Office of Enterprise Assessments
Lessons Learned from the
2015 Emergency Management Assessments

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Office of Emergency Management Assessments
Office of Environment, Safety and Health Assessments
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Acronyms

CNS	Consolidated Nuclear Security, LLC
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
EAL	Emergency Action Level
EEG	Exercise Evaluation Guide
EM	Office of Environmental Management
EMG	Emergency Management Guide
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
ERO	Emergency Response Organization
HAZMAT	Hazardous Material
IC	Incident Commander
LSPT	Limited-Scope Performance Test
NNSA	National Nuclear Security Administration
PAC	Protective Action Criteria

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EXECUTIVE SUMMARY

The Office of Emergency Management Assessments, within the Office of Enterprise Assessments (EA), evaluates specific areas of interest at U.S. Department of Energy (DOE) facilities. EA based this report on an overview of the seven EA emergency management assessments conducted in 2015, including an analysis of observed conditions against DOE requirements. The report goes beyond compliance reporting to offer lessons learned and recommendations for improving DOE/National Nuclear Security Administration (NNSA) emergency management programs. EA provides this information to help Federal line management understand the current state of DOE's emergency management readiness and to provide contractor personnel with information on lessons learned, recommendations, and best practices for their consideration when evaluating their emergency management programs.

Each DOE site that EA reviewed has established an emergency management program that includes the base program requirements, as well as additional requirements for hazardous materials that could pose a serious threat to workers, the public, or the environment. These programs include a hierarchy of documents containing appropriate management policy statements, standards and requirements, and implementing procedures. At all sites, training programs are in place to provide a foundation to qualify emergency responders. At several sites, emergency response organizations exhibited good command and control of simulated events. The incident commanders established unified command and adequately assessed the scope and magnitude of the emergency, leading to the development and implementation of suitable incident action plans. EA identified two best management practices at the Y-12 National Security Complex that warrant consideration for implementation at other sites. First, the Exercise Builder software program significantly reduces the time needed to prepare drill and exercise packages and after-action reports, while also increasing consistency and improving the overall effectiveness of the drill and exercise program. Second, a site-level drill and exercise committee promotes effectiveness and efficiency in providing input to scenario development, supporting an experienced group of controllers and evaluators familiar with the areas assigned during drills and exercises, and reviewing drill and exercise after-action reports for technical and factual accuracy.

EA also identified several common weaknesses that were developed into lessons learned. Some are similar to those identified in the *EA Lessons Learned for the 2014 Emergency Management Reviews*. Specific lessons learned from the 2015 assessments are in the areas of hazardous materials program technical planning basis, emergency response performance, and emergency preparedness.

Hazardous Materials Program Technical Planning Basis: Some sites' analytical approach to emergency planning hazards assessments led to unrealistic and overly conservative consequence assessments, which in turn led to default protective actions extending well beyond the areas that would actually require action. Some site personnel contended that this conservatism was desirable because it reflected further margins of safety. However, during exercises, overly conservative protection actions caused the implementation of protective actions far beyond the affected areas, resulted in notifications sent to DOE/NNSA Headquarters and offsite authorities that indicated site conditions were more severe than warranted and rendered needed emergency response facilities, evacuation routes, and supporting locations unavailable.

Emergency Response Performance: EA identified three lessons learned related to inadequate responder performance regarding use of tools, consequent assessments, and communication. At some sites,

emergency responders did not use the many available tools or did not demonstrate proficiency in their use. These tools include consequence assessment modeling programs, protective action distance plotting programs, plume model projections, response position checklists, manuals, handbooks, procedures, forms, and information management systems. Some consequence assessment teams did not fully use the available modeling tools, successfully communicate the assessment results, or confirm that the initial protective actions were accurate, appropriate, and conservative. Some sites also did not demonstrate continuous, effective, and accurate communications and use of information management tools among response components, causing inadequate situational awareness among the site, DOE/NNSA Headquarters, and offsite organizations. Responders missed opportunities to improve proficiency, acquire information, understand consequences, and perform the tasks needed to effectively protect people and mitigate event consequences. Further, emergency response organizations often lacked both a common operating picture of the emergency response and a common situational awareness among all teams. These three areas are all a repeat of lessons learned identified in 2014.

Emergency Preparedness: EA noted five lessons learned regarding feedback and improvement processes within emergency management specifically in the areas of issues management, exercise programs, and lessons learned sharing. Some sites' corrective actions do not adequately resolve or prevent recurrence of an identified issue or lead to program improvements. Exercise evaluation criteria are sometimes inadequate and/or do not evaluate exercise player performance critically (repeat lesson learned). Further, at some sites, line management self-assessment methods do not effectively evaluate the adequacy of emergency management programs. Exercise programs at some sites do not systematically validate all elements of the emergency management program over a five-year period. Line management and emergency program managers make minimal use of site and DOE/NNSA corporate lessons-learned programs to identify opportunities to improve their emergency management programs. Cumulatively, the feedback and improvement processes resulted in site personnel not adequately assessing the overall effectiveness of the site's emergency management program, resolving identified issues, preventing recurrence through corrective actions, and/or improving the program. Some sites do not test the effectiveness of all aspects of their emergency management programs during exercises, and exercise evaluators sometimes do not capture evidence of inadequate performance by the emergency response organization. Finally, site emergency management personnel do not share the knowledge and experience gained by others through lessons learned to benefit their programs and other sites.

Collectively for these lessons learned, EA developed the following recommendations for senior management. EA also developed detailed recommendations for each lesson learned (summarized in Appendix A) to aid in improving specific aspects of site emergency management programs:

- Ensure the site emergency management program adequately minimizes the risk to site's mission, particularly focusing on whether emergency planning hazards assessments provide an appropriate balance between conservatism and realism and whether the level of effort spent on emergency responder training and exercise programs delivers sufficient proficiency.
- Stress the importance of full and open communication during emergency responses so that all parties (including offsite organizations) have a common operational picture.
- Actively promote the value of continuous improvement in the emergency management program through self-critical assessments and exercise evaluations, diligent resolution of identified issues, and sharing of lessons learned with other sites.

In 2016, EA will continue to use site exercise evaluations and performance tests to assess the effectiveness of emergency management programs and selected program elements to identify the contributing causes for observed weaknesses. EA will also continue to evaluate the application of lessons learned and the effectiveness of corrective actions taken in response to previous assessments, both at the site implementation level and at the policy level as new requirements are approved.

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1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) oversight program is designed to enhance DOE safety and security programs by providing the Secretary and Deputy Secretary of Energy, Under Secretaries of Energy, other DOE managers, senior contractors, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and requirements and the effectiveness of DOE and contractor line management performance and risk management in safety and security and other critical functions as directed by the Secretary. The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, and EA implements the program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides.

The Office of Emergency Management Assessments, within EA, evaluates specific areas of interest at DOE facilities. This report is based on EA emergency management assessments conducted in 2015, including an analysis of observed conditions against the requirements in DOE Order 151.1C, *Comprehensive Emergency Management System*. This report goes beyond compliance reporting to offer lessons learned and recommendations for improving DOE/National Nuclear Security Administration (NNSA) emergency management programs. In consideration of the issues identified through these independent assessments, EA developed nine lessons learned with associated recommendations for line management's consideration for improving program or management effectiveness. This report also identifies two best practices that could help other DOE organizations solve challenging problems.

1.1 Report Scope

This report draws on the EA assessments during 2015 at seven DOE/NNSA sites that meet DOE Order 151.1C requirements for having an Operational Emergency hazardous material (HAZMAT) program. Table 1 lists the sites, the responsible program office for Federal oversight, the type of EA assessment, and exercise scenario information. EA has published separate reports to document its activities and conclusions for each site assessed, available at http://www.energy.gov/ea/listings/assessment-documents.

The assessments included evaluating demonstrations of severe event preparedness and selected emergency management program elements that EA assesses on a periodic basis. As part of this effort, EA revisited four sites in 2015 to complete exercise program assessments that began in 2014 with an assessment of exercise planning, conduct, and evaluation activities. EA also observed performance demonstrations at two sites for a response to a severe event as described in the 2013 DOE Operating Experience Level 1, *Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events*, which addresses lessons learned from the 2011 Fukushima event in Japan. At another site, EA observed limited-scope performance tests (LSPTs) to evaluate the performance of the emergency response organization (ERO). Other areas EA assessed in 2015 included the emergency management program elements of the HAZMAT program technical planning basis, plans and procedures, exercises, training and drills, program administration, and readiness assurance.

Table 1. Sites Assessed During 2015

Site	Program Office	Assessment Type	Exercise Scenario Synopsis
East Tennessee Technology Park	Office of Environmental Management (EM)	HAZMAT Program Technical Planning Basis, Readiness Assurance, Exercises, and Program Administration Program Element Reviews	Not applicable
Los Alamos National Laboratory	NNSA	Severe Event Exercise Review	Earthquake with damage at three emergency planning hazards assessment (EPHA) facilities and a release of radiological materials and hazardous chemicals
Pantex Plant	NNSA	Exercise Program Review and Severe Event Exercise Review	Active shooter resulting in mass casualty condition; no HAZMAT release
Sandia National Laboratories/New Mexico	NNSA	Exercise Program Review	Not applicable
Savannah River Site	EM	Exercise Program Review	Not applicable
Waste Isolation Pilot Plant	EM	LSPTs and HAZMAT Program Technical Planning Basis, Plans and Procedures, Training and Drills, and Exercises Program Element Reviews	LSPT #1 – earthquake with a surface radiological material release LSPT #2 – dropped waste assembly with an underground release cascading to a surface radiological material release
Y-12 National Security Complex	NNSA	Exercise Program Review	Not applicable

1.2 Requirements and Guidance

EA conducts its assessments in accordance with DOE Order 227.1A and DOE Order 226.1B, *Implementation of DOE Oversight Policy*. EA used DOE Order 151.1C as the basis for the emergency management program assessments. The order identifies emergency preparedness and response requirements for DOE/NNSA sites and references an associated set of emergency management guides (EMGs) with implementing guidance. EA used the order to derive EA Criteria and Review Approach Document (CRAD) 33-01, *2015 Emergency Management Program Review*, and CRAD 45-61, *Exercises Program Review and Severe Event Response Evaluation*, which EA used for the assessments. EA also considered the NNSA Office of Emergency Operations, Office of Plans and Policy's relevant answers to frequently asked questions about the order. When EA evaluated a site's exercise or LSPT, EA also used the site's exercise criteria, usually based on the site's procedures for implementing emergency plans.

2.0 BEST PRACTICES

Best practices are a positive example of work processes that may provide a basis for significant operational improvements or cost savings. During the 2015 assessments, EA identified two best practices at the Y-12 National Security Complex. Other DOE/NNSA sites should consider gathering additional information about these practices and determining their potential benefit to the site's emergency management program. EA recognizes that the information below is derived from a sample of DOE sites and that other sites may also have effective, innovative approaches.

2.1 Drill and Exercise Planning

Consolidated Nuclear Security, LLC (CNS) effectively uses Exercise Builder (a software tool for developing emergency management exercises and drills, sponsored by the DOE Office of Emergency Operations, Office of Emergency Plans and Policy) from the start of the initial exercise planning, through execution and evaluation of the exercise and completion of the after-action report. Importantly, the pre-loaded Exercise Builder baseline generates the exercise objectives and the exercise evaluation guides (EEGs), including response steps and evaluation checklists and criteria. This approach ensures that each exercise objective has associated evaluation information, such as the stated objective, the applicable evaluation criteria from the EMG, and an evaluator checklist. CNS has also tied the evaluation criteria to the evaluator's checklist, which cites the applicable reference from the CNS plan or procedure in the EEG. CNS updates the EEGs after each change to an emergency management plan or procedure, and the organizations responsible for completing the objective's action statement concur in the EEGs. Overall, this approach has significantly reduced the time required to prepare drill and exercise packages and after-action reports, while also increasing consistency and improving the effectiveness of the drill and exercise process. CNS can now produce comprehensive drill and exercise packages in a matter of hours or days instead of weeks.

2.2 Drill and Exercise Conduct

CNS uses a site-level drill and exercise committee to support the CNS exercise coordinator. The committee coordinates the Y-12 drill and exercise schedules with members' organizations, provides input to scenario development, serves as an experienced group of controllers or evaluators familiar with the areas assigned during drills and exercises, and reviews drill and exercise after-action reports for technical and factual accuracy. In addition, committee members facilitate critiques at each venue immediately after a drill or exercise, using a prescribed protocol to foster critical assessments and to gather and document participants' observations. CNS also conducts a formal evaluator and controller debrief after each drill or exercise to determine whether the responders accomplished the individual exercise objectives, based on a synthesis of all the observations and information gathered during the activity. By establishing a long-term committee to perform these critical functions, CNS has significantly improved the effectiveness and efficiency of its drill and exercise program.

3.0 LESSONS LEARNED ANALYSIS

Each reviewed DOE site has established an emergency management program that includes the base program requirements and additional requirements for HAZMAT that could pose a serious airborne threat to workers, the public, or the environment. These programs include a hierarchy of documents containing appropriate management policy statements, standards and requirements, and implementing procedures. At all sites, training programs are in place to provide a foundation to qualify emergency responders. At several sites, EROs exhibited good command and control of simulated events. The incident commanders (ICs) established unified command and adequately assessed the scope and magnitude of the emergency,

leading to the development and implementation of suitable incident action plans. However, EA identified nine lessons learned from the assessments of emergency management programs in 2015. The lessons learned reflect observed weaknesses that represent deviations from published DOE requirements and initiatives. Although the underlying weaknesses did not necessarily apply to all the sites, and many sites have developed and implemented actions to address the issues identified at their sites, the lessons learned and recommendations presented here (and summarized in Appendix A) provide additional insights into potential improvements at all sites. Consequently, DOE/NNSA organizations and site contractors should evaluate the applicability of the following lessons learned and recommendations to their operations and consider using them as appropriate in accordance with site-specific program objectives.

3.1 Hazardous Materials Program Technical Planning Basis

In addition to the established emergency management program, DOE Order 151.1C requires all sites to complete emergency planning, and all sites that EA visited during 2015 have HAZMAT programs to meet this requirement. For HAZMAT programs, the order requires emergency planning to include the identification of hazards and threats, hazard mitigation, development and preparation of emergency plans and procedures, and identification of personnel and resources needed for an effective emergency response. The order and associated EMGs give detailed instructions on determining whether a site requires a HAZMAT program and how to establish an appropriate response based on technical considerations.

To document the technical planning basis, DOE Order 151.1C requires the site contractor to develop a hazards survey that identifies significant quantities of HAZMAT for a more detailed assessment. The order then requires the contractor perform a quantitative analysis using accepted techniques. DOE Guide 151.1-2, *Technical Planning Basis*, provides accepted assessment techniques and recommends the use of quantitative analyses to determine exposures at specific receptors of interest (i.e., facility boundary, onsite receptor locations, site boundary, and offsite locations of interest) and to determine the maximum distance from release points at which exposures could exceed the applicable protective action criteria (PAC). Site personnel then use the results of these calculations to establish the areas where PAC may be exceeded, to serve as the basis for emergency classifications and the emergency planning zone, and (along with additional information) to determine the appropriate protective actions for personnel in areas that may have undesirable concentrations of airborne HAZMAT.

EA identified one lesson learned related to the HAZMAT program technical planning basis in 2015.

Lessons Learned Statement: EPHA analysis methodologies at some sites result in overly conservative protective actions that can negatively impact the response to a classified Operational Emergency.

Discussion: The DOE emergency management policy promotes a response that is commensurate with the hazard. However, at some sites, the analytical approach that emergency planners use in their EPHAs results in overly conservative and unrealistic consequence assessments. Some site emergency planners change the assumptions used as input parameters for modeling consequences, use simplistic modeling software, or do not apply plausible and allowable mitigating factors, resulting in default protective actions that extend well beyond the areas projected to exceed PAC concentrations. Furthermore, the documentation of the methods, assumptions, and models used to calculate consequences is not always sufficient to allow independent analysts to critically review and, if necessary, reconstruct the analyses and results. In addition, the emergency action levels (EALs) derived from the EPHA do not always distinguish among the plausible source term quantities for a spectrum of events but instead default to General Emergency classifications.

Analysis: Site personnel contend that methods resulting in overly conservative protective actions are desirable because they reflect further margins of safety. However, during exercises, overly conservative protective actions caused the implementation of protective actions far beyond the areas actually affected, resulted in notifications sent to DOE/NNSA Headquarters and offsite authorities that indicated site conditions were more severe than warranted, and rendered needed emergency response facilities, evacuation routes, and supporting locations unavailable. For example, at one site, a small release that exceeded PAC only on site led to a General Emergency declaration, and the contractor recommended protective action recommendations out to ten miles from the site, thereby activating local government protective actions where none were needed and potentially alarming the public unnecessarily. Additional negative consequences could include:

- EPHA analyses incorrectly predict that planned emergency response facilities and support areas will be in an atmosphere above PAC and will not be usable.
- Exaggerated consequences add complications and limit options for safe routing of ERO members and evacuees.
- Locations deemed safe for incident command posts and staging areas are unnecessarily too far away to be effective.
- EALs identify unnecessarily large areas for evacuation, increasing the size of the population for evacuation and making evacuations in needed areas more difficult or untimely.
- Larger-than-needed perimeters make controlling the scene more difficult.
- Small events lead to unnecessary shutdown of public highways.
- Operations located well beyond properly projected airborne concentrations are subject to unnecessary shutdown.
- DOE/NNSA Headquarters and offsite authorities receive misinformation about the severity of the event.
- Exaggerated areas of predicted offsite contamination to offsite authorities make it more difficult for field monitoring teams to determine the contamination boundary.
- Exaggerated consequence information erodes public trust and responder confidence in implementing the planned response, so responders may ignore the EPHA predictions, decline to don personal protective equipment, or not implement emergency exposure guideline protocols when accurately predicted exposures would warrant their use.

Recommendations: Ensure that EPHA hazards analyses provide conservative, but realistic consequences. The following actions should be considered:

- Incorporating acceptable methodologies from DOE Guide 151.1-2 with realistic expectations for:
  - Material at risk quantities based on design and administrative limits, segmentation, and/or containment barriers
  - Damage ratios
  - Release fractions
  - Meteorological data
  - Release heights
- Using dispersion modeling software programs contained in the DOE Emergency Management Issues Special Interest Group Subcommittee on Consequence Assessment and Protective Actions consequence assessment modeling toolbox to ensure that the software complies with their software quality assurance guidance
- Fully documenting the methods, assumptions, and models for calculating consequences to facilitate critical review and, if necessary, reconstruction of the analyses and their results by independent analysts

- Using EAL entry indicators that are consistent with the analyzed scenario's source term and dispersion mechanisms used in the EPHA
- Implementing separate EALs for each emergency classification (Alert, Site Area Emergency, and General Emergency) rather than one EAL for the entire spectrum of events, whenever possible.

3.2 Emergency Response Performance

EA identified three lessons learned related to emergency response during exercises and LSPTs in 2015, all of which EA previously noted in its 2014 lessons learned report.

Lessons Learned Statement: During exercises, some emergency responders did not demonstrate the necessary proficiency or use available response tools to promote effective performance.

Discussion: DOE Order 151.1C requires initial training and annual refresher training for the instruction and demonstration of proficiency by all primary and alternate ERO personnel, and EA noted that training programs were in place at all sites to provide a foundation to qualify emergency responders. However, EA observed that some emergency responders either do not use the many readily available tools or use them incorrectly. These tools include EALs, EPHAs, consequence assessment modeling programs, protective action distance plotting programs, plume model projections, ERO position checklists, source term determination tools, manuals, handbooks, procedures, forms, information management tools (such as WebEOC), and situation reports. In some cases, responders were aware of the need to collect and share event data but did not know how to enter the data into computer programs or how to distribute the information.

Analysis: Although training and drill programs alert responders to the available response tools and their purpose, responders may not have enough opportunity to practice using the tools or receive enough critical feedback during drills and exercises to correct performance issues. Further, response procedures do not always contain sufficient details on roles and responsibilities, give clear implementing instructions, or specify record keeping requirements. Responders also do not always refer to procedures containing tool instructions, and evaluators do not always give feedback when responders do not perform tasks using the tools. As a result, responders miss opportunities to improve proficiency, acquire information, understand consequences, and perform required tasks that are vital to effectively protecting people and mitigating event consequences.

Recommendations: Improve emergency responder training and qualifications programs to promote effective use of response tools. The following actions should be considered:

- Determining whether more frequent drills and exercises are necessary to improve and maintain the performance of primary and alternate ERO members
- Reviewing response plans, procedures, checklists, and other implementing documents and soliciting input from ERO members to ensure that the documents give enough details on roles, responsibilities, instructions, and record keeping requirements
- Ensuring that response procedures establish appropriate procedure compliance requirements (e.g., mandatory use of checklists and required data entry into WebEOC) and that ERO members understand them
- Evaluating training, drills, and exercises to ensure that responders perform appropriately and receive appropriate feedback on incorrect actions
- Providing remedial training to responders who do not demonstrate proficiency using response tools
- Using ERO members in evaluation roles in order to increase exposure to the response tools.

Lessons Learned Statement: During exercises, some consequence assessment teams did not fully use the available modeling tools, successfully communicate the assessment results, or confirm that the initial protective actions were accurate, appropriate, and conservative.

Discussion: DOE Order 151.1C requires assessing the potential or actual onsite and offsite consequences of an emergency. The order further states that consequence assessments must be timely throughout an emergency; integrated into the event classification and protective actions processes; and coordinated with Federal, state, local, and tribal organizations. EA observed that consequence assessment teams consistently developed plume model projections during exercises and LSPTs. However, at most sites, the site ERO did not use the plume projections to identify areas needing evacuation; reconcile discrepancies between plume projections and EAL classifications and protective actions; or brief the emergency operations center (EOC) cadre on the projected consequences. Furthermore, most sites did not give plume model projections to their ICs or offsite authorities responsible for implementing offsite protective actions. In addition, one consequence assessment team did not provide the ERO with information on how to reach the EOC safely, and another team did not provide timely estimates of exposure at receptors of interest. At another site, the consequence assessment team did not fully investigate why the ERO declared a General Emergency and recommended offsite protective actions when the potential release did not exceed PAC off site. At yet another site, the consequence assessment team used incorrect modeling data that led to delayed and incorrect initial analyses and the potential exposure and contamination of workers and responders.

Analysis: Although training and drill programs provide opportunities for consequence assessment teams to practice developing plume models, they do not demonstrate why successful completion of all consequence assessment tasks is critical to the overall effective performance of the ERO. Consequence assessment teams do not always receive critical feedback during drills and exercises to correct performance issues, so they may persist in providing the ERO with inadequate information for protecting the on-scene and nearby facility personnel and may be unable to recognize when protective actions are excessive for the postulated release.

Recommendations: Improve the quality of consequence assessment team performance. The following actions should be considered:

- Emphasizing consequence assessment in drills and refresher training by communicating:
  - The purpose and use of the plume projection products
  - The need to provide timely and accurate plume projection products for validation of EALs and protective action decision-making
  - The need to ensure that plume plots clearly indicate the PAC and threshold for early lethality concentration, dose areas of concern and concentrations, and doses at the facility boundary to aid in protective action decision-making for workers and first responders
  - The importance of providing an initial assessment within an hour from the time of release to ensure that personnel can take timely protective actions
  - The importance of providing real-time meteorological plume projections for all HAZMAT releases to determine event-specific estimates of the consequences.
- Including exercise objectives and detailed evaluation criteria for consequence assessment teams during exercises
- Critically evaluating the consequence assessment team's ability to provide:
  - Timely and accurate plume projections using real-time meteorological data
  - Plume projections that clearly identify PAC, threshold for early lethality concentrations, dose areas of concern, and doses at the facility boundary
  - An initial assessment within one hour from the time of the release.

Lessons Learned Statement: During exercises, some sites do not demonstrate continuous, effective, and accurate communications and use of information management tools among response components, leading to inadequately shared situational awareness among the site, DOE/NNSA Headquarters, and offsite organizations.

Discussion: DOE Order 151.1C requires that the contractor provide effective communications among response organizations throughout an emergency and establish effective methods of communication among event scene responders, emergency managers, and response facilities. Additionally, effective implementation of the National Incident Management System requires communication within the ERO to provide a common operating picture of the emergency response and shared situational awareness among all teams. During most 2015 exercises and LSPTs that EA evaluated, responders had inadequate communications and ineffective information flow processes for acquiring, recording, and disseminating timely and accurate event information among the ERO and offsite response organizations. Emergency planners did not define the information flow processes among command centers and field responders by documenting the responsibilities for collecting information and distributing validated information. Additionally, incident management tools did not enable the ERO to share important event information among the command centers and field responders. Although most sites have WebEOC as their incident management tool, one site discontinued the use of WebEOC, opting instead to use a simple timeline of significant events. At another site, the ERO entered only some significant event and status information into the tool rather than using the tool to capture, distribute, and assess all relevant emergency information among the entire ERO. Other examples of significant communication and information management issues noted at individual sites include:

- Offsite responders received only partial information about a facility's structural collapse and resultant HAZMAT release because of the inability to capture, distribute, and assess all relevant emergency information.
- EOC personnel took photos of computer screens showing the plume model and transmitted the photos via cell phone to the IC because of inadequate data communications in the field.
- The incident command post, site operations center, and EOC did not share a common operating picture of the event, resulting in fundamentally different understandings of the event (i.e., potential consequences, response actions, and protective actions).
- Communication weaknesses led to significant delays in activating the ERO, dispatching the fire department, and recalling off-duty fire fighters.
- The ERO paging system could not make simultaneous ERO activations and notifications, resulting in a delayed response to the event.
- The ERO sent some offsite emergency notifications that contained contradictory or erroneous information and did not verify that offsite organizations received the notifications.

At several sites, ERO members did not obtain some pertinent information, such as the names of injured personnel and their locations and injuries, when documenting injury reports; did not provide information on all injured personnel to the IC; and did not inform other ERO members of injured personnel numbers and locations. Furthermore, at all sites evaluated in 2015, EA observed inadequate interoperability among the site EOC and the local, state, or DOE/NNSA Headquarters EOCs. For example, the offsite officials could not view WebEOC data or important site-produced technical products, which those officials need for timely and accurate decision-making.

Analysis: The key weaknesses regarding effective communication to maintain situational awareness include:

- Not clearly assigning the responsibilities for collecting specific event information and the processes for validating and disseminating that information in a formally defined information flow process among the site's response facilities, field responders, and offsite organizations
- Using incident management tools only during emergencies, with no opportunity for practice during drills and exercises
- Restricting offsite organizations' access to unclassified emergency response information, such as notification forms, emergency status updates, plume projections, significant events data, and field monitoring data, all of which offsite officials need for timely and accurate decision-making
- Providing incomplete emergency status updates to DOE/NNSA Headquarters and restricting access to the site's WebEOC event information.

As a result of these weaknesses, the EROs lacked a common operating picture of the emergency response and a shared situational awareness among all teams. Specific consequences of this lack of a common operating picture included:

- Command and control of the event was sometimes ineffective in ensuring a timely and planned response strategy that all command centers understood.
- The response to injured, contaminated, and missing workers postulated within the exercise scenario was ineffective.
- Offsite responders could not safely extinguish a fire because of incomplete information.
- ICs were unaware of the potential for radiological doses during the event, so the IC did not establish safe operating locations for the incident command posts and staging areas.
- Activation of the county's notification system for implementing protective action recommendations was delayed.

Recommendations: Improve communications to promote a common operating picture of the emergency response. The following actions should be considered:

- Formally defining emergency information flow processes between the onsite and offsite response organizations
- Installing and fully implementing an automated information management system
- Clearly assigning the responsibility for capturing, validating, and disseminating specific event information
- Enabling offsite access to unclassified emergency response information, such as notification forms, emergency status updates, plume projections, significant events data, and field monitoring data
- Expanding the use of incident management tools to allow a rapid interface with other systems necessary to communicate a common operating picture and shared situational awareness by:
  - Providing a real-time description of events at the incident scene
  - Providing details of the ERO's response to the incident
  - Enabling the ERO to predict changes during the incident
  - Supporting ERO objectives that forecast future actions
- Integrating incident management tools with other web-based geographical information systems to provide ERO personnel with views, data, and analysis tools for the site, the surrounding area, and interiors of many onsite buildings, including:
  - Meteorological monitoring data
  - Plume projections
  - Damage assessments

  - Field monitoring data
  - Site master planning data and engineering drawings (such as site drawings, utility drawings, and facility floor plans)
  - Personnel data
  - Facilities information management data
- Automating the news release approval process for public information officers in different locations by coordinating a quick, consistent, factual message that contains relevant information
- Integrating the use of social media as an additional means to answer, enhance, or verify information
- Defining expected actions for achieving and maintaining situational awareness among all teams.

3.3 Emergency Preparedness

EA identified five lessons learned related to emergency preparedness, including two that EA previously noted in the 2014 lessons-learned report.

Lessons Learned Statement: Line management self-assessments at some sites do not fully evaluate the adequacy of emergency management programs.

Discussion: DOE Order 151.1C requires that the contractor and cognizant field element conduct annual self-assessments of all 15 elements of their emergency management programs and that the cognizant field element conducts an evaluation of the contractor emergency management program every three years, using the specific standards and criteria issued by the Director, Office of Emergency Operations. DOE Guide 151.1-3, *Programmatic Elements*, also recommends that personnel performing self-assessments be qualified and trained in audits or evaluations and that assessments have convincing evidence. However, contractor and Federal line oversight assessments often do not identify non-compliances and other issues regarding their emergency management programs. The most common examples include:

- Not assessing all elements of the emergency management program.
- For sites with multiple locations, not assessing emergency management activities at each location.
- Not using comprehensive evaluation criteria.
- Not documenting the evaluation criteria for the assessment.
- Not requiring assessors to review or document the objective evidence they used to determine whether personnel are performing the actions necessary to meet evaluation criteria. For example:
  - Assessors did not confirm the retention of required records, the documentation of drill and exercise participation, or the conduct of shelter-in-place drills.
  - Assessors did not reference exercise after-action reports to support conclusions on the adequacy of ERO performance.
- Not issuing timely assessment reports.

Analysis: Contractors and Federal organizations often do not provide training to assessors on how to conduct a thorough emergency management assessment. Site personnel also sometimes rely on limited-scope external assessments of their emergency management program instead of performing their own in-depth assessments. Further, the assessment procedures sometimes provide insufficient detail on conducting and documenting a thorough assessment, so contractors and Federal line oversight officials often do not adequately assess the overall effectiveness of their site emergency management program.

Recommendations: Improve the assessment programs' ability to identify weaknesses in emergency management programs. The following actions should be considered:

- Providing training in assessment techniques for personnel who conduct emergency management assessments
- Developing and maintaining an assessment plan that contains the schedule and responsibilities for assessing all 15 program elements, at all relevant locations
- Using external assessments as a tool to validate the effectiveness of self-assessments, not as a replacement for self-assessments
- Using the applicable evaluation criteria contained in DOE Guide 151.1-3, Appendix D, for assessments
- Documenting the evaluation criteria in the assessment report
- Documenting the objective evidence for determining whether the evaluation criteria were met in the assessment report
- Using a performance metric that tracks the timely completion of assessment reports.

Lessons Learned Statement: Corrective actions implemented to address identified weaknesses at some sites do not consistently resolve or prevent recurrence of the issue and do not always lead to program improvements.

Discussion: DOE Order 151.1C requires corrective actions for issues identified during internal and external evaluations, including exercises, to support continuous improvement. The order also states that corrective action plans must be developed within 30 working days and include an independent verification and validation process. DOE Guide 151.1-3 further recommends performing a root cause analysis for issues, determining the extent and prevalence of the same or similar problem areas, and tracking the completion of corrective actions. As noted in 2014, the corrective actions that emergency management personnel develop for some issues identified during assessments and exercises often do not ensure adequate resolution of the issues. EA noted cases where site personnel did not:

- Enter emergency management issues in the site issues management system or otherwise track the completion of corrective actions.
- Assign severity levels for issues in accordance with site issues management procedures (e.g., an issue that met the site's definition of a finding was categorized as an observation).
- Determine the root cause of an issue, particularly for recurring issues.
- Perform extent-of-condition reviews.
- Develop corrective actions within 30 working days as required by DOE Order 151.1C.
- Prevent recurrence when developing corrective actions.
- Complete all corrective actions before closing an issue.
- Develop additional corrective actions when an effectiveness review indicated that the implemented corrective actions did not resolve the issue.
- Independently verify the completion of corrective actions.
- Validate the effectiveness of corrective actions.

Analysis: EA noted that a few site issues management procedures (both contractor and Federal) did not discuss the processes for:

- Performing root cause analysis
- Preventing recurrence during development of corrective actions
- Tracking corrective actions

- Managing changes to corrective actions
- Following up on overdue corrective actions.

In other cases, emergency management personnel did not follow the site issues management procedure. This resulted in corrective actions that did not prevent recurrence. For example:

- Providing required reading and briefings to current ERO personnel to address performance issues without ensuring that new personnel in those ERO positions receive the same information
- Identifying the names of candidates for a joint information center with too few trained individuals without ensuring that the candidates complete the required training to join the cadre
- Repairing malfunctioning equipment in an emergency response facility without determining why the facility's periodic testing program did not identify the malfunction.

In other cases, emergency management personnel closed issues before completing all corrective actions. This resulted in:

- Closing an improvement item intended to prevent giving the media inconsistent and incomplete information after scheduling a drill that addresses spokesperson training, but before conducting the training
- Closing a finding about untrained EOC derivative classifiers after only a few of the classifiers received the required training
- Closing a finding intended to ensure next-of-kin notification for a deceased employee by stating that the assigned organization was not responsible for this finding so it needed to perform no further action.

Consequently, issues remain unresolved, corrective actions do not prevent recurrence of the issue, and program improvements do not occur.

Recommendations: Promote continuous improvement in the emergency management program through the issues management process. The following actions should be considered:

- Revising site issues management procedures to clearly describe the site processes for:
  - Performing root cause analysis and extent-of-condition reviews
  - Tracking corrective actions
  - Managing changes to corrective actions
  - Following up on overdue corrective actions
- Using a performance metric that tracks the timely development of corrective actions
- Entering unresolved issues into the issues management system
- Evaluating all proposed corrective actions to ensure that they will prevent recurrence of the issue, and clearly specifying the objective evidence required to close the corrective action
- Prohibiting actionees from closing their own corrective actions
- Prohibiting closure of corrective actions before approval and implementation of programs, documents, and actions
- Verifying that the objective evidence required to close a corrective action demonstrates adequate completion
- Ensuring that corrective actions incorporate activities for validating effectiveness.

Lessons Learned Statement: Exercises do not validate all elements of the emergency management program over a five-year period at some sites.

Discussion: DOE Order 151.1C requires that the exercise program validate all elements of their emergency management program over a five-year period, invite offsite response organizations to participate in a sitewide exercise at least once every three years, exercise its emergency response capability annually, and rotate the basis for the exercises among its facilities with EPHAs. The order further requires that site-level ERO elements must participate in at least one exercise annually. However, emergency management personnel do not test some aspects of the emergency management program in their exercises. The omitted aspects typically include:

- Rotating the basis of the site's exercises among the EPHA facilities and including all of the significant hazards on site
- Requiring participation of all site-level ERO elements annually
- Using exercise scenarios that involve:
  - An onsite Office of Secure Transportation event (where applicable)
  - A severe event or multi-facility HAZMAT release scenarios corresponding to an analyzed bounding event – i.e., a design basis event or a beyond-design-basis event that results in the release of the maximum inventory of a facility's HAZMAT
  - A joint response by the fire department and protective force to a security concern, with a HAZMAT component and a protective force representative serving as the IC
- Inviting offsite organizations to participate in a site exercise at least every three years
- Testing the treatment of contaminated/injured employees at offsite hospitals
- Incorporating NNSA radiological assets into the site's response
- Using alternate command centers
- Testing all required protective actions (e.g., sheltering and evacuating).

Analysis: Some sites conduct few exercises, so it is difficult for them to validate all elements over a five-year period. Some sites also lack a comprehensive plan for validating all elements of their emergency programs. Such sites often do not test numerous important aspects of the emergency management program, such as:

- Responding to an emergency at some facilities with EPHAs and significant hazards
- Confirming the ability of site-level ERO elements (such as radiological response teams and medical facilities) to respond adequately
- Testing the ERO's response to a full range of possible emergency scenarios
- Interacting with offsite response organizations and incorporating offsite assets
- Coordinating the treatment of contaminated/injured personnel at an offsite hospital
- Using alternate command centers
- Confirming that site personnel can implement all required protective actions quickly, safely, and effectively.

Recommendations: Improve the capability to test all aspects of the emergency management program at the appropriate frequencies. The following actions should be considered:

- Conducting more exercises, or increasing the scope of exercises, to test all aspects of the emergency management program
- Developing a planning matrix for the exercise program that shows how the emergency management program will be tested periodically, including the full range of:

    - Response program elements (i.e., ERO, offsite response interfaces, emergency facilities and equipment, emergency categorization and classification, notifications and communications, consequence assessment, protective actions and reentry, emergency medical support, emergency public information, and termination and recovery)
    - Hazards (e.g., radiological, chemical, bounding HAZMAT consequence events)
    - Initiating events (e.g., large fire, transportation accident, severe event, onsite Office of Secure Transportation event, security event with HAZMAT component)
    - Site-level ERO components (e.g., EOC cadre, field monitoring teams, decontamination teams)
    - EPHA facilities
    - Primary and alternate command centers (e.g., EOC, operations center, joint information center)
    - NNSA radiological assets
    - Offsite organizations, including offsite hospitals treating contaminated/injured employees
    - Onsite protective actions (e.g., sheltering, evacuating)
- Reviewing the status of the planning matrix annually and making changes as necessary.

Lessons Learned Statement: Some exercise evaluations do not provide the sites with an effective and reliable assessment of ERO performance.

Discussion: DOE Order 151.1C requires each exercise to be evaluated and critiqued effectively and reliably, using a critique process that includes gathering and documenting participant observations and identifying corrective action items that must be incorporated into the emergency management program. However, EA noted in 2014 and again in 2015 that emergency management personnel sometimes do not provide adequate evaluation criteria for each exercise objective or do not evaluate exercise player performance critically. Some contractors do not provide their exercise evaluators with specific measurable evaluation criteria for each exercise objective. In some cases, the evaluation criteria do not refer to the site's emergency plan and implementing procedures that establish the site-specific standards for expected performance. In other cases, the evaluation criteria omit critical actions that exercise players must complete to demonstrate that they met an objective. For example, an objective on completing timely initial consequence assessment did not include verification of the event classification and protective actions, or use of plume modeling software, as required by the site's procedures for performing a timely initial assessment. In another case, an objective on the ERO maintaining adequate situational awareness did not include criteria for the EOC. In the absence of adequate evaluation criteria, exercise evaluators rely mostly on their experience to evaluate the exercise, resulting in increased variability and a more subjective evaluation.

EA also noted that some sites do not critically evaluate player performance during exercises. Exercise evaluators noted instances where performance did not meet the evaluation criteria, but emergency management personnel did not categorize the shortfall as a finding or did not develop corrective actions to address it. Such issues included:

- Not making timely onsite protective action announcements
- Providing protective action information by means of a public address system that was garbled and not loud enough
- Not telling the first responders that a radioactive material release was in progress at the event scene
- Not checking all areas around a building for wounded personnel during an active shooter exercise
- Transporting an injured worker to the medical clinic without warning the medical staff that the patient was possibly contaminated with acid
- Not accounting for all injured workers
- Allowing personnel to drive through a projected radiological material plume, but not surveying the personnel or the vehicles for contamination afterward

- Not staffing an emergency response facility within one hour as required by the site emergency plan
- Not providing timely initial and ongoing consequence assessments
- Giving incorrect protective action information to the public in an emergency alerting system message and subsequent press releases
- Not providing accurate and timely follow-up notifications to offsite officials and DOE/NNSA Headquarters when conditions changed
- Not providing prompt and effective medical support to injured personnel.

Analysis: At some sites, the contractor did not correlate the exercise objectives with the site procedures. In other cases, the contractor changed the site procedures frequently and did not make the corresponding changes in the exercise evaluation criteria. As a result, the criteria did not reflect measurable standards that evaluators could use to assess whether exercise objectives were met. For evaluating player performance, emergency management personnel sometimes used exercise evaluators who had little experience in the area they were evaluating, thereby exacerbating the subjectivity of the evaluation. In other cases, emergency management personnel assigned staff to dual roles as both exercise evaluators and controllers, detracting from their ability to evaluate the exercise. Further, exercise evaluators sometimes graded criteria as "not applicable" or "not observed," rather than "not met," when player performance did not meet the criteria, so they did not capture examples of inadequate ERO performance. In such cases, the exercise evaluations did not facilitate correction of performance deficiencies and program improvement, as intended.

Recommendations: Improve the ability to recognize response implementation issues during exercises, and promote a culture of continuous improvement. The following actions should be considered:

- Ensuring that each exercise objective contains the applicable evaluation criteria from DOE Guide 151.1-3, modified to be relevant to the site, with references to the action steps from the applicable site emergency plans and procedures
- Updating the evaluation criteria as needed when emergency plans and procedures change
- Promoting an exercise evaluation culture that seeks program improvements through active senior management involvement
- Increasing the attention to evaluator comments that indicate ERO performance issues during exercises
- Assigning the most experienced personnel in the subject matter as evaluators
- Setting clear expectations and providing training on the use of exercise evaluation criteria to minimize subjectivity
- Using evaluators from offsite sources who have appropriate experience for the area they evaluate
- In evaluator training, emphasizing the differences between "not met," "not applicable," and "not observed" grades for evaluation criteria
- Recruiting and training a sufficient number of controllers and evaluators to minimize the need for assigning dual controller/evaluator responsibilities.

Lessons Learned Statement: Emergency management personnel at some sites do not share lessons learned within their ERO and with other sites.

Discussion: DOE Order 151.1C requires the readiness assurance program to include a system for incorporating and tracking lessons learned from training, drills and exercises, actual responses, and a sitewide lessons-learned program. Additionally, the site must participate in the DOE/NNSA corporate lessons-learned system. However, EA observed that most line management and emergency program managers make minimal use of site and DOE/NNSA corporate lessons-learned programs to improve their emergency management programs. For example:

- Emergency management personnel at a few sites do not identify lessons learned from their activities.
- Annual ERO refresher training at some sites does not contain a summary of lessons learned from the previous year's emergency management activities at the site or the DOE/NNSA corporate lessons-learned system.
- Emergency management personnel at some sites do not send site exercise after-action reports to the ERO.
- Most ERO members do not enroll in site systems that disseminate lessons learned.
- Some emergency management personnel do not participate in the DOE/NNSA corporate lessons-learned system.

Analysis: At some sites, emergency management personnel are not familiar with the DOE/NNSA corporate lessons-learned system. At other sites, development and incorporation of lessons learned into the emergency management program has not been a priority. As a result, site emergency management personnel do not share knowledge and experience among individuals and organizations in order to benefit from others' experiences, good and bad, both from within and outside the DOE/NNSA complex.

Recommendations: Encourage continuous improvement through active use of emergency management lessons learned. The following actions should be considered:

- Promoting the development of lessons learned from training, drills and exercises, actual responses, and routine operations, and submission to site and DOE/NNSA corporate lessons-learned systems
- Including lessons learned from the previous year in the annual ERO refresher training
- Sending exercise after-action reports to the site ERO, including personnel who did not participate in the exercise
- Encouraging ERO members to subscribe to and actively participate in the site and DOE/NNSA corporate lessons-learned systems for automatic receipt of emergency management lessons learned
- Formally evaluating emergency management lessons learned from the DOE/NNSA corporate lessons-learned system for incorporation into the site emergency management program.

4.0 FUTURE ASSESSMENTS

In 2016, EA will continue to use site exercise evaluations and performance tests to assess emergency management program effectiveness. Based on the results of these assessments, EA will evaluate selected emergency management program elements to determine contributing causes for any observed weaknesses. EA will also continue to evaluate the application of lessons learned and the effectiveness of corrective actions taken in response to previous assessments, both at the site implementation level and at the policy level as new requirements are considered.

Appendix A
2015 Lessons Learned and Recommendations

Hazardous Materials Program Technical Planning Basis	
Lesson Learned	**Recommendations**
Emergency planning hazards assessment (EPHA) analysis methodologies at some sites result in overly conservative protective actions that can negatively impact the response to a classified Operational Emergency.	Incorporating acceptable methodologies from U.S. Department of Energy (DOE) Guide 151.1-2 with realistic expectations for: • Material at risk quantities based on design and administrative limits, segmentation, and/or containment barriers • Damage ratios • Release fractions • Meteorological data • Release heights
	Using dispersion modeling software programs contained in the DOE Emergency Management Issues Special Interest Group Subcommittee on Consequence Assessment and Protective Actions consequence assessment modeling toolbox to ensure that the software complies with their software quality assurance guidance
	Fully documenting the methods, assumptions, and models for calculating consequences to facilitate critical review and, if necessary, reconstruction of the analyses and their results by independent analysts
	Using emergency action level (EAL) entry indicators that are consistent with the analyzed scenario's source term and dispersion mechanisms used in the EPHA
	Implementing separate EALs for each emergency classification (Alert, Site Area Emergency, and General Emergency) rather than one EAL for the entire spectrum of events, whenever possible
Emergency Response Performance	
Lesson Learned	**Recommendations**
During exercises, some emergency responders did not demonstrate the necessary proficiency or use available response tools to promote effective performance (repeat lesson learned).	Determining whether more frequent drills and exercises are necessary to improve and maintain the performance of primary and alternate emergency response organization (ERO) members
	Reviewing response plans, procedures, checklists, and other implementing documents and soliciting input from ERO members to ensure that the documents give enough details on roles, responsibilities, instructions, and record keeping requirements
	Ensuring that response procedures establish appropriate procedure compliance requirements (e.g., mandatory use of checklists and required data entry into WebEOC) and that ERO members understand them
	Evaluating training, drills, and exercises to ensure that responders perform appropriately and receive appropriate feedback on incorrect actions
	Providing remedial training to responders who do not demonstrate proficiency using response tools
	Using ERO members in evaluation roles in order to increase exposure to the response tools

Emergency Response Performance	
Lesson Learned	**Recommendations**
During exercises, some consequence assessment teams did not fully use the available modeling tools, successfully communicate the assessment results, or confirm that the initial protective actions were accurate, appropriate, and conservative (repeat lesson learned).	Emphasizing consequence assessment in drills and refresher training by communicating: • The purpose and use of the plume projection products • The need to provide timely and accurate plume projection products for validation of EALs and protective action decision-making • The need to ensure that plume plots clearly indicate the protective action criteria (PAC) and threshold for early lethality concentration, dose areas of concern and concentrations, and doses at the facility boundary to aid in protective action decision-making for workers and first responders • The importance of providing an initial assessment within an hour from the time of release to ensure that personnel can take timely protective actions • The importance of providing real-time meteorological plume projections for all hazardous material (HAZMAT) releases to determine event-specific estimates of the consequences
	Including exercise objectives and detailed evaluation criteria for consequence assessment teams during exercises
	Critically evaluating the consequence assessment team's ability to provide: • Timely and accurate plume projections using real-time meteorological data • Plume projections that clearly identify PAC, threshold for early lethality concentrations, dose areas of concern, and doses at the facility boundary • An initial assessment within one hour from the time of the release

Emergency Response Performance	
Lesson Learned	**Recommendations**
During exercises, some sites do not demonstrate continuous, effective, and accurate communications and use of information management tools among response components, leading to inadequately shared situational awareness among the site, DOE/National Nuclear Security Administration (NNSA) Headquarters, and offsite organizations (repeat lesson learned).	Formally defining emergency information flow processes between the onsite and offsite response organizations
	Installing and fully implementing an automated information management system
	Clearly assigning the responsibility for capturing, validating, and disseminating specific event information
	Enabling offsite access to unclassified emergency response information, such as notification forms, emergency status updates, plume projections, significant events data, and field monitoring data
	Expanding the use of incident management tools to allow a rapid interface with other systems necessary to communicate a common operating picture and shared situational awareness by: • Providing a real-time description of events at the incident scene • Providing details of the ERO's response to the incident • Enabling the ERO to predict changes during the incident • Supporting ERO objectives that forecast future actions
	Integrating incident management tools with other web-based geographical information systems to provide ERO personnel with views, data, and analysis tools for the site, the surrounding area, and interiors of many onsite buildings, including: • Meteorological monitoring data • Plume projections • Damage assessments • Field monitoring data • Site master planning data and engineering drawings (such as site drawings, utility drawings, and facility floor plans) • Personnel data • Facilities information management data
	Automating the news release approval process for public information officers in different locations by coordinating a quick, consistent, factual message that contains relevant information
	Integrating the use of social media as an additional means to answer, enhance, or verify information
	Defining expected actions for achieving and maintaining situational awareness among all teams

Emergency Preparedness	
Lesson Learned	**Recommendations**
Line management self-assessments at some sites do not fully evaluate the adequacy of emergency management programs.	Providing training in assessment techniques for personnel who conduct emergency management assessments
	Developing and maintaining an assessment plan that contains the schedule and responsibilities for assessing all 15 program elements, at all relevant locations
	Using external assessments as a tool to validate the effectiveness of self-assessments, not as a replacement for self-assessments
	Using the applicable evaluation criteria contained in DOE Guide 151.1-3, Appendix D, for assessments
	Documenting the evaluation criteria in the assessment report
	Documenting the objective evidence for determining whether the evaluation criteria were met in the assessment report
	Using a performance metric that tracks the timely completion of assessment reports
Corrective actions implemented to address identified weaknesses at some sites do not consistently resolve or prevent recurrence of the issue and do not always lead to program improvements (repeat lesson learned).	Revising site issues management procedures to clearly describe the site processes for: • Performing root cause analysis and extent-of-condition reviews • Tracking corrective actions • Managing changes to corrective actions • Following up on overdue corrective actions
	Using a performance metric that tracks the timely development of corrective actions
	Entering unresolved issues into the issues management system
	Evaluating all proposed corrective actions to ensure that they will prevent recurrence of the issue, and clearly specifying the objective evidence required to close the corrective action
	Prohibiting actionees from closing their own corrective actions
	Prohibiting closure of corrective actions before approval and implementation of programs, documents, and actions
	Verifying that the objective evidence required to close a corrective action demonstrates adequate completion
	Ensuring that corrective actions incorporate activities for validating effectiveness

Emergency Preparedness	
Lesson Learned	**Recommendations**
Exercises do not validate all elements of the emergency management program over a five-year period at some sites.	Conducting more exercises, or increasing the scope of exercises, to test all aspects of the emergency management program
	Developing a planning matrix for the exercise program that shows how the emergency management program will be tested periodically, including the full range of: • Response program elements (i.e., ERO, offsite response interfaces, emergency facilities and equipment, emergency categorization and classification, notifications and communications, consequence assessment, protective actions and reentry, emergency medical support, emergency public information, and termination and recovery) • Hazards (e.g., radiological, chemical, bounding HAZMAT consequence events) • Initiating events (e.g., large fire, transportation accident, severe event, onsite Office of Secure Transportation event, security event with HAZMAT component) • Site-level ERO components (e.g., emergency operations center (EOC) cadre, field monitoring teams, decontamination teams) • EPHA facilities • Primary and alternate command centers (e.g., EOC, operations center, joint information center) • NNSA radiological assets • Offsite organizations, including offsite hospitals treating contaminated/injured employees • Onsite protective actions (e.g., sheltering, evacuating)
	Reviewing the status of the planning matrix annually and making changes as necessary

Emergency Preparedness	
Lesson Learned	**Recommendations**
Some exercise evaluations do not provide the sites with an effective and reliable assessment of emergency response organization performance (repeat lesson learned).	Ensuring that each exercise objective contains the applicable evaluation criteria from DOE Guide 151.1-3, modified to be relevant to the site, with references to the action steps from the applicable site emergency plans and procedures
	Updating the evaluation criteria as needed when emergency plans and procedures change
	Promoting an exercise evaluation culture that seeks program improvements through active senior management involvement
	Increasing the attention to evaluator comments that indicate ERO performance issues during exercises
	Assigning the most experienced personnel in the subject matter as evaluators
	Setting clear expectations and providing training on the use of exercise evaluation criteria to minimize subjectivity
	Using evaluators from offsite sources who have appropriate experience for the area they evaluate
	In evaluator training, emphasizing the differences between "not met," "not applicable," and "not observed" grades for evaluation criteria
	Recruiting and training a sufficient number of controllers and evaluators to minimize the need for assigning dual controller/evaluator responsibilities
Emergency management personnel at some sites do not share lessons learned within their ERO and with other sites.	Promoting the development of lessons learned from training, drills and exercises, actual responses, and routine operations, and submission to site and DOE/NNSA corporate lessons-learned systems
	Including lessons learned from the previous year in the annual ERO refresher training
	Sending exercise after-action reports to the site ERO, including personnel who did not participate in the exercise
	Encouraging ERO members to subscribe to and actively participate in the site and DOE/NNSA corporate lessons-learned systems for automatic receipt of emergency management lessons learned
	Formally evaluating emergency management lessons learned from the DOE/NNSA corporate lessons-learned system for incorporation into the site emergency management program

Appendix B
Supplemental Information

Office of Enterprise Assessments (EA) Management

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