*, to identify provisions that should be incorporated into the EPHA development process (e.g., perform qualitative screening of accurate facility inventories and include results in the hazards survey).
 - Document the hazardous material identification and screening process employed at ANL-W. For materials that are not screened, fully characterize the hazards in the EPHA to ensure that a technical basis is available for preparing response tools.
 - Establish institutional mechanisms to assure that facility managers notify the emergency management coordinator of changes in facility hazardous material inventory or processing that may trigger additional survey and/or assessment activities.

- Ensure multi-disciplinary membership on the hazards survey/assessment development team, and facility manager involvement and approval in the survey and assessment document development process.
- Enhance the quality of the facility hazards surveys and site EPHA by including additional details and assumptions. Specific actions to consider include:
 - Include transportation activities in the facility hazards surveys, and include assessment documentation in a transportation EPHA for movement of radioactive materials on the site.
 - Include all attributes required by DOE Order 151.1B, along with references to hazardous material database inventories, in hazards surveys.
 - Compute “surrogate” TPQs (i.e., the amount of hazardous material required to exceed PACs at critical receptors) for materials of concern that do not have CFR-published values, and include these values in applicable site procedures.
 - Fully document the hazardous materials screened in hazards surveys and assessments.
 - Analyze a more complete spectrum of emergency events and conditions to address the weaknesses in hazards screening and analysis discussed above. Clearly correlate event initiators with barrier failure analysis to ensure that the full spectrum of events is addressed. Provide additional consequence analysis results to ensure that a technical basis for preparing protective actions is available and considered.
 - Enhance the site vulnerability documents by including the effects of malevolent acts that involve hazardous materials contained in facilities or transported on site.
- Enhance the EALs and integrate them with the implementing procedures to make them a more effective emergency response tool. Specific actions to consider include:

- Ensure that each EAL is technically supported by the hazards assessment.
 - Develop recommended EALs, together with integrated, fully defined protective actions, as output products of the hazards assessment.
 - Fully integrate EALs with EIPs to alert facility operations personnel to the existence of classifiable emergencies upon reaching certain plant conditions defined by emergency operating procedures.
- Conduct performance testing to validate EALs. Ensure that EALs and corresponding protective action tables are used consistently and as written by trained personnel in a manner that will efficiently accomplish the desired actions in a high-stress, time-urgent environment.

APPENDIX D

EMERGENCY RESPONSE

D.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 properly execute actions to protect emergency responders, workers, and the public. Critical elements of the initial response include the categorization and classification of the emergency, formulation of protective actions, and notifications to onsite personnel and offsite authorities. Concurrent response actions include reentry and rescue, provision of medical care, and ongoing assessment of event consequences using additional data and/or field monitoring results.

Most of the information provided in this section is based on observations from six limited scope exercises conducted by the Office of Independent Oversight and Performance Assurance (OA). Three scenarios were developed and each scenario was administered to two different teams composed of players in identical positions. Collectively, the players included emergency action managers (EAMs), building emergency directors (BEDs), on scene commanders (OSCs), Argonne National Laboratory – West (ANL-W) security officers in charge (OICs), Idaho National Engineering and Environmental Laboratory’s (INEEL) Station 2 fire captains, some ANL-W emergency command center (ECC) staff positions (operations manager, ECC planning managers, notification specialist, communicator), and health physics personnel. The exercises presented three operational emergency scenarios to the participants: a malevolent act with a potential for a bomb explosion and release of radioactive material; an earthquake with resultant facility fire that produces a release of radioactive material; and a hazardous material spill. The scenarios, which were developed by OA in conjunction with ANL-W trusted agents, were presented to the participants by the ANL-W trusted agents, who also acted as the balance-of-plant personnel to ensure scenario validity and delivery of accurate event cues.

D.2 Status and Results

The ANL-W emergency response strategies are implemented at three locations: the facility, the scene, and the EAM’s location—the ECC on day shift and the Fuel Conditioning Facility (FCF) control room during off-normal hours. Additional resources are available through the INEEL emergency operations center (EOC), where the key interface point is between the EAM (and support staff) and INEEL’s warning communications center (WCC). The site’s emergency response resources, which are commensurate with hazardous operations, are reduced during off-normal hours. ANL-W has its own security force and an INEEL fire station within the ANL-W fence line. ANL-W command positions include the EAM, OSC, security OIC, and fire captain, any of whom may be the incident commander (IC) depending on the type of event and effectiveness of the evolving command structure. During off-normal hours, the FCF facility area supervisor is the backshift EAM and the fire captain is the OSC. In accordance with emergency program implementing procedures, event categorization and classification decisions and notifications to offsite authorities are the responsibility of the EAM.

D.2.1 Emergency Response Decision-Making

ERO Activation

The ANL-W emergency response organization (ERO) activation process is effective in recalling site ERO personnel in a complete and timely manner. During the exercises, the dial 13 process and the “all call” announcement over the public address system recalled necessary ERO personnel including security, fire department, OSC, and ECC staff. Calls to the WCC were initiated by EAM instructions to ECC notification specialists. During an actual emergency, these calls would result in notifications to the INEEL duty officer and then to the emergency director, and

would activate the INEEL EOC and Central Facilities Area ECC, if determined to be necessary by INEEL personnel, and initiate actions to obtain offsite assets as established through DOE/INEEL agreements. However, EAMs did not fully understand this notification and activation process.

Categorization, Classification, and Notification

Timely categorization and classification capability is available during normal working hours when the ECC is activated. EAMs were cognizant of their responsibility for performing categorization and classification duties in a timely manner and the methods, using emergency action levels (EALs), for making these determinations. Although categorization and classification declarations made during the exercises were timely (within 20 minutes of EAMs' arrival at the ECC), they were not always accurate. In one case, an EAM assigned categorization and classification duties to ECC staff members, who used an incorrect EAL. Here, the EAM did not review the EAL selection for applicability and threshold conditions. This resulted in misinformation reported on the notification form regarding the event type and the event classification. In this case, an Alert classification was made when the conditions for a Site Area Emergency were met for the EAL developed for the scenario event. In another scenario, the EAM decided to apply a discretionary EAL, determined the event to be a non-classifiable operational emergency, and then decided a site evacuation was warranted to protect site workers. When questioned after termination of the scenario, the EAM did not understand the dichotomy between the categorization/classification decision and the protective actions ordered.

The backshift EAMs, who are located in the FCF and physically separated from the ECC, were aware of categorization and classification decision requirements and had site EALs at their workstations, but did not attempt to use them for decision-making. Backshift EAMs attempted to call the on-call EAMs, who are day shift workers, to perform this function, as stated in the implementing procedures. When backshift EAMs could not contact on-call personnel, due to exercise controls, they did not make categorization and classification decisions themselves. As a result, offsite authorities were not notified of the event. And, when the WCC was contacted by the backshift EAM for an offsite asset request, the WCC was not presented with

either a request to actuate the EOC or an operational emergency and severity level that would initiate INEEL actions to actuate the EOC.

An effective notification process is implemented during normal working hours from the ECC. Notifications during exercises were timely, accurate, and complete when performed by ECC staff. The notification specialists were proactive in preparing notification forms and soliciting input from ECC staff members. The EAMs performed appropriate reviews and approvals before they were transmitted to the WCC. Notification forms accurately reflected the decisional information made by the ECC and were ready for transmission in a timely manner. Initial and update notification forms were prepared as event conditions changed, and ECC personnel demonstrated they were familiar with hourly updates required by site procedures.

However, the backshift EAMs did not perform the required event categorization and classification duties, and no follow-on actions were taken to perform the required notifications. Additionally, the backshift EAMs did not attempt to gather information similar to that required by the site notification form in anticipation of making notifications. The backshift EAMs had no notification forms or other guidance documents that might have been helpful in gathering information expected by recipients. Backshift EAMs did have a list of contact numbers at their workstations that could have been helpful in getting guidance from site managers at home but, in one case, the EAM relocated without taking the contact numbers. This resulted in further notification delays as the EAM performed computer searches for phone numbers from the fire station, and when unsuccessful, requested the WCC to determine the numbers.

Finding # 5: Mechanisms are not in place to enable prompt event categorization and classification and notifications to offsite authorities during off-normal hours, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

Protective Actions

ERO decisions and actions taken for the protection of site workers were prompt and usually effective. "Site Take Cover" sirens and announcements over the site's public address system were implemented early in the exercises to provide immediate worker protection while the ERO was being recalled and gathering data

germane to protective action decision-making. During building evacuations, the EAMs provided workers safe route instructions to minimize exposure to hazards, when applicable. The EAMs also showed concern for personnel accountability, typically performed by building emergency directors, and sometimes by the EAMs, security, and fire personnel. However, the following exercise observations indicate the diminished effectiveness of the processes for performing personnel accountability and implementing protective actions:

- Two EAMs did not have confidence that accurate personnel accountability could be attained without performing a site evacuation, which allows use of the site's access badge reader.
- Although personnel accountability is to be performed by BEDs, not all site buildings have a BED and there is no procedural guidance established for performing accountability.
- There are no established roles and responsibilities or procedures at site buildings to ensure that doors and windows will be closed and ventilation systems will be shut down during shelter-in-place protective actions.
- Some building ventilation systems cannot be secured by occupants; plant services personnel support is required to perform the actions.

Additionally, inconsistent and divergent protective actions were ordered by EAMs for similar events. In the case of a 5500-gallon, uncontained spill of ethanol, the EAM evacuated the immediate area and prohibited, via a public address announcement, smoking/sparking activities on site. In another case, an EAM ordered a site evacuation for a 690-gallon, contained spill of ethanol and indicated in follow-up questioning that site evacuation is the most conservative protective action. In the first case, the actions were performed in accordance with EAL protective actions and are considered commensurate with the hazard. In the second case, the actions were not commensurate with the EAL categorization and were overly conservative.

Responders and key decision makers were not always adequately protected during postulated exercise events. Isolation zone perimeters were not established, were established too close to hazards, were not implemented as ordered, or were not communicated to all members of the unified command. Contributing to

this weakness was a lack of information for determining isolation zones and misjudgment of distances. For example, during a postulated bomb threat scenario, the security OIC did not establish and communicate a standoff distance because the information needed to make this determination was left in the security building that had been evacuated. Hence, no standoff distance was used in positioning the tactical response team or provided to the EAM or OSC (fire department). Later, when the fire captain was selecting a staging area, he requested permission from the EAM to relocate near the event scene. The EAM granted permission to relocate, even though the fire station building was close to the scene and provided an adequate protective barrier for fire and rescue responders. There, the EAM had no means to determine whether the location was far enough from the postulated bomb and did not consult with the OIC. The fire captain then relocated to the staging area that was well within the isolation zone that should have been established. In addition, the OIC positioned four people on the tactical response team within the area where an isolation zone should have been established. Furthermore, once he was repositioned, the OSC used his radio to communicate to the EAM. While the EAM knew that use of radios was prohibited for safety reasons, he did not establish another means of communication to the OSC before allowing the relocation and did not enforce the radio prohibition afterward. In two other scenarios, there were misjudgments in establishing or maintaining isolation zone distance in the field. Although in one case the ECC staff later recognized and corrected the error, security perimeter control personnel, an OIC, and an EAM were unnecessarily placed or permitted to be in harm's way.

Finding #6: During limited scope exercises, emergency responders and key decision-makers were not adequately protected and actions implemented to protect workers from postulated hazards were not fully effective, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

Unified Command

The effectiveness of unified command observed during the exercises was mixed. Two of the four teams that were tested, each consisting of an OSC, BED, EAM, fire captain, and security OIC, executed their emergency response actions in a well-coordinated and timely manner. It was clear who was in charge of the

response, communications were effective in keeping response personnel informed, and adequate protection was provided to workers and responders.

The actions of the remaining unified command teams demonstrated weaknesses in the unified command structure, primarily caused by lack of communications, which resulted in placing responders and decision-makers unnecessarily in harm's way and duplicated efforts in implementing response tasks, particularly during the backshift scenarios. During the scenarios that took place on the backshift, the command structure included the EAM, the fire captain (as OSC), and the security lieutenant (as OIC), who were physically separated when the postulated event occurred and could not co-locate without being within the isolation zone. By site procedures, the event conditions prohibited radio use for communications, and as a result, the exchange of information among command structure personnel deteriorated during the scenario. This resulted in the EAM and security OIC duplicating efforts, such as an EAM obtaining additional security personnel from the state patrol while the OIC was obtaining them from INEEL and more significantly, communicating the implemented protections for response personnel independently. Consequently, during one of the security scenarios, the fire department was permitted to stage in an unsafe zone. In another security scenario, the EAM and OIC broke a "security take cover" condition to co-locate with the OSC in the fire station and establish a command post. In this case, the security OIC thought the EAM was the incident commander when the EAM knew very little related to the ongoing response. Furthermore, the ANL-W emergency plan describes the OIC as the IC for security events. The consequences of these relocations included the loss of offsite contact numbers for the EAM's use and, more significantly, exposed the EAM and OIC to the postulated bomb while en route to the command post, which was well within the isolation zone. Observed difficulties in establishing and implementing an effective unified command may relate to observed plan and procedure weaknesses, as discussed in Section C.2.2 and addressed in Finding #4 above.

To summarize, during limited scope exercises simulating day shift activities, the ANL-W process of activating the ERO was observed to be timely and efficient. Once activated, the ECC team adequately performed their emergency management functions. EAMs were cognizant of their responsibility for performing categorization and classification duties in a timely manner, using the EALs and supported by ECC personnel; they completed categorization and

classification determinations in a timely, though not always accurate, manner. Notifications during day shift were timely, accurate, and complete. The effectiveness of unified command was acceptable, with a clear chain of command and effective communications keeping response personnel informed. ERO decisions and actions taken to protect site workers were prompt and generally effective. However, lack of formal processes or procedures to accomplish personnel accountability and shelter-in-place protective actions could diminish the effectiveness of these actions. Observation of limited scope exercises simulating backshift activities revealed significant weaknesses in performing ERO functions. Backshift EAMs were aware of categorization and classification decision-making requirements and had site EALs and EPIPs available. However, when the on-call EAM was unavailable, the backshift EAMs did not attempt to perform categorization or classification and consequently did not initiate appropriate notifications. Additionally, the actions of the backshift unified command teams demonstrated weaknesses in understanding and implementing the unified command structure, including establishing a clear chain of command and communicating event status and actions. While initial protective actions for site workers were generally adequate, protective actions for responders and key decision-makers were not always adequate during the postulated scenarios. Isolation zone perimeters were not established, were established too close to hazards, were not implemented as ordered, or were not communicated to all members of the unified command.

D.2.2 Consequence Assessment

Since the 2001 OA inspection, ANL-W has taken positive steps in establishing a consequence assessment capability, but has not achieved the capability of developing a timely initial assessment significantly beyond the capability of field responders. A consequence assessment team (CAT) leader and team members have been identified, and a CAT workspace has been established in close proximity to the ECC to facilitate immediate interactions, if needed. The CAT leader is also a part of the ECC staff supporting the EAM. The CAT workspace is equipped with pertinent tools, such as widely used dispersion model programs; ANL-W hazards assessment documents; and protective action criteria references, such as emergency response planning guideline criteria, temporary emergency exposure limits (TEELs), and the Department of

Transportation’s Emergency Response Guidebook (ERG). Nevertheless, some consequence assessment program tools are unavailable or are not useful in obtaining a timely initial assessment. Missing components include consequence assessment procedures, mechanisms to keep TEELs up to date, and sufficient information in the hazards assessment documents. Furthermore, the dispersion model programs have not been preloaded with site source term data to enable a conservative, yet timely initial assessment under current weather conditions until the source term can be refined from factual field data.

CAT members are not proficient in providing timely and accurate consequence assessments. During demonstrations of CAT tasks, team members were not familiar with which dispersion model program to use (one team attempted to use a Flamex program that was inappropriate for the postulated releases), did not understand what assessment data they should develop (total effective dose equivalent contours or ground disposition data), and were not familiar with all the program input fields. When CAT members could not develop assessments using their computer program models, they resorted to the ERG. However, most CAT members were not proficient in using the ERG. With one exception, CAT members did not understand the concept of protective action criteria, did not know the site-specific protective action criteria, and could not interpret consequence assessment output documents. The latter is a critical weakness because during the exercises EAMs were observed to depend on CAT personnel to interpret consequence assessment results in their decision-making.

In short, since the 2001 OA inspection, ANL-W has taken some positive steps to establish a consequence assessment capability, including the designation of a CAT and establishment of a workspace adjacent to the ECC. However, some critical consequence assessment program tools are unavailable or not useful in obtaining a timely initial assessment, and CAT members are not proficient in providing accurate consequence assessments or interpreting results. Consequently, ANL-W has not achieved the capability of developing consequence assessments to support effective decision-making.

Finding #7: Consequence assessment teams did not demonstrate the ability to provide assessments for postulated events, as required by DOE Order 151.1B, *Comprehensive Emergency Management System*.

D.3 Conclusions

During observations of limited scope exercises, ANL-W ERO activation methods were timely and effective in recalling ERO members. Immediate actions to protect site workers were generally appropriate, but follow-up actions to obtain accurate personnel accountability and protect personnel sheltered in place were not fully effective. Event categorization and classification decisions and offsite notifications were timely, though not always accurate, during the day shift, but these actions were not performed by backshift personnel. Weaknesses were observed in the protective actions afforded to emergency responders in half of the scenarios, and were significant for the two backshift scenario teams. These were, in part, caused by weaknesses in implementation of the unified command structure. Although some actions have been taken to improve the capabilities of the site’s CATs, the consequence assessment program is not fully developed, and team members could not provide an assessment for use in protective action decision-making. Overall, site workers were given adequate, though not fully effective, immediate protection actions. Protective actions and support for emergency responders were not always provided, and significant weaknesses were identified in backshift emergency response activities.

D.4 Ratings

A rating of NEEDS IMPROVEMENT is assigned to the area of ANL-W emergency response decision-making.

A rating of SIGNIFICANT WEAKNESS is assigned to the area of ANL-W consequence assessment.

D.5 Opportunities for Improvement

This Independent Oversight review identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible U.S. Department of Energy (DOE) and laboratory line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Argonne National Laboratory – West

- Improve the timeliness and effectiveness of protective actions for responders through consideration of the following recommendations.
 - Provide the explosive standoff distance table, used by security personnel, as an attachment to the bomb-threat emergency plan implementing procedure so that all members of the unified command are familiar with and are provided the guidance in implementing isolation zones for events of this type.
 - During drills and exercises, encourage early use of strategic response planning maps when establishing perimeter controls, staging areas, and command posts. Mark positions on the map and evaluate them for distance to hazards, orientation with respect to wind direction, and consideration for elevation and protective barrier structures.
 - Ensure that users of strategic response planning maps are familiar with map scales, particularly where multiple scales are used.
 - Provide more frequent drill opportunities under unified command.
 - Develop a unified command procedure to clearly establish roles and responsibilities within the command structure. Identify conditions that dictate the appropriate incident commander assignment.
- Consider the following when improving the consequence assessment capability and effectiveness.
 - Develop consequence assessment procedures to provide a reference for CAT members and to serve as a basis for their training.
 - Provide focused training to CAT members regarding the purpose of team output documents. Specific items should include interpretation of dispersion program output documents, particularly protective action decision-making parameters.
- Drill CAT members frequently enough to attain and maintain proficiency in their dispersion model programs and ERG usage. Ensure that all dispersion model programs are exercised at a frequency to maintain member proficiency equally.
- Drill CAT personnel with ECC staff so that the EAMs understand the capabilities of the CAT and so that the CAT members understand EAM expectations.
- Preload site-specific source term data into the dispersion model programs to enable a timely initial assessment that uses current weather conditions while obtaining other event-specific data to support source term refinement.
- Establish periodic review and updates of protective action criteria references using the Subcommittee on Consequence Assessment and Protective Action (SCAPA) web site.
- Strengthen worker protective actions by enhancing existing processes through consideration of the following actions.
 - Formally establish roles and responsibilities for closing doors and windows and securing ventilation systems in buildings when sheltering in place. Establish a list of buildings where shutdown of ventilation systems is not feasible for occupants, and provide this list in the protective action implementing procedures to aid in shelter-in-place/evacuation decision-making.
 - Develop a personnel accountability procedure. Specifically address roles and responsibilities regarding the accountability of personnel in buildings that do not have an assigned BED, and establish protocols addressing the accountability of transient workers and workers who may be on site after normal working hours.
 - Establish personnel accountability logs, especially for buildings without a BED, to support full and accurate accountability.

- Consider conducting an exercise with INEEL and DOE participation to improve ANL-W decision-makers' understanding of and expectations for a site integrated response. Focus on interactions and roles of the different venues, including the INEEL

WCC and EOC, the Central Facilities Area ECC, and the DOE EOC, in their activation and support in acquiring/providing assets and notification functions.

APPENDIX E

DOE LINE MANAGEMENT OVERSIGHT

E.1 Introduction

U.S. Department of Energy (DOE) Order 151.1B assigns line management oversight, as well as various emergency response roles, to cognizant DOE field and Headquarters elements. Line responsibility for the operation of Argonne National Laboratory-West (ANL-W) falls under the Argonne Site Office (ASO). Within ASO, the Argonne Site Office-West (ASO-W) group, via the ASO-W emergency management coordinator, is responsible for providing emergency management guidance and oversight of the primary contractor, the University of Chicago. ASO reports to Office of Science (SC), which is the lead program secretarial office with responsibility for management overview, as well as policy guidance and direction responsibility for the site. The Office of Nuclear Energy, Science, & Technology (NE) is the cognizant secretarial office and, under a management agreement, has line management responsibility for programmatic direction, performance accountability, funding of landlord activities, and infrastructure operations, including emergency management. The NE Office of Integrated Safety and Project Management (NE-70), through the NE emergency management coordinator, is responsible for monitoring the status of emergency management programs at all NE sites. The NE Office of Nuclear Facilities Management (NE-40) provides line management oversight of ANL-W.

DOE line management oversight includes elements of readiness assurance as well as performance of some planning and response functions. Readiness assurance activities ensure that ANL-W and ASO-W emergency management program plans, procedures, and resources will facilitate an effective response to an emergency at the ANL-W site. Key elements of the readiness assurance program for DOE field elements include active involvement in monitoring program effectiveness for both contractor and DOE responsibilities; timely implementation of corrective actions for identified weaknesses; and incorporation of lessons learned from training, drills, exercises, or actual events. DOE field elements also have direct responsibility for performing some emergency response activities, primarily oversight of the site's emergency response and activities related to the release of emergency public information to site workers and the public.

This inspection examined the processes by which NE, ASO, and ASO-W provide guidance and direction to and maintain operational awareness of the ANL-W site emergency management program. Also evaluated were those functions of emergency management planning and response for which ASO-W is responsible.

E.2 Status and Results

As the representative of the program offices for emergency management program implementation at ANL-W, NE-40 personnel communicate with ASO and ASO-W on a variety of topics, including the emergency readiness assurance plan (ERAP), performance metrics, assessment results, and emergency planning hazard assessments. NE has coordinated the preparation of the annual readiness assurance report with the SC. Documents receive an informal review, but generally no formal comments are provided to the site. NE has been active in ensuring that corrective actions from the previous Office of Independent Oversight and Performance Assurance (OA) inspection are addressed and closed, but NE has not conducted its own verification or validation of the effectiveness of the closure actions. Although NE is in the process of preparing an assessment program for the Idaho Operations Office (NE-ID) and performed an environment, safety and health assessment of ANL-W in June 2001, NE has not performed an assessment of the ASO-W emergency management program within the past three years.

ASO maintains oversight of the emergency management program at ANL-W through discussions and electronic mail with ASO-W, and by receipt and review of the ANL-W documents and reports. In addition, ASO-W and a DOE team evaluated emergency preparedness as part of the startup of a new facility. ASO has provided limited support to ASO-W through review and comment on such documents as the emergency preparedness hazard assessment, and has not conducted an assessment of the emergency management oversight at ASO-W.

Roles and responsibilities for field oversight of the ANL-W emergency management program are clearly delineated in the Argonne Functions, Responsibilities and Authorities Manual. Primary responsibility for

oversight of the ANL-W program is given to ASO-W. As part of the transition to the new Idaho National Laboratory, ASO-W personnel have recently been assigned to NE-ID. Coordination between NE-ID and ASO is serving to ensure that roles and responsibilities for oversight are clear during this transition. Responsibilities within ASO-W are further defined in an ASO-W procedure, which assigns primary responsibility for program oversight to the emergency management coordinator.

The position of ASO-W emergency management coordinator, who is supported by the other facility representatives, is assigned to one of the facility representatives as a minor collateral duty. ASO-W personnel do not have significant experience or training in emergency management, particularly in the area of hazards surveys and assessments, and the availability of support within ASO is limited. ASO-W oversight is accomplished through operational awareness activities conducted by the Facility Representatives, including observation of site emergency drills and review of emergency management program documentation. ASO-W personnel are responsible for review and/or approval of essential emergency management program documents, including the emergency management plan, emergency planning zone, hazards surveys and assessments, the ERAP, and performance metrics.

Quarterly, ANL-W prepares emergency management performance data, which are then reviewed by ASO-W and forwarded to NE. However, the emergency management performance metrics or other methods of performance-based contracting have not been used to address feedback and improvement of the program with the laboratory. ANL-W has prepared ERAPs annually as required, and they have been reviewed by ASO-W and forwarded to the appropriate line managers. ASO-W has received and reviewed the emergency management plan and the emergency planning hazard assessment and provided comments to the laboratory; however, the review and approval process has not always been timely. For example, the ANL-W emergency management plan was completed in May 2002 but was not approved until October 2003. Additionally, no evidence is available to indicate that the emergency preparedness hazard assessment and the emergency planning zone have been approved by the DOE, as required by DOE order and ASO-W procedure. Furthermore, review of the hazards surveys and the emergency preparedness hazard assessment during this inspection indicates that

weaknesses in these activities and documents were not identified during the ASO and ASO-W review (see Appendix C for further discussion).

Finding #8: ASO-W has not ensured that the ANL-W site emergency plan and emergency planning zone have been reviewed and approved, as required by DOE Order 151.1B and ASO-W procedures.

ASO and ASO-W have established the necessary programmatic and procedural processes for conducting assessments of the overall ANL-W emergency management program, including program self-assessments. The ANL-W emergency management plan and supporting administrative procedures establish the responsibility and processes for the performance of laboratory self-assessments, which are scheduled in the ERAP and have been conducted as scheduled. For example, through the self-assessment process, the ANL-W emergency coordinator identified the need and initiated action to improve the public information capability by arranging an INEEL workshop focused on the operation of the Joint Information Center. However, the results of the ANL-W self assessments are not provided to ASO-W for their use in evaluating laboratory performance or adjusting program oversight. DOE procedures assign the responsibility for performing laboratory oversight assessments to ASO-W and provide the framework for scheduling and performing the assessments, as well as tracking any resulting corrective actions. ASO-W has performed limited oversight of the ANL-W emergency preparedness program through observations conducted and documented by the Facility Representatives, but ASO-W has not scheduled or performed the formal assessments of the ANL-W emergency management program necessary to meet the requirements of DOE Order 151.1B. Likewise, ASO-W has not conducted self-assessments of its emergency management program, nor has its emergency management program been the subject of any assessments by ASO, the Chicago Operations Office, or NE.

Finding #9: NE, ASO, and ASO-W have not ensured that the ANL-W site emergency management program has been assessed at least once every three years, nor have they conducted annual internal readiness assurance assessments of their emergency management programs, as required by DOE Order 151.1B and ASO procedures.

The ASO procedure on functional area reviews provides a process for tracking findings and corrective actions, including quarterly status reports, through the laboratory. Team leads are responsible for verifying the status of corrective actions, but the means for verification are not specified. Review of the action items related to the May 2001 OA inspection indicates that the action items have been completed and verified closed by ASO-W and ASO through review of evidentiary documentation. However, this inspection identified several significant weaknesses in the areas addressed by the corrective actions taken in response to the previous OA inspection. For example:

- While procedures and processes have been established, hazards surveys and the emergency preparedness hazards assessment are not complete and accurate.
- While a consequence assessment team leader and consequence assessment teams have been assigned to the emergency response organization, they do not possess the tools or training necessary to effectively perform their assignments.
- While an assessment program has been defined, ASO-W has not conducted the required assessments of the ANL-W emergency program.

Finding #10: ASO-W has not ensured that the corrective actions resulting from previous assessments have been effectively implemented, as required by DOE Order 151.1B.

The roles and responsibilities of ASO-W personnel during an emergency are delineated in an ASO-W procedure and in the ANL-W emergency plan implementing procedures. During an event, the ASO-W team leader and emergency management coordinator report to the emergency communications center to provide oversight of the ANL-W response and maintain communications with DOE line management and Headquarters personnel. ANL-W is in charge of the response to the event, including categorization, classification, notification, and protective actions, and coordinates with the INEEL emergency operations center to implement appropriate actions in response to the event. ANL-W is also responsible for public information, though this responsibility may be delegated to the INEEL Joint Information Center, if activated. By procedure, news releases must be

reviewed by ASO-W personnel. Unlike other DOE sites, however, ASO-W has not defined an operational role for DOE that provides oversight of ANL-W in reviewing and validating the emergency response actions.

E.3 Conclusions

The roles and responsibilities for readiness assurance activities at ANL-W have been established through the functional responsibilities and authorities manuals and the management agreement for the site. ASO has delegated primary responsibility for readiness assurance to ASO-W. ASO and ASO-W have established procedures to govern their oversight activities and their involvement in site emergency response. However, ASO-W involvement in providing oversight and direction for the laboratory program is limited by the fact that emergency management oversight is assigned to a Facility Representative as a collateral duty, and consists primarily of observations of drills by Facility Representatives. Consequently, required assessments of the laboratory and ASO-W emergency management programs have not been performed. While the laboratory has established a basic self-assessment program, completed ANL-W self-assessments are not provided to ASO-W and are not utilized as part of the oversight program. None of the required functional assessments of the laboratory's emergency management program have been performed by NE, ASO, or ASO-W during the last three-year period. As required, ASO-W receives important emergency management program documentation for review and approval, but the responsible ASO-W personnel lack experience and technical qualifications in emergency management. Although ASO-W has received some support from ASO in conducting the required reviews, the review and approval of important emergency management program documents, such as the emergency plan, emergency planning zone, and emergency preparedness hazard assessment, have not been timely or technically rigorous. ANL-W prepares and submits quarterly performance metrics as required, but there is no evidence that these metrics are being utilized for feedback and improvement of the program. Similarly, performance-based contracting incentives have not been utilized to encourage emergency management program improvements. Further, while ASO and ASO-W verification activities have ensured that corrective actions in response to the previous OA inspection are completed, these activities were not

sufficient to ensure that corrective actions were effective in addressing the identified deficiencies. Finally, ASO-W has not defined an operational role for DOE during emergency response that provides active, integrated oversight of ANL-W in reviewing and validating emergency response actions. Overall, the framework for DOE readiness assurance activities is adequately established in procedures and documents. However, the implementation of the required readiness assurance activities has not been effective in providing oversight of or direction to ANL-W.

E.4 Rating

A rating of SIGNIFICANT WEAKNESS is assigned to the area of DOE line management oversight.

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

DOE Office of Nuclear Energy, Science, & Technology

- Consider developing an emergency management program oversight policy statement or program management aid that formally conveys DOE expectations regarding the approach to be used by NE and NE-ID in fulfilling the line management oversight responsibilities for ANL-W facilities and activities assigned by DOE Order 151.1B.
- In coordination with NE-ID and ASO, consider developing a systematic approach and schedule for conducting emergency management program assessments and corrective action verification.

Argonne Site Office - West

- Improve the implementation of the self-assessment program through consideration of the following actions:

- Schedule and conduct annual self-assessments of the ASO-W emergency management program, including all functional areas over an appropriate period.
- Ensure that the laboratory performs the required annual program self-assessments and provides the results to ASO-W.
- Strongly encourage the use of performance-based assessments for both ASO-W and ANL-W assessments.
- Factor the self-assessments into the ERAP and the overall site assessment schedule.
- Consider developing a detailed, resource-loaded assessment plan for completing the required program assessments over the three-year cycle.
 - Identify the assessments needed to address each of the emergency management program functional areas over the three-year cycle.
 - Integrate self-assessments with internal and external assessments and evaluated exercises.
 - Balance the assessment of documents with performance-based assessments of field implementation of the documents.
 - Identify the resources needed to complete the assessment plan. For activities that require outside expertise, identify how that expertise will be obtained.
 - Include the updated assessment plan in the ERAP.
- Consider establishing a process for using performance metrics and performance-based contract incentives in managing of laboratory activities.
 - Identify strategic goals for the laboratory's emergency management program.
 - Develop performance metrics designed to achieve the program's strategic goals.

- Include emergency management performance metrics in the laboratory's contract incentives.
 - Use the performance metrics as one measure of laboratory performance in emergency management, and use these metrics to provide feedback to encourage improvement in the laboratory program.
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- Consider revising the emergency response procedures to integrate ASO-W personnel into the emergency response organization with a more active oversight role in event categorization and classification, notification, and determination of protective actions and protective action recommendations.

Abbreviations Used in This Report (continued)

OIC	Officer in Charge
OSC	On Scene Commander
OST	Office of Safeguards Transportation
PAC	Protective Action Criteria
SAE	Site Area Emergency
SC	DOE Office of Science
SCAPA	Subcommittee on Consequence Assessment and Protective Actions
TEEL	Temporary Emergency Exposure Limit
TPQ	Threshold Planning Quantity
VA	Vulnerability Assessment
WCC	Warning Communications Center