Office of Enterprise Assessments Review of the Pantex Plant Emergency Management Exercise Program

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Acronyms

CAP	Corrective Action Plan
CAT	Consequence Assessment Team
CDNS	Chief of Defense Nuclear Safety
CNS	Consolidated Nuclear Security, LLC
CRAD	Criteria, Review, and Approach Document
DOE	U. S. Department of Energy
EA	Office of Enterprise Assessments
EAL	Emergency Action Level
EEG	Exercise Evaluation Guide
EM	Emergency Manager
EMD	Emergency Management Department
EOC	Emergency Operations Center
EOM	Emergency Operations Manager
EPHA	Emergency Planning Hazards Assessment
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
HAZMAT	Hazardous Material
IC	Incident Commander
ICT	Incident Command Team
ICV	Incident Command Vehicle
NFPA	National Fire Protection Association
NNSA	National Nuclear Security Administration
NPO	NNSA Production Office
OC	Operations Center
OE	Operational Emergency
OE-1	Operating Experience Level 1
OEM	Operational Emergency Manual
OFI	Opportunity for Improvement
PAR	Protective Action Recommendation
PER/ESTARS	Problem Evaluation Request/Electronic Suspense Tracking and Routing System
PSS	Plant Shift Superintendent
SIP	Shelter in Place
SITREP	Situation Report
SUV	Sport Utility Vehicle
TD&E	Training, Drills, and Exercises
VBIED	Vehicle-borne Improvised Explosive Device
Y-12	Y-12 National Security Complex

Executive Summary

The U.S. Department of Energy (DOE) independent Office of Enterprise Assessments (EA) conducted a review of the National Nuclear Security Administration (NNSA) Pantex Plant exercise program. The purpose of this EA review was to evaluate the exercise program's effectiveness in validating, through tests and demonstrations, response elements of the Pantex emergency management program. EA performed this review from April 21 to May 21, 2015, and complements the EA severe event response exercise evaluation performed at the Pantex Plant in 2014 to provide a more complete evaluation of the Consolidated Nuclear Security, LLC (CNS) exercise program.

As a follow-up to the 2014 severe event exercise evaluation, and at the request of the NNSA Production Office (NPO), EA also performed a review of a full-scale emergency management exercise at the Pantex Plant from August 18 to August 20, 2015 to independently assess CNS's progress in improving its response to an Operational Emergency exercise scenario and its ability to conduct and self-evaluate an exercise.

Operating contractor CNS manages the site-level emergency management program, and NPO provides Federal oversight. CNS has established a formal exercise program to validate emergency management program elements at the Pantex Plant. Exercise packages include all requirements of the DOE order and guides, the emergency plan, and the exercise manual. CNS uses an adequate framework for evaluations by using exercise objectives, evaluation criteria, a team of evaluators, hotwashes, critiques, and exercise evaluation guides. In addition, CNS uses its corporate Problem Evaluation Request/Electronic Suspense Tracking and Routing System to manage emergency management related findings and improvement items and track the closure of corrective actions. NPO conducts numerous performance-based assessments of the CNS emergency management program and has a comprehensive issues management process for tracking CNS weaknesses.

However, during the 2015 follow up program review, EA identified the following significant weaknesses in CNS and NPO implementation of the emergency exercise program:

- During the past five years, planning for some important aspects of the Pantex Plant emergency management program, such as responding to an onsite Office of Secure Transportation event, utilizing alternate command centers, conducting full-scale plant evacuations, or utilizing DOE emergency response assets has not been validated. Further, the exercise program has not been effective in identifying findings and fostering continuous improvement.

- The lack of critical evaluation of responder actions has diminished the evaluation process and the validation of program plans and procedures. For evaluation of the 2014 full-participation exercise, references to manuals and handbooks were provided instead of specific measurable evaluation criteria for each objective, and the exercise evaluation guides did not contain measurable standards for assessing exercise objectives. Also, contrary to CNS exercise program guidance, CNS evaluators served as controllers, diminishing their ability to observe and critically assess responder actions. These inconsistencies contributed to CNS evaluators documenting no findings, whereas other (e.g., non-CNS) co-located evaluators identified nine findings during the exercise. In the 2015 full-scale exercise, CNS showed improvement in certain aspects of its exercise program, such as evaluators not serving as controllers and identifying findings to improve the program; however, many of the problems in the exercise evaluation process remained.

- CNS implements the Pantex Plant emergency plan through emergency response organization position-specific manuals and handbooks that do not support an effective event response. Significantly, CNS has not established requirements that emergency response organization cadre members use these manuals and handbooks in conducting their position-specific duties. Further, the ERO position-specific emergency plan handbooks generally do not define the actions necessary for personnel to conduct their assigned duties.

- The corrective action process has not been effective. CNS has not completed effective corrective actions in a timely manner, some issues have recurred over several years, and there has been a high rejection rate of completed corrective actions by CNS effectiveness reviews.

- CNS has not implemented an effective lessons-learned program for promoting program improvements using Pantex Plant and DOE/NNSA complex experience. CNS does not communicate lessons learned through after-action reports, annual refresher training, or continuing training. Further, CNS does not evaluate or track lessons learned from self-identified lessons learned.

- NPO does not consistently perform comprehensive evaluations of the contractor program and does not document its evaluation criteria in contractor assessment reports, and those reports are not completed in a timely manner. NPO also does not use its issues management process to track most of the emergency management issues that require NPO action.

During the 2015 full-scale exercise, EA concluded that the Pantex Plant emergency response organization had made improvements since the 2014 exercise at each of the reassessed venues, which included the operations center, the emergency operations center, the Fire Department's incident command vehicle, and the consequence assessment room. EA noted improvements in sharing information among site responders and offsite authorities, consequence assessment functions, new tools and revised protocols, sound abatement in the incident command vehicle, and CNS's conduct and evaluation of the exercise.

However, EA also identified some new and some continuing performance issues. Most significantly, CNS' control at the event/incident scene was not consistent with the National Incident Management System's Incident Command System. The lack of an incident command structure limited the situational awareness of responder actions and inhibited the execution of a coordinated response at the various incident sites. For some of the continuing performance issues, corrective action plans are still in progress to address issues identified during the 2014 exercise.

Overall, CNS has formal procedures for exercise planning evaluation and issues management. However, the exercise program and corrective action process are only marginally effective in facilitating improvement in the program. The exercise program has not validated all elements of the emergency management program over a five-year period, has not adequately identified findings, and has not fostered program improvements. The exercise evaluation guides do not reflect measurable standards in assessing exercise objectives. Significantly, CNS emergency plan implementation manuals and handbooks do not support an effective exercise evaluation, with personnel relying on experience rather than verified and approved procedures. While the EA observations of the 2015 full-scale exercise identified actions to correct some of the previously assessed weaknesses within the emergency management program identified by the 2014 EA exercise evaluation, continued corrective actions are warranted in the areas of emergency plan implementing procedures, exercise evaluation processes, sustained critical self-assessments of training and exercises, and issues management.

Office of Enterprise Assessments Review of the
Pantex Plant
Emergency Management Exercise Program

1.0 PURPOSE

The U.S. Department of Energy (DOE) independent Office of Enterprise Assessments (EA) conducted a review of the emergency management exercise program at the National Nuclear Security Administration (NNSA) Pantex Plant. This review complements the EA severe event response review performed at the Pantex Plant in 2014 to allow conclusions based on a more complete evaluation of the Consolidated Nuclear Security, LLC (CNS) exercise program. The purpose of this EA review was to evaluate the exercise program's effectiveness in validating, through tests and demonstrations, all elements of the Pantex Plant emergency management program and fostering continuous program improvements.

EA performed this review from April 21 to May 21, 2015. As a follow-up to the severe event exercise evaluation EA performed in 2014 and at the request of the NNSA Production Office (NPO), EA performed an evaluation of a full-scale emergency management exercise from August 18 to 20, 2015. This report discusses the scope, background, methodology, results, and conclusions of the two 2015 EA reviews. Details of the August exercise evaluation are provided in Appendix C.

2.0 SCOPE

This EA review assessed the effectiveness and implementation of the emergency management exercise program that CNS established, as well as the line oversight of the exercise program provided by the NNSA Production Office (NPO). The EA Pantex Plant review plan (*Plan for the Office of Enterprise Assessments Review of Emergency Management at the Pantex Plant*) dated March 19, 2015, describes the specific focus of this review. This review evaluated the site's exercise program to determine whether it uses plausible and realistic Operational Emergency event scenarios, validates all elements of the emergency management program, effectively evaluates emergency response, properly conducts exercises, and provides a means to improve the site's preparedness to respond to Operational Emergencies. The review evaluated key exercise program documents; exercise planning and implementation activities for the 2014 full-participation exercise; exercise after-action reports for the past five years; corrective action processes for deficiencies, weaknesses, and improvement items identified during exercises; and use of lessons-learned programs.

3.0 BACKGROUND

The Pantex Plant was constructed for the assembly, disassembly, testing, and evaluation of nuclear weapons in support of DOE's stockpile maintenance program. Pantex also performs research and development in conventional high explosives, and serves as an interim storage site for plutonium pits removed from dismantled weapons. Pantex has significant quantities of radioactive material and hazardous chemicals. Pantex is therefore required to have an Operational Emergency hazardous material (HAZMAT) program in accordance with DOE Order 151.1C, *Comprehensive Emergency Management System.*

Pantex has a site-level emergency response organization (ERO), which responds to all emergency events at the plant. As the 24-hour point of contact for Pantex, the plant shift superintendent (PSS) initially directs site-level responses. When an Operational Emergency occurs at the Pantex Plant, personnel notify

the PSS, who then implements the emergency plan. The PSS initially categorizes the incident and determines the proper emergency class in accordance with established emergency action levels (EALs), and may activate the ERO. The PSS transitions site-level response to the Emergency Operations Center (EOC) when it becomes operational. The EOC provides site-level support to the incident commander (IC), including activating and deploying site response assets to the scene; activating mutual aid requests; providing technical support, such as site field monitoring; and conducting coordination with state and local governments.

The EA review program is designed to enhance DOE safety and security programs by providing DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and requirements, as well as the effectiveness of DOE and contractor line management performance in safety and security and other critical functions as directed by the Secretary of Energy. The EA review program is described in and governed by DOE Order 227.1, *Independent Oversight Program*, and a comprehensive set of internal protocols, operating practices, inspector guides, and process guides.

This EA review evaluated the Pantex Plant exercise program to assess how thoroughly the Pantex Plant emergency management program was tested by the site-level and facility-level exercises over the past five years and how effective the exercise program has been in fostering continuous improvements and lessons learned. As part of the five-year program review, EA also examined the use of severe event exercise scenarios as delineated by DOE's Operating Experience Level 1 (OE-1), *Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events*. EA also examined how the corrective action process was applied to address the internal findings from the Pantex Plant 2014 full-participation exercise after-action report.

EA's exercise review in 2014 identified some strengths. Personnel exhibited generally good command and control of the emergency events. Personnel also developed critical response objectives and established priorities to support the IC and address balance of plant requirements, mass casualties, and infrastructure damage. However, EA observed several performance issues during the 2014 review. CNS information flow processes were not effective in acquiring, recording, and disseminating timely and accurate event information among the ERO cadre and offsite response organizations. The manuals referenced by the exercise objectives for how tasks were to be accomplished generally lacked specificity; where procedures were specific, players frequently relied instead on personal experience and knowledge to accomplish tasks. Also, exercise evaluators were not sufficiently critical in identifying significant weaknesses while evaluating player performance. This 2015 review evaluated the effectiveness of corrective actions associated with these issues by looking at corrective action plans (CAPs), the processes used to rank findings and to track and close out corrective actions, and the records and documents that serve as objective evidence of completed actions.

4.0 METHODOLOGY

As identified in the EA review plan, this review considered the requirements related to the emergency management exercise program issued through DOE Order 151.1C for an Operational Emergency HAZMAT program. EA used key aspects of these requirements as delineated in the inspection criteria and lines of inquiry of Criteria, Review, and Approach Document (CRAD) 45-61, *Exercise Program Review and Severe Event Response Evaluation*. EA completed the Pantex review under CRAD 45-61 through three reviews and two separate reports. In 2014, EA evaluated the site's response to a postulated severe event, as planned and conducted by CNS for the Pantex annual full-participation exercise, and issued a report on the site's response. In August 2015, EA evaluated the site's response during an annual full-participation exercise, using EA evaluators stationed at the same response venues as in the 2014

exercise to better allow them to identify areas of improvement, continuing issues, and new issues. This 2015 report discusses both EA's exercise program review and the site's actions addressing findings from the Pantex 2014 full-participation exercise after-action report.

To gather data for this 2015 review, EA examined key documents, such as the Pantex emergency plan, exercise program implementing procedures, exercise plans, exercise schedules, the set of exercise objectives and criteria, after-action reports, CAPs, the corrective action tracking system, and records associated with corrective action closure. EA also reviewed CNS's use of the Pantex and DOE corporate lessons-learned programs. EA interviewed key personnel responsible for developing and executing the exercise program and used the observations from the 2014 full-participation exercise in arriving at conclusions. The members of the EA review team, the Quality Review Board, and EA management responsible for this review are listed in Appendix A. Appendix B provides a detailed list of the documents reviewed and personnel interviewed. Results from the August 2015 review of the annual full-participation exercise are presented in Appendix C.

5.0 RESULTS

The results of this review are organized around six principal components of an exercise program: exercise plans and procedures, exercise evaluations, after-action reports, exercise conduct, program improvements, and lessons learned. In addition, Section 5.4 addresses the severe event exercise evaluation component described in OE-1.

5.1 Exercise Plans and Procedures

Review Criteria:
A formal exercise program must validate all elements of an emergency management program over a 5-year period. The exercise program must validate facility and site-level emergency management program elements by initiating response to simulated, realistic emergency events/conditions in a manner that, as nearly as possible, replicates an integrated emergency response to an actual event. Planning and preparation must use an effective, structured approach that includes documentation of specific objectives, scope, time lines, injects, controller instructions, and evaluation criteria for realistic scenarios. (DOE Order 151.1C and paraphrased from CRAD 45-61.)

For this portion of the review, EA reviewed the CNS emergency plan, exercise and drill standards, baseline ERO and response organizations' objectives, response steps, evaluation checklists and criteria, the Pantex 2014 full-participation exercise after-action report, the five-year exercise schedule, exercise plans from the most recent five-year period, and records of exercise plan approval.

The CNS exercise program documents adequately incorporate DOE order requirements. CNS has appropriately documented the exercise program description and implementing processes in the Pantex Plant exercise plan (*(U) Emergency Management Training, Drill and Exercise Program Plan*) and a training, drill, and exercise (TD&E) manual (*(U) Emergency Management Training, Drills, and Exercises*). The emergency management department (EMD) adequately documents the schedule for executing an ongoing five-year exercise program in the exercise plan. Collectively, these exercise program documents incorporate the DOE Order 151.1C exercise requirements.

CNS appropriately develops exercise plans consistent with DOE Order 151.1C and DOE Guide 151.1-3, *Programmatic Elements*, using the TD&E manual. CNS defines the processes that Pantex uses to develop, conduct, evaluate, and document site-level emergency management exercises in the TD&E manual. EMD uses an effective, structured approach when planning and preparing exercises. The

exercise plans include documentation of specific objectives, scope, timelines, injects, controller instructions, and evaluation criteria for realistic scenarios. The EMD exercise developer involves facility managers and personnel to ensure appropriate information on scenarios, facility configurations, and source terms are used in the development of the exercises. In addition, the exercise developer works with other Pantex department personnel (i.e., fire department, medical, and security) to include realistic props for exercise play. For example, an overturned vehicle with moulaged mannequins (mannequins with mock injuries applied for the purpose of training) was used for the 2014 full-participation exercise.

CNS appropriately maintains a five-year annual exercise schedule, and EMD posts the schedule on the EMD SharePoint site. With one exception, CNS has conducted at least one annual exercise each year for the past five years. The 90-, 60-, and 30-Day Exercise Plan submissions to NPO were also included and, once approved, distributed to DOE Headquarters. The 2013 annual exercise was not conducted until January 29, 2014.

Although Pantex has an appropriate exercise program, CNS does not validate the full scope of emergency management program elements over a five-year period. DOE Guide 151.1-4, *Response Elements*, requires the periodic exercises to test the ten program response elements. However, in the past five years, CNS has not validated or tested the use of alternate command centers, a full-scale plant evacuation, an onsite Office of Secure Transportation event, or DOE emergency response assets. (See **OFI-CNS-1**.)

Finding F-CNS-1: Contrary to DOE Order 151.1C, the CNS exercise program does not validate all elements of the emergency management program over a five-year period.

Overall, CNS has established a formal exercise program to validate emergency management program elements at the site. The Pantex emergency plan and exercise documents appropriately incorporate the DOE requirements for the contents of an exercise plan. Exercise plans for the past five years were adequately prepared in accordance with the implementing standards and were approved by NPO and submitted to the required DOE Headquarters organizations. However, CNS has not validated the full range of important program elements over the past five-year period.

5.2 Exercise Evaluations

Review Criteria:
Exercises are evaluated and critiqued effectively and reliably and result in lessons-learned, corrective actions, and program improvements for identified program weaknesses. (DOE Order 151.1C paraphrased from CRAD 45-61.)

For this portion of the review, EA used the 2014 exercise evaluation activities (e.g., the planned evaluation criteria; use of hot washes, critiques, and exercise evaluation guides (EEGs); and the CNS and EA after-action report results) to make conclusions about the effectiveness and reliability of CNS evaluations. EA also assessed CNS implementing practices against the site's exercise program documents, which include exercise plans, manuals, handbooks (also known as ERO teambooks), and work instructions.

CNS establishes an adequate framework for evaluating exercises in the Pantex Plant emergency plan (*(U) Pantex Plant Comprehensive Emergency Management Plan*); a training, drill, and exercise plan (*(U) Emergency Management Training, Drill, and Exercise Program Plan*); and a training, drill, and exercise manual (*(U) Emergency Management Training, Drills, and Exercises*). With one exception, these documents are consistent with the requirements of DOE Order 151.1C and recommendations in the associated guides. These documents adequately describe the role of evaluators, hotwashes, critiques, evaluation criteria, and EEGs that are part of the Pantex Plant exercise program. Missing from these

documents are adequate definitions of findings, deficiencies, and weaknesses, which are terms defined in the DOE guide used to properly process findings in the issues management system. (See **OFI-CNS-2**.) CNS personnel stated that they use the definitions in the DOE guide when ranking findings to apply the appropriate corrective action process.

Although the program requirements are adequate, CNS did not always adhere to its plans, manuals, and handbooks when evaluating the 2014 exercise. The following weaknesses are most significant:

- CNS did not provide specific measurable evaluation criteria for each objective to be used during the exercise. Instead, the exercise documents provided references to manuals and handbooks. Neither evaluators nor responders referenced the manuals and handbooks during the exercise. CNS exercise program documents state that specific evaluation criteria, using a procedure or checklist, must be developed for measuring performance. (See **OFI-CNS-3**.)

- The EEGs, used after exercise play, do not reflect measurable standards in assessing exercise objectives. For example, the EEG used to evaluate a timely initial assessment (Pan-CAT.3) does not include a verification of the event classification, protective actions, use of proper EALs, or use of initial and validating plume modeling software described as the Pantex Plant methods of performing a timely initial assessment in implementing documents. (See **OFI-CNS-3**.)

- All CNS evaluators also served as controllers, but the exercise program documents state that an evaluator's only function is to observe and document the responder actions. (See **OFI-CNS-3**.)

- One evaluator had little experience in the assigned area; however, the program documents say that the exercise evaluator organization is composed of personnel knowledgeable in emergency response and emergency operations in the area they are assigned to evaluate. (See **OFI-CNS-3**.)

EA also observed that replacing emergency plan implementing procedures with manuals and handbooks does not support an effective response or exercise evaluation. (See **OFI-CNS-4**.) DOE Order 151.1C requires emergency plan implementing procedures to describe how emergency plans must be implemented. The CNS manuals and handbooks are the sole means to meet this requirement. However, the uses of these types of documents provide less implementing instructions and evaluators did not critically evaluate responder adherence to executing the instructions as a means to satisfy DOE 151.1C order requirements. For example, the logistics handbook provides little information on how to acquire assets under emergency conditions. During the exercise, the logistics team relied on the Google search engine to locate available ambulances, rather than written protocols, leaving evaluators no means to determine whether this action met the planned expectations. In addition, most exercise players did not adhere to their manuals and handbooks, resulting in response tasks not performed. For example, a handbook requires the consequence assessment team (CAT) to brief the ERO command room on plume plots that show areas that exceed protective action criteria; however, this duty was not conducted during the exercise. Importantly, the CNS evaluation did not identify this condition as an area to be corrected.

No findings were identified by CNS evaluators in the CNS 2014 after-action report. However, NPO issued one finding, identified by an NPO contractor, which was incorporated into the CNS after-action report, and EA evaluators identified eight findings. (See **OFI-CNS-3**.) CNS had evaluators at the same locations as the NPO and EA evaluators and used the same evaluation criteria. EA attributes this divergence, in part, to how evaluators view the same conditions differently when specific measurable evaluation criteria do not exist as a result of differences in evaluator experience and the CNS evaluators being distracted by controller duties. For example, during the 2014 exercise:

- EA identified a finding for CNS not developing a procedure to implement ERO activation within one hour of an operational emergency declaration, as established by the Pantex Plant emergency plan and the DOE response guide. CNS identified that the ERO was not staffed within one hour after declaration of the operational emergency; however, CNS graded the objective as MET. The EEGs contain two objectives that have criteria for activating the ERO within an hour – Pan-EXEC.2 and Pan-EOC-6. Pan-EXEC.2 correctly established the one-hour period from the time of Operational Emergency declaration, whereas Pan-EOC.6 says one hour from the activation time. Therefore, the evaluator for Pan-EOC-6 chose the start time to be the time a safe route inject message was provided. Further, Pan-EOC-6 states it is validating that the ERO is activated within one hour, in accordance with the operational emergency manual (OEM). However, the OEM did not include this requirement and the discrepancy went unnoticed by CNS. As a result, this objective was not effective in validating the OEM.

- EA identified a finding for initial and ongoing assessments because these required functions were not performed. CNS, however, identified these issues as improvement items. EA noted that the readiness assurance plan that was in effect during the 2014 exercise used the failure to perform a timely initial assessment as an example of a deficiency when categorizing a finding. The objectives for these consequence assessment functions (Pan-CAT.3 and Pan-CAT.4) make reference to the OEM, which in turn, references the CAT handbook for the evaluation criteria. Since the evaluator did not assess the performance against these documents, the exercise could not validate them. EA observed that the CAT evaluator did note in the EEG that responders met the wording of all Pan-CAT.4 criteria, but added that the CAT failed the intent of the objective. However, CNS graded the objective as MET.

- EA identified a finding of ineffective communications for cross-cutting communication weaknesses because:

    - The CAT did not brief the command room on a plume plot projection showing areas where protective action criteria were exceeded and evacuations should be considered. Also, the CAT did not reconcile why offsite protective actions extended ten-miles when plume plot projections indicated protective action criteria was not exceeded off site. The CNS evaluator credited other plume plots, which did not reflect protective action criteria, for meeting this objective (Pan-EXEC.6).

    - CNS incorrectly recommended protective actions to offsite authorities for the entire ten-mile emergency planning zone (EPZ) through a media release when no protective action criteria were exceeded off site. Additionally, the CNS ERO did not communicate well with offsite authorities about protective action criteria and potentially contaminated areas off site.

    - CNS responders did not activate the ERO because neither the PSS nor a CAT member established safe routes to the EOC. After more than an hour delay, while the PSS and the plume plot modeler waited for each other's phone call, a CNS controller provided an inject message for a safe route in order to proceed with the exercise.

    - CNS did not provide offsite authorities radioactive material release data or timely plume plots showing offsite areas with the potential for radioactive contamination to support offsite field monitoring.

    - CNS provided incomplete and inaccurate information to DOE Headquarters and did not provide updates when new information was available.

- Communications did not foster interoperability among onsite and offsite response facilities. Offsite decision-makers were unable to view emergency data and technical products produced by the site, which were needed for timely and accurate decision-making.

CNS evaluators identified communication problems, such as not using repeat backs, and inaccuracies in the situation report (SITREP) (which resulted in CNS grading objective Pan-ECT.4 as NOT MET), poor communications between the PSS and the emergency services dispatch center (which resulted in CNS grading objective Pan-ESDC.2 as NOT MET), and problems with protective action messages, but did not identify a finding.

- EA identified a finding that no evacuation protective actions are included in the EAL guides, regardless of HAZMAT airborne concentrations. Although some Pantex Plant emergency plans recognize the need for evacuations, the EAL set does not establish a means for personnel to quickly make a decision to evacuate based on significant HAZMAT release indications.

- EA identified a finding because CNS did not provide accurate, candid, and timely information to the news media and the public. CNS gave incorrect protective action information to the public in the National Weather Service Emergency Alerting System message and the Pantex Plant press releases that followed. The preplanned emergency alerting system message stated that local officials recommend all residents and visitors in the Pantex Plant 10-mile EPZ to immediately shelter in place. This conflicted with the PSS-issued protective action recommendation that only applied to some zones (2, 3, 4, A) within the EPZ. The initial preauthorized Pantex Plant press release and updates incorrectly identified that Carson, Potter, and Armstrong county residents living within the 10-mile EPZ should continue to shelter in place. The CNS evaluator marked protective action updates to the offsite authorities as not applicable (Pan-EXEC.6).

- EA identified a finding because CNS did not provide accurate and timely follow-up notifications to offsite officials when conditions changed. The CNS evaluator marked follow-up notifications as not observed (Pan-PSS.6).

- EA identified a finding because CNS did not provide emergency status updates to DOE Headquarters. The Operations Center transmitted only one DOE Headquarters SITREP, which contained inaccurate and incomplete information. CNS made an observation (Pan-EXEC.5) that DOE Headquarters should be updated with new information.

- EA identified a finding that CNS did not ensure that medical support for injured personnel was promptly and effectively implemented. CNS marked similar items as not observed, and the objective was graded as MET based on activation of the emergency contact coordinator (Pan-EXEC.9).

The 2014 and 2015 Pantex exercise after-action reports rank findings into deficiencies and weaknesses, which reflect direct impact or indirect impact on performance of a function, respectively, and define these terms within the after-action reports using the same definitions provided in DOE Emergency Management Guide 151.1-3. The 2014 report identifies one finding, ranked as a deficiency, and 12 improvement items. The 2015 report identifies three findings, all deficiencies, and 15 improvement items. The findings and improvement items were entered into the CNS Problem Evaluation Request/Electronic Suspense Tracking and Routing System (PER/ESTARS) database for tracking and to initiate corrective actions.

Overall, CNS uses an adequate framework to establish evaluations by using exercise objectives, evaluation criteria, a team of evaluators, hotwashes, critiques, and EEGs, which have resulted in findings for resolution; however, the lack of implementing details diminish the effectiveness and reliability of exercise evaluations. Additional weaknesses include evaluation criteria that lack measurable standards, evaluators distracted by controller duties, use of inexperienced personnel as evaluators, and the lack of critical evaluations for adherence to implementing documents. The lack of critical evaluations of responders adhering to response documents diminishes the evaluation of a response and validation of the procedures, which are two important goals of an exercise.

5.3 After-Action Reports

Review criteria:
Evaluation reports for facility and site exercises must be completed within 30 working days and submitted to the Cognizant Field Element, the Program Secretarial Officer(s), and the Director, Office of Emergency Operations. (DOE Order 151.1C)

For this portion of the review, EA reviewed the site emergency plan, CNS exercise procedures, and the 2014 and 2015 CNS exercise after-action reports.

CNS program documents adequately establish requirements for developing, approving, and distributing exercise after-action reports, as required by DOE Order 151.1C and the DOE guide 151.1-3. The site emergency plan; the emergency management training, drill, and exercise program plan; and the emergency management TD&E manual define the program requirements for developing, approving, and distributing CNS exercise after-action reports. These documents promulgate the DOE requirements for completing after-action reports within 30 working days of the exercise completion date, providing draft reports to NPO for comments and approval, and submitting the approved reports to NPO, the Program Secretarial Officer, and the Director, Office of Emergency Operations.

With two exceptions, the 2014 and 2015 CNS after-action reports were developed, approved, and distributed in accordance with the CNS program documents. The reports' contents were derived from the exercise plans and evaluation activities and, overall, the exercise evaluation results were presented as recommended by the DOE Guide 151.1-3. The content includes the exercise scenario, scope, purpose, objectives, participants, an overall performance rating, and results for each objective. However, the after-action reports did not contain recommendations for correcting negative findings, as recommended by the DOE Order 151.1C and required by CNS program documents, or lessons learned as required by CNS program documents. (See **OFI-CNS-5**.)

The CNS after-action reports also provide an overall summary of the performance during the exercise that is based on an objective scoring system. The after-action reports sometimes refer to this scoring system as an emergency management drill/exercise scoring system. The scoring system raises ratings for objectives met, noteworthy practices, and superior performances while lowering ratings for objectives NOT MET and for findings. While this concept is sound, it is subject to misinterpretation. The rating can be viewed as an indicator of the exercise quality when it is intended to rate the players performance. This could lead to conclusions that a critically evaluated exercise, one that results in more findings, is a poor exercise. This contradicts the goal of the exercise program to provide effective and reliable evaluations that lead to program improvements and may detract from evaluators identifying findings. The presentation of the "exercise rating" does not clearly establish whether there are problems with the exercise or the response. (See **OFI-CNS-3**.)

Overall, CNS has established an adequate framework for developing, approving, and distributing exercise after-action reports to meet DOE Order requirements. The August 2014 and February 2015 exercise

after-action reports were developed, approved, and distributed in accordance with the CNS program documents with two minor exceptions, i.e., the inclusion of corrective action recommendations and lessons learned. Additionally, the recently adopted exercise scoring criteria could cause evaluators to underreport findings in order to improve the exercise score.

5.4 Severe Event Exercises

Review criteria:
Severe event exercises include events that impact multiple facilities that cause the loss of infrastructure and primary capabilities and introduce secondary or compounding severe events that occur during critical stages of the initial response or during later remediation efforts. (OE-1 and CRAD 45-61)

When CNS was planning its 2014 annual full-participation exercise, EA asked CNS to include severe event components from a list of EA focus areas that were consistent with the OE-1 scenarios. CNS added most of the requested focus areas, but did not test the use of alternate command centers or backup power systems. EA was able to validate most of CNS's capabilities for responding to the types of severe events described in OE-1, and reviewed the past five years of exercise plans and after-action reports to determine the extent of testing of severe event capabilities.

EMD has developed and conducted full-participation severe event exercises for the past two years to validate CNS's capabilities for responding to the types of severe events described in OE-1. However, CNS has not effectively validated the planning for an OE-1 severe event response during an exercise in the past five years because EMD has not obtained NPO approval on revisions to the Pantex Plant emergency planning hazards assessment (EPHA) and EALs. The current EPHA and EAL set do not contain severe event scenarios as identified in OE-1. EMD has revised the site emergency planning hazards assessment (EPHA) to include OE-1 severe event scenarios and has transmitted the EPHA to NPO, but has not received NPO approval to complete a set of severe event EALs and revisions to EPZs and other emergency response documents. NPO indicated that final approval of the EPHA would occur by the end of this calendar year. Additionally, the evaluators did not effectively critique or validate the exercise conduct, as discussed in Section 5.2.

Overall, CNS has not effectively validated its capabilities for responding to the types of severe events described in OE-1. EMD has revised the site EPHA to enable the Pantex ERO to evaluate severe events involving multiple facilities; however, NPO has yet to approve the EPHA.

5.5 Exercise Conduct

Review Criteria:
Each exercise must be conducted, controlled, evaluated, and critiqued effectively and reliably. (DOE Order 151.1C paraphrased from CRAD 45-61)

For this portion of the review, EA observed the conduct of the 2014 full-participation exercise and reviewed the Pantex 2014 full-participation exercise after-action report.

CNS conducted and controlled the 2014 full-participation exercise within the framework of the DOE order and guides; however, the exercise conduct and control were partially ineffective. EMD produced an adequate exercise package that includes all requirements of the DOE order and guides, the emergency plan, and the exercise manual. EMD provides appropriate training for exercise controllers and evaluators, identifying vests, an adequate controller communications network, and message injects. However, EA identified weaknesses in exercise conduct and control observed in the PSS room, consequence assessment room, logistics room, and at the incident scene. Control weaknesses included controllers having to issue

contingency messages and an insufficient number of personnel to minimize the need for evaluators to also perform controller functions. In some cases, issuance of contingency messages indicated that emergency responders were not performing their assigned duties as required. Controllers had to issue four contingency messages because responders did not initiate actions that were critical for successful completion of the exercise. Most significantly, one contingency message had to be issued to activate the ERO because the PSS had not established safe routes for CNS responders in a timely manner, as discussed in Section 5.2. This contingency message was issued one hour and twenty minutes after the General Emergency declaration.

Additionally, CNS has replaced ERO position-specific emergency plan implementing procedures with position-specific handbooks. However, the handbooks generally do not contain the procedures necessary for personnel to conduct their assigned duties and were not referenced in the EEGs or the exercise plan as evaluation criteria. For example, although CNS has developed a Logistic Team Handbook, the Logistics Team exercise evaluation criteria referred to the OEM, which contains little or no information on how to perform the stated objectives. Additionally, CNS has not established requirements that ERO cadre members use the manuals and handbooks in conducting their position-specific duties, and most of the ERO cadre members did not use them. Relying on the experience of players instead of following procedures did not validate plans/procedures or ensure that other personnel would have performed the duties in a similar manner during an actual event. (See **OFI-CNS-6** and **Finding F-CNS-2**.)

Finding F-CNS-2: Contrary to DOE Order 151.1C, CNS has not developed emergency plan implementing procedures to describe how the emergency plans must be implemented.

Overall, CNS conducted and controlled the 2014 full-participation exercise within the framework of DOE requirements, but numerous control weaknesses diminished the effectiveness and reliability of the exercise. CNS has not established required procedures for the ERO cadre members to use in conducting their position-specific duties for implementing the Pantex emergency plan and, instead, relies on the experience of the players to perform the duties.

5.6 Corrective Actions and Improvements

Review Criteria:
Lessons-learned must be developed, resulting in corrective actions and improvements. (DOE Order 151.1C paraphrased from CRAD 45-61.)

5.6.1 Contractor Issues Management Process

For this portion of the review, EA reviewed the site emergency plan, the site contractor assurance system assessments description, the CNS issues management procedure, the 2014 and 2015 CNS exercise after-action reports, a sample of recent CNS self-assessment reports related to EA observations made during the 2014 exercise, and the management of issues identified by external organizations. EA used the issues identified in the 2010 EA report, the 2014 Chief of Defense Nuclear Safety (CDNS) report, and NPO oversight activities in making conclusions about the CNS process for addressing external evaluation results. Records in the PER/ESTARS database related to EA observations during the 2014 Pantex annual exercise were also reviewed.

Consistent with the Pantex Plant emergency plan, CNS program documents adequately establish requirements for processing and closing out contractor responsibilities for findings identified in the emergency management program. These emergency management division and site-wide documents include the *(U) Contractor Assurance System Assessment Manual*; *(U) Emergency Management Training, Drills, and Exercises* manuals; (*U) Develop, Track, and Administer Problem Evaluation Requests* and *(U)*

Performing Causal Analysis and Developing Corrective Action Plans work instructions. Collectively, these documents incorporate the DOE Order 151.1C requirements of completing CAPs within 30 days after receiving an after-action report, completion of corrective actions for site exercises through independent verification and validation practices, effectiveness reviews to ensure the original finding is resolved, and completion of corrective actions involving revision of procedures or training of personnel before the next exercise.

CNS has consistently entered all emergency management findings and improvement items into the site PER/ESTARS database for issues identified in exercises and the readiness assurance program self-assessments. Once the findings and improvement items are entered, the processes for causal analysis, CAP development, assignment of responsibilities, establishment of due dates, and scheduling and tracking of closeout activities are initiated. A review committee determines the rigor of the causal analysis CAPs based on its judgment about the significance of an issue. The tracking system adequately supports this process by providing responsible personnel notifications for upcoming and past due dates as well as a means to attach closure files for easy access. This is a well-structured process that uses an effective tracking mechanism.

CNS has entered all findings, weaknesses, and improvement items identified by NPO in the last two years into the PER/ESTARS database. The process described above is adequate for the issues that NPO identifies during exercises and other emergency management oversight activities.

However, CNS has not entered any issues identified in the EA 2010 Pantex Plant emergency management review report or the 2014 CDNS report into the PER/ESTARS database for processing because NPO did not transmit these reports to CNS. (See **OFI-NPO-1**.) The EA 2010 emergency management review of Pantex covered 7 of the 15 emergency management program elements and identified recommendations to improve 5 elements. The contractor took no actions to address issues identified in the EA report. The 2014 CDNS review identified one Pantex weakness that was directed at its technical planning basis regarding severe event planning. Because Pantex had already initiated actions for this weakness for other reasons and before the CDNS report was received, NPO saw no need to send CNS a copy of the report. (See **NPO-OFI-2**). The CDNS team did not discuss or validate the report with CNS at Pantex; therefore, the CNS at Pantex had no knowledge of the content of the report. NPO expects that a recent revision of the Pantex Plant EPHA will correct the weakness identified by the CDNS review. NPO is now reviewing the EPHA revision for approval and expects to be complete by the end of this calendar year.

CNS has an adequate process to track and manage emergency management issues identified in exercises, self-assessments, NPO oversight activities, and external evaluators. CNS has entered all emergency management issues identified in exercises, self-assessment reviews, and NPO oversight activities, but not from the external reviews performed by EA in 2010 or CDNS in 2014. This has resulted in missed opportunities to improve the Pantex emergency management program.

5.6.2 Contractor Corrective Actions

For this portion of the review, EA reviewed the CNS issues management procedure, exercise after-action reports, self-assessment reports, exercise and self-assessment CAPs, PER/ESTARS records, and closure evidence.

CNS has not completed corrective actions related to emergency management issues in a timely, effective manner. (See **OFI-CNS-7**.) Although CNS consistently follows its corrective action process, there is either a high ejection rate during the CNS effectiveness reviews, or the original problem is sometimes observed again during a subsequent drill, exercise, or self-assessment. This condition is indicative of problems in the causal analysis, the completeness of the CAPs, and in the performance of independent

verifications, possibly because issues are often ranked as improvement items rather than deficiencies or weaknesses. The CNS independent verification process is a significant check in the CNS process. Draft documents are accepted in the closure process, and the independent verification ensures that these draft documents remain unchanged when issued. However, in one case involving training for CAT members, an independent verification did not identify that training had not been completed when it was submitted for an effectiveness review. When effectiveness reviews reject corrective actions, CNS closes out the finding and reopens it under a new PER/ESTARS number and the process starts all over again. This can sometimes go on for years without resolution, as indicated below.

- During the 2014 exercise, the CAT did not perform the site timely initial assessment and continuous ongoing assessments processes defined in the OEM and the CAT handbook. CNS has a CAP that addresses relevant procedure and checklist revisions; however, EA observed that the CAT did not use procedures or complete their checklists during the exercise. EA further noted that a CNS self-assessment identified these same problems in 2012 during a drill (PER-2012-0283 and PER-2012-0284) and again in the 2015 exercise after-action report.

- During the 2014 exercise, offsite authorities made it known that they are still not getting needed HAZMAT dispersion information in a timely manner. Offsite personnel said that they expected to see the plume plots sooner because CNS had installed computers and provided liaisons in the Amarillo EOC to overcome this longstanding problem. The PER/ESTARS database indicated that a 2011 self-assessment identified this same issue (PER-2011-1180) based on limitations caused by a telephone bridgeline. For this 2011 item, the CAP was limited to installing some communication routers and updating an information release form in a handbook. During the 2014 exercise, CNS did not provide offsite authorities plume plots because of classification concerns.

- During the 2014 exercise, all evaluators performed as controllers because of an insufficient number of controllers and evaluators. A 2011 self-assessment identified a finding for this same condition (PER-2011-1172). The 2011 finding had a CAP that was limited to changing a manual. Recruitment and training of additional evaluators were not included. EA further noted that nearly all exercise evaluators also served as controllers during the 2015 exercise.

- During the 2014 exercise, EA observed that none of the EAL guides led to evacuation protective actions, regardless of HAZMAT airborne concentrations and the integrity of structures used for shelters. CNS explained that security conditions at Pantex do not provide a viable means for evacuation. However, site plans and procedures reflect evacuation protective actions, just not through EALs. A 2013 self-assessment determined that the offsite relocation facilities identified in site evacuation plans at the time were never tested in a drill or exercise (PER-2013-0414). CNS resolved this issue by eliminating the offsite muster locations from Pantex plans and will require site workers to go home and to call their supervisors for accountability purposes. This concept has also not been tested to determine whether it can be completed within 45 minutes while controlling contaminated personnel, vehicle, and equipment as stipulated by DOE criteria.

- During the 2014 exercise, ERO members often did not complete their checklists. A CNS self-assessment had identified this same condition in 2011 (PER-2011-1146).

EA noted that the following corrective actions from the 2014 exercise, involving revision of procedures or training of personnel, should have been completed before the February 2015 exercise per DOE 151.1C and the CNS exercise program requirements, but were not. (See **OFI-CNS-8**.)

- Updates for several plans and procedures that needed additional detail (specific documents were not identified).

- A determination as to whether the emergency services dispatch center procedures, training, and forms need to be revised. This action was closed after the 2015 exercise by a memorandum that documented a meeting.

- Addressing performance problems in completing a SITREP report.

- Addressing timeliness of the CAT in providing a plume plot to offsite authorities and properly briefing the EOC command room. The corrective actions are limited to review and consider the need to update CAT procedures and checklist.

- Ensuring proper response of the fire department support team when conflicting directions are provided by the PSS and the IC.

- Addressing loud conditions in the incident command vehicle that hampered communications. This item was closed after the 2015 exercise by a memorandum to explore an alternate generator, which is the source of the noise.

- Addressing PSS denying requests made by the IC for the fire department support team, not providing complete and accurate information on the initial notification forms, and not notifying offsite authorities when protective actions changed. These items were closed after the February 2015 exercise by developing a tool to determine safe routes for first responders and consideration of notification process changes.

Overall, based on some issues recurring over several years and a frequent rejection rate of completed corrective actions by CNS effectiveness reviews, the corrective action process has not been effective for emergency management issues. These problems are likely to be weaknesses in the causal analysis in identifying a complete CAP and/or an ineffective independent verification process and the low expectations for responder adherence to response manuals and handbooks. Further, corrective actions involving responder training or procedure revisions are not always completed before the next exercise.

5.6.3 NNSA Oversight and Issues Management

For this portion of the review, EA reviewed the NPO oversight process procedure, NPO survey results (topical area quarterly summary reports), the processing of a 2014 CDNS review finding, and findings NPO issued to CNS during the past two years. No NPO self-assessment results were provided for EA review, and no issues had been entered into the NPO corrective action tracking system database until late in the final week of data collection activities. This EA review used the same CRAD that had been used for EA 2015 review at the Y-12 National Security Complex (Y-12). NPO uses the same oversight procedures and personnel to perform oversight activities at Pantex and Y-12. Likewise, the 2014 CDNS report of emergency management addressed Pantex and Y-12 programs in a single report.

The NPO oversight procedure (*NPO Oversight Process*) describes the process that all NPO organizations use to formally resolve issues identified in oversight activities. Additional details for NPO oversight activities are described in its survey/self-assessment guide. The process prioritizes issues into four categories based on significance, and the procedure provides appropriate guidance on developing corrective actions and preventing recurrence. In addition, the procedure requires formal tracking of corrective actions (using ePegasus, a computerized issues management tracking system) and the use of

objective evidence to close corrective actions. The procedure also requires identification of root causes, extent-of-condition reviews, and effectiveness reviews for the two most significant levels of issues.

NPO did not provide findings identified from self-assessment activities and the 2014 CDNS review identified one finding for NPO applicable to the Pantex Plant. When EA initiated this review, NPO had no entries in the ePegasus database relating to the Pantex Plant emergency management program, but NPO was populating the database with existing issues during the EA visit. (See **OFI-NPO-2**.) The 2014 CDNS report had one finding for NPO's oversight activities at the Pantex Plant and it remains unresolved, so EA did not write a duplicate finding. The finding was for NPO not performing the required triennial reviews of the contractor emergency management program. Although DOE Order 151.1C requires CAPs to be completed within 30 days of receipt of an evaluation report, NPO has not developed a CAP for this 2014 finding. EA identified this same condition during the recent Y-12 review and issued a finding for not completing a CAP within 30 days of receiving the 2014 CDNS evaluation report and, therefore, a duplicate finding is not being made from this review at the Pantex Plant.

Although NPO performs many oversight activities in accordance with its survey/self-assessment guide and identifies weaknesses and deficiencies that are transmitted to CNS, the structured approach required by the DOE Order 151.1C and the applicable DOE guide is not used. The 2014 CDNS review identified the lack of following the order's approach as a finding, so EA did not duplicate that finding in this review. The order establishes a comprehensive review of the 15 emergency management program elements every three years using criteria contained in the guide. The last time NPO used the approach described in the DOE order at the Pantex Plant was during an October 2012 to May 2013 review, but that review only assessed 13 program elements; missing from the review were (1) Training and Drills and (2) Exercises. Subject matter experts from the Office of the Associate Administrator for Safety and Health performed the review on behalf of NPO, and NPO concluded from the results that the Pantex emergency program possessed several fundamental weaknesses that required management attention. The review identified 17 findings, 11 weaknesses, and 8 OFIs while making an effort not to duplicate previously identified problems. NPO formally sent its conclusion to CNS in February 2014 and requested the development of an emergency management strategic plan for improvement by March 14, 2014. The requested plan also needed to include the two missing program elements in addition to CAPs for other NPO findings, commitments made to external stakeholders, and DOE's OE-1. CNS promptly responded with a strategic plan that consisted of programmatic, training, and drill activities and milestones. NPO has accepted the CNS strategic plan and is monitoring CNS' progress in its implementation.

Since the 2012-2013 review, NPO has used its survey and self-assessment guide to perform self-assessments and contractor oversight activities. The parent process for this guide is NPO governance principles rather than DOE Order 151.1C and, because they are different, the 2014 CDNS review identified this as a finding. EA did not see oversight reports linked to evaluation criteria and results developed from the survey process. (See **OFI-NPO-1**.) Instead, NPO provided topical area quarterly summary reports that include activities at Pantex and Y-12. The quarterly summary reports identify NPO oversight activities for the current and following quarter and the results in form of findings, OFIs, and strengths. NPO also gave EA a list of all issues identified by NPO in the previous two years that were identified through a variety of oversight activities such as reviews of the emergency plan, hazard survey, EPHA, and offsite agreements, and observations of emergency drills and exercises. All NPO-identified issues for CNS have been entered into the CNS PER/ESTARS corrective action tracking system for further processing.

Overall, NPO conducts numerous performance-based assessments and oversight activities of the CNS emergency management program and has an adequate issues management process with respect to emergency management issues. However, NPO does not perform comprehensive self-assessments or compliance-based assessments of the contractor program as required by DOE Order 151.1C and identified

as a finding during a 2014 CDNS review. NPO also does not provide CNS assessment reports of its oversight activities or promptly forward external assessment reports to CNS for action. Further, NPO has not used its issues management process to resolve its emergency management issues. Additionally, contrary to DOE Order 151.1C, NPO has not yet developed corrective actions for the Pantex Plant finding from the fiscal year 2014 CDNS review.

5.7 Lessons Learned

Review Criteria:
Lessons-learned must be developed, resulting in corrective actions and improvements. (DOE Order 151.1C paraphrased from CRAD 45-61.)

For this portion of the review, EA reviewed the CNS lessons-learned program documents and after-action reports from exercises and drills for the past year.

Overall, the CNS lessons-learned program is ineffective in promoting emergency management program improvements using Pantex and DOE/NNSA complex experience. DOE Order 151.1C requires the readiness assurance program to include a system for incorporating and tracking lessons learned from TD&E, actual event responses, and a sitewide lessons-learned program. Additionally, the site must participate in the DOE/NNSA corporate lessons-learned program. CNS communicates lessons learned identified in PER/ESTARS and requires relevant emergency management/ERO personnel to conduct required reading, but does not communicate lessons learned through after-action reports, annual ERO refresher training, or ERO continuing training. EMD participates in the NNSA corporate lessons-learned program, and downloaded the EA lessons-learned reports and required relevant emergency management/ERO personnel to conduct required reading. However, EMD did not review the EA lessons learned to determine whether they applied to the Pantex emergency management program, and EMD has not added any emergency management related lessons learned into the corporate database. Further, EMD does not evaluate or track lessons learned from internally identified lessons learned from drills and exercises. EMD has self-identified that a lessons-learned process needs to be developed and has issued a problem evaluation report to implement a corrective action process to address this issue. EMD has recently started to introduce a process to identify, track, and resolve potential issues as well as capture best practices and lessons learned into its exercises and drills. (See **OFI-CNS-5**.)

6.0 CONCLUSIONS

CNS has established a formal exercise program to validate emergency management program elements at the Pantex Plant. Exercise packages include all requirements of the DOE order and guides, the emergency plan, and the exercise manual. CNS uses an adequate framework to establish evaluations by using exercise objectives, evaluation criteria, a team of evaluators, hotwashes, critiques, and EEGs. In addition, CNS has a process for resolving findings and improvement items and for tracking the closure of corrective actions using PER/ESTARS. CNS develops timely corrective actions with reasonable due dates and provides adequate closure evidence for issues in the issues management system. NPO conducts numerous performance-based assessments of the CNS emergency management program and has a comprehensive issues management process.

However, EA identified some weaknesses in CNS's and NPO's implementation of the emergency exercise program:

- During the past five years, CNS has not validated its planning for some important aspects of the Pantex emergency management program, such as responding to an onsite Office of Secure

Transportation event, utilizing alternate command centers, conducting full-scale plant evacuations, or utilizing DOE emergency response assets. Further, the exercise program has not been effective in identifying findings and fostering continuous improvement.

The lack of critical evaluation of responder actions diminishes the evaluation process and also the validation of program plans and procedures. For the 2014 full-participation exercise, references to manuals and handbooks were provided instead of specific measurable evaluation criteria for each objective, and the exercise evaluation guides did not contain measurable standards for assessing exercise objectives. Also, contrary to CNS exercise program guidance, CNS evaluators served as controllers, diminishing their ability to observe and critically assess responder actions. These inconsistencies contributed to CNS evaluators documenting no findings, whereas other (e.g., non-CNS) co-located evaluators identified nine findings for the exercise.

- CNS implements the Pantex emergency plan through emergency response organization position-specific manuals and handbooks that do not support an effective event response. Significantly, CNS has not established requirements that emergency response organization cadre members use these manuals and handbooks in conducting their position-specific duties. Further, the ERO position-specific emergency plan handbooks generally do not define the actions necessary for personnel to conduct their assigned duties.

- CNS has not been successful in completing effective corrective actions in a timely manner. Based on some issues recurring over several years and a frequent rejection rate of completed corrective actions by CNS effectiveness reviews, the corrective action process has not been effective.

- CNS has not implemented an effective lessons-learned program for promoting program improvements using Pantex and DOE/NNSA complex experience. CNS does not communicate lessons learned through after-action reports, annual refresher training, or continuing training. Further, CNS does not evaluate or track lessons learned from internally identified lessons learned.

- NPO does not consistently perform comprehensive evaluations of the contractor program and does not document its evaluation criteria in contractor assessment reports, and those reports are not completed in a timely manner. NPO also does not use its issues management process to track most of the emergency management issues that require NPO action.

Overall, CNS has developed formal procedures for exercise planning evaluation and issues management. However, the exercise program and corrective action process are only marginally effective in facilitating improvement in the program. The exercise program has not validated all elements of the emergency management program over a five-year period, identified findings, and fostered program improvements. The exercise evaluation guides do not reflect measurable standards in assessing exercise objectives. Significantly, CNS emergency plan implementation manuals and handbooks do not support an effective exercise evaluation, with personnel relying on experience rather than proven and approved procedures. CNS has produced some corrective actions, but they have not been effective in resolving issues and preventing recurrence. Finally, while NPO conducts many performance-based assessments, NPO does not use its issues management process to track many of the emergency management issues that require NPO action.

7.0 FINDINGS

As defined in DOE Order 227.1, *Independent Oversight Program*, findings indicate significant deficiencies or safety issues that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. Findings may identify aspects of a program that do not meet the intent of DOE policy or Federal regulation. CAPs must be developed and implemented for EA appraisal findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 227.1 to manage these CAPs and track them to completion.

During the exercise program review conducted during and April and May, EA identified the following findings.

Finding F-CNS-1: Contrary to DOE Order 151.1C, the CNS exercise program does not validate all elements of the emergency management program over a five-year period.

CNS does not validate the full scope of emergency management program elements over a five-year period. CNS has not validated or tested the use of alternate command centers, a full-scale plant evacuation, an onsite Office of Secure Transportation event, or DOE emergency response assets.

Finding F-CNS-2: Contrary to DOE Order 151.1C, CNS has not developed emergency plan implementing procedures to describe how the emergency plans must be implemented.

CNS ERO position-specific emergency plan handbooks generally do not contain the actions necessary for personnel to conduct their assigned duties. Additionally, CNS has not established requirements that ERO cadre members use the manuals and handbooks in conducting their position-specific duties.

EA identified an additional issue with NPO issues management during this review but did not issue a finding because the issue had been included in the *Office of Enterprise Assessments Review of the Y-12 National Security Complex Emergency Management Exercise*, dated June 2015. The previously issued finding is:

Finding F-NPO-1: Contrary to DOE Order 151.1C, NPO did not develop corrective actions within 30 working days of receipt of a final evaluation report.

NPO did not develop corrective actions within 30 working days for two findings from a Fiscal Year 2014 CDNS review as required.

During the exercise evaluation conducted during August, EA identified the following finding, which is further discussed in Appendix C.

Finding F-CNS-C1: CNS's control at the event/incident scene was not effective or consistent with the National Incident Management System's Incident Command System (DOE Order 151.1C).

8.0 OPPORTUNITIES FOR IMPROVEMENT

This EA review identified 10 OFIs. These potential enhancements are not intended to be prescriptive or mandatory. Rather, they are suggestions offered by the EA review team that may assist site management in implementing best practices, or provide potential solutions to minor issues identified during the conduct of the review. In some cases, OFIs address areas where program or process improvements can be

achieved through minimal effort. It is anticipated that these OFIs will be evaluated by the responsible line management organizations and either accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and priorities.

NPO

OFI-NPO-1: Enhance NPO's oversight of the CNS exercise program by:

- Including exercise program responsibilities in the NPO annual self-assessments
- Documenting evaluation criteria used to determine performance in contractor assessment reports
- Completing timely contractor assessment reports
- Periodically conducting comprehensive, compliance-based assessments of the CNS exercise program
- Ensuring prompt transmittal of external assessments of the CNS emergency management program to CNS.

OFI-NPO-2: Improve the resolution of NPO emergency management issues by:

- Entering identified issues into ePegasus in a timely manner
- Developing timely corrective actions for emergency management issues and documenting these actions in ePegasus.

CNS

OFI-CNS-1: Validate, in the exercise program, the planning for responding to:

- An onsite Office of Secure Transportation event
- Alternate command centers
- A full-scale site evacuation
- Utilization of DOE emergency response assets.

OFI-CNS-2: Improve the emergency management implementing documents by providing consistent definitions for findings, deficiencies, and weaknesses, as provided by the DOE Emergency Management Guide 151.1-3, *Programmatic Elements*, to ensure proper processing of exercise findings and implementation of corrective action processes. Specific documents to consider for update include:

- *(U) Pantex Plant Comprehensive Emergency Management Plan*
- *(U) Emergency Management Training, Drill, and Exercise Program Plan*
- *(U) Emergency Management Training, Drills, and Exercises* manual
- *(U) Develop, Track, and Administer Problem Evaluation Requests* work instruction
- *(U) Performing Causal Analysis and Developing Corrective Action Plans* work instruction.

OFI-CNS-3: Improve evaluations by:

- Increasing the number of trained CNS personnel for evaluator assignments
- Assigning the most experienced personnel in the subject matter as evaluators
- Adding measurable standards to the exercise objective criteria and the EEGs that are based on Pantex plans and procedures

- Clarifying in after-action reports, and other means, that the exercise rating system is a player performance rating and not a rating of the exercise.

OFI-CNS-4: Improve ERO responses by establishing expectations that adherence to instructions provided in manuals and handbooks are the same as procedures. These expectations should be reinforced by:

- Written instructions in the manuals, handbooks, or other means
- Communicating adherence expectations during ERO training
- Providing immediate feedback during drills and after exercises
- Increasing the frequency of drills until the ERO is proficient in performing response tasks.

OFI-CNS-5: Enhance continuous improvement derived from the lessons-learned program by:

- Sharing emergency management lessons learned between Pantex facilities and functional groups, including performance weaknesses with cross-cutting or common issues requiring corrective action
- Evaluating and tracking lessons learned from after-action reports and drills and exercises
- Summarizing emergency management related lessons-learned from the previous year in the annual ERO refresher training
- Effectively participating in the DOE/NNSA corporate lessons-learned program related to emergency management issues.

OFI-CNS-6: Improve the site's ability to respond to emergency events by:

- Ensuring all implementing documents meet the DOE Order requirements for emergency plan implementing procedures
- Establishing requirements for ERO cadre members to adhere to and use position-specific handbooks
- Ensuring that each ERO position-specific handbook contains appropriate information (i.e., position objectives, checklists, and job aides) to perform duties and meet expectations.

OFI-CNS-7: Improve the effectiveness of corrective actions by:

- Reviewing the process for ranking issues to ensure issues are properly ranked as deficiencies, weaknesses, or improvement items for appropriate processing in the issues management program
- Reviewing the committee membership and process that establishes CAPs to ensure all barriers to successful performance are identified and addressed
- Reviewing the independent verification process and practices to determine how incomplete corrective actions are approved for an effectiveness review.

OFI-CNS-8: When correcting procedures and ERO performance issues identified during an exercise, complete procedure revisions and training before the next exercise to promote improved performance and validate the procedure changes and effectiveness of the training.

During the exercise evaluation conducted during August 2015, EA identified the following Opportunities for Improvement.

OFI-CNS-C1: Consider adding a map in the OC or a geographic information system application to the new emergency management information system that will enable the OC to identify buildings, zones, or areas where the public address system is inaudible and implement compensatory notification methods.

OFI-CNS-C2: Consider resolving the issue that caused the first part of some public address system announcements to be cut off.

OFI-CNS-C3: Consider utilizing a group of control pagers in the OC that will show whether an ERO page went out and was received by the intended ERO group.

OFI-CNS-C4: Consider developing a process for tracking injured workers by:

- Ensuring that badge information, extent of injuries, and current treatment location is recorded for all injured workers
- Requiring the protective force to let the Fire Department to record badge numbers for deceased victims
- Modifying the *IC Teambook*, *ICT Checklist*, *Incident Management System* guideline, OEM, and relevant security procedures to communicate a single process for tracking injured personnel and deceased victims, with clear assignment of responsibilities and reporting mechanisms
- Conducting drills and tabletop exercises with the protective force and Fire Department to practice reporting patient status information during mass casualty events.

OFI-CNS-C5: Consider improving the process for establishing and executing unified incident command by:

- Providing for direct communications between the lead Fire Department and protective force officers from the initial stages of an emergency through resolution
- For security emergencies, determining the protocol for allowing the Fire Department to pre-stage assets in a safe location closer to an event scene
- Determining the roles and responsibilities for deciding when a unified incident command is warranted
- Modifying the *IC Teambook*, *ICT Checklist*, *Incident Management System* guideline, OEM, and relevant security procedures to communicate the process for establishing and executing a unified incident command
- Conducting drills and tabletop exercises with the protective force and Fire Department to practice communications, pre-staging assets, and establishing and executing a unified incident command.

OFI-CNS-C6: Consider improving consistency in determining bomb threat protective action distances within the site ERO and with offsite responders by:

- Requiring all ERO members to use the Department of Homeland Security, Office of Bombing Prevention bomb threat standoff card dated June 2010
- Confirming the threat description (e.g., car or SUV/van) to use within the ERO for threats that do not fall within one of the prescribed threat descriptions on the card.

OFI-CNS-C7: Consider emphasizing the use of the *ICT Checklist* by the Fire Department and protective force during all drills and exercises until consistent use of the checklist is achieved.

OFI-CNS-C8: Consider revising the *Emergency Response Organization Membership Policy* to include the requirement that all ERO members must follow and fill out the position-specific checklists and record completed tasks.

OFI-CNS-C9: Consider revising the emergency planning hazards assessment (EPHA) and EALs to support a response commensurate with the hazards and improve a response by:

- Screening material from a quantitative assessment, as allowed by DOE Order 151.1C
- Establishing event classifications based on where protective action criteria may be exceeded, as determined by a quantitative analysis
- Establishing EAL entry conditions that identify event classification levels based on HAZMAT quantity and dispersion mechanisms
- Using DOE provisions to evacuate the public from Pantex Plant buildings that are beyond the site fence and closing the access road to those buildings within an hour of an event in order to eliminate some unnecessary General Emergency responses
- Establish expectations for briefing the EOC cadre and providing offsite authorities and media notifications to explain event classifications that do not meet DOE classification definitions.

OFI-CNS-C10: Consider developing field monitoring response procedures for the chemicals on site that are known to be toxic by inhalation.

9.0 ITEMS FOR FOLLOW-UP

Using an appropriately scoped CRAD, evaluate the technical planning basis program element with emphasis on EAL development.

Appendix A
Supplemental Information

Dates of Review

Onsite Review: April 21 – May 21, 2015

Office of Enterprise Assessments Management

Glenn S. Podonsky, Director, Office of Enterprise Assessments
William A. Eckroade, Deputy Director, Office of Enterprise Assessments
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
William E. Miller, Director, Office of Nuclear Safety and Environmental Assessments
Patricia Williams, Director, Office of Worker Safety and Health Assessments
Gerald M. McAteer, Director, Office of Emergency Management Assessments

Quality Review Board

William A. Eckroade
John S. Boulden III
Thomas R. Staker
Patricia Williams
Michael Kilpatrick

EA Site Lead

Jimmy Dyke

EA Reviewers During the April and May 2015 Review Period

Randy Griffin – Lead
Deborah Johnson
Tom Rogers

EA Evaluators During the August 2015 Exercise Evaluation
Thomas Staker
Kurt Runge – Team Lead
John Bolling
Jeff LaRosa
Deb Johnson
Teri Lachman
Thomas Rogers

Appendix B
Key Documents Reviewed, Interviews, and Observations

Key Documents Reviewed

- DIR-0017, *Emergency Response Organization Membership Policy*, Rev. 3
- EM-PLN-0019, *(U) Pantex Plant Comprehensive Emergency Management Plan*, Rev. 7
- EM-PLN-0023, *(U) Emergency Management Training, Drill, and Exercise Program Plan*, Rev. 11
- Fire Department Guideline PX-OG-006, *Incident Management System*, Rev. 5, 01/22/09
- HNDBK-0012, *CAT Teambook*, Rev. 6
- HNDBK-0013, *Emergency Communications Teambook*, Rev. 8
- HNDBK-0016, *IC Teambook*, Rev. 8
- HNDBK-0015, *Executive Teambook*, Rev. 10
- HNDBK-0018, *Logistics Group Teambook*, Rev. 4
- ICS 201, *Incident Briefing* form, 08/19/15
- MNL-190884, *Emergency Action Levels*, Rev. 6, 08/12/11
- MNL-293104, *(U) Contractor Assurance Assessment Manual*, Rev. 12
- MNL-352185, *(U) Emergency Management Training, Drills, and Exercises*, Rev. 2
- MNL-352187, *OEM*, Rev. 3
- MNL-352190, *Operations Center Manual*, Rev. 2, 06/02/14
- NPO-3.4.1.1, *NPO Oversight Process*, Rev. 1, 10/28/14
- PX-5330, *ICT Checklist*, Rev. 7
- SS&ES-15-004, *Standing Order Temporary New 2.13 Terrorist Attack or Active Shooter EAL*, 07/21/15
- WI.02.03.04.01.01, *Performing Causal Analysis and Developing Corrective Action Plans*, Rev. 15
- WI.02.03.04.01.06, *Develop, Track, and Administer Problem Evaluation Requests*, Rev. 15

Interviews

- CNS CAT Leader
- CNS Drill Coordinator
- CNS Emergency Management Department Director
- CNS Fire Department ICT controller/evaluator
- NPO Emergency Management Program Manager
- Pantex Drill Coordinator
- Pantex EMD Acting Department Manager
- Pantex EMD Manager
- Pantex EMD Exercise Coordinator
- Pantex EMD Issues Management Coordinator
- Pantex EMD Readiness Assurance/Recovery Coordinator
- Tactical OC staff

Observations

- CAT Response
- EOC Executive Team Response
- Fire Department ICT Response

- Protective Force IC Response
- PSS Response

Appendix C
Office of Enterprise Assessments Evaluation of the
Pantex Plant August 2015 Full-Scale Exercise

SUMMARY

On August 19, 2015, CNS conducted an exercise, known as *Shooter-15*, to test and demonstrate the proficiency of the integrated emergency response capability of the Pantex Plant ERO in accordance with DOE Order 151.1C; DOE Guide 151.1-3, *Programmatic Elements*; and the Pantex Plant emergency plan and implementing protocols.

The initiating event for this exercise was a postulated attack by two active shooters who had planted explosive devices in one vehicle that entered a receipt and storage building, where chemical HAZMAT is received, and on a second vehicle parked on Pantex Plant property. One dentonation was simulated within the building on a vehicle delivering bottles of nitrous oxide, but no HAZMAT releases, as defined by DOE Order 151.1C, were postulated. The exercise scenario also postulated a mass casualty condition resulting from the attackers' gunfire. This 2015 exercise scenario differed from the 2014 scenario, which involved a tornado resulting in site damage, mass casualties, an explosion, and releases of radioactive material and hazardous chemicals.

EA evaluated the exercise at the request of NPO to independently assess CNS's progress in improving its response to an Operational Emergency exercise scenario and its ability to conduct and self-evaluate an exercise since EA's evaluation of the Pantex Plant annual exercise in 2014. For both exercises, EA evaluators used the exercise package, exercise evaluation guidelines, and response tools developed by CNS to perform the evaluation and were collocated with CNS evaluators. Additionally, EA used the portion of Criteria, Review, and Approach Document (CRAD) 45-61, *Exercise Program Review and Severe Event Response Evaluation*, that is applicable to an exercise evaluation. EA evaluators were stationed at the same response venues during this 2015 exercise as they were during the 2014 exercise so they could better identify areas of improvement, continuing issues, and new issues. However, EA could not reassess all of the objectives from the 2014 exercise, because of differences in the exercise scenarios; the 2015 exercise scenario involved two active shooters, mass casualties, and explosives at two site locations, while the 2014 exercise involved a tornado resulting in site damage, mass casualties, and releases of radioactive material and hazardous chemicals.

EA concluded that the Pantex Plant emergency response organization had improved since the 2014 exercise at each of the reassessed venues, which included the operations center, the emergency operations center, the Fire Department's incident command vehicle, and the consequence assessment room. EA noted improvements in sharing information among site responders and offsite authorities, consequence assessment functions, new tools and revised protocols, sound abatement in the incident command vehicle, and CNS's conduct and evaluation of the exercise.

However, EA also identified some new and some continuing performance issues. Most significantly, CNS' control at the event/incident scene was not consistent with the National Incident Management System's Incident Command System. The lack of an incident command structure limited the situational awareness of responder actions and inhibited the execution of a coordinated response at the various incident sites. For some of the continuing performance issues, corrective action plans are still in progress to address issues identified during the 2014 exercise. Other new and continuing issues are provided below.

Overall, CNS has initiated actions to correct identified weaknesses within the emergency management program observed during the 2014 EA exercise evaluation and comply with DOE Order 151.1C. However, continued corrective actions are warranted in the areas of emergency plan implementing procedures, exercise evaluation processes, and sustained critical self-assessments of training and exercises.

RESULTS

The results of this evaluation are organized based on EA observations at the evaluated venues (OC, incident command venues, EOC, and consequence assessment room) and for one crosscutting topical area (the overall conduct of the exercise).

Criteria:

An exercise validates elements of an emergency management program by initiating a response to simulated, realistic emergency events/conditions in a manner that, as nearly as possible, replicates an integrated emergency response to an actual event. Planning and preparation use an effective, structured approach that includes documentation of specific objectives, scope, time lines, injects, controller instructions, and evaluation criteria for realistic scenarios. Exercises are conducted, controlled, evaluated, and critiqued effectively and reliably and result in lessons-learned, corrective actions, and program improvements for identified program weaknesses. (Paraphrased from CRAD 45-61, *Exercise Program Review and Severe Event Response Evaluation)*

Operations Center

At the start of the exercise, CNS staffed the OC with two qualified plant shift superintendents (PSSs) and four PSS trainees who quickly recognized the active shooter situation as an OE and appropriately classified the event as an Alert in accordance with emergency action level (EAL) 2.13, *Sitewide Terrorist Attack or Active Shooter*. The PSS also immediately ordered implementation of shelter-in-place (SIP) protective actions for onsite workers in accordance with *Guide Sheet Charlie*. Furthermore, the OC completed initial notifications to offsite authorities in a timely manner.

Improvements Noted:

- The PSS implemented the appropriate EALs for all required emergency condition changes, which included the active shooter, explosion, mass casualty, and bomb threat EALs.
- CNS revised the Pantex Plant notification form to collect all information required by DOE Headquarters, including damage, casualties, impact on site operations, and level of media interest.

Continuing Issues:

Command and Control:

- The PSS did not establish effective communication between the incident commander (protective force officer) and the Assistant Fire Chief, significantly hindering effective command and control of the event (see additional comments in Sections 5.2 and 5.3).
- The PSS and incident commander (IC) did not participate in bridge line calls, thereby adversely affecting overall situational awareness and the ability to ensure a common operating picture among responders outside the event scene.

Communications Systems and Equipment:

- Communication system issues adversely affected response (e.g., CNS's ERO paging system was not capable of making simultaneous ERO activations and notifications).
- The OC had to terminate the Fire Department support team activation before completion in order to enable the activation of the EOC cadre scenario; activation of both teams was delayed as a result.
- Two PSS trainees spent over an hour making notifications required for the upgrade in the Security Conditions level. This would be a simple task for a modern automated notification system, which CNS plans to install.

Initial News Release Information:

- The initial news release was not made in accordance with CNS protocols, and the OC did not implement the required pre-approved initial news release (Form PX-5527) to communicate the issuance of protective action recommendations (PARs) for the offsite populations to SIP, which should have followed the activation of the offsite warning sirens and the General Emergency declaration.
- Eleven minutes after CNS activated the offsite warning sirens, the PSS and CAT determined that the offsite PARs were not necessary and lifted the SIP using the National Oceanographic and Atmospheric Administration radio capability. However, CNS did not communicate or document this decision in the subsequent offsite notifications or news releases.

Responder Proficiency:

- EA noted continuing issues in responders' proficiency in completing offsite notification forms, including information on the cessation of PARs and the number of injured personnel.

Interoperability Among Onsite and Offsite Response Facilities:

- EA noted continuing issues involving inadequate interoperability among onsite and offsite response facilities; key personnel outside the Pantex Plant EOC were unable to view event information and technical products, which they need for timely and accurate decision-making. CNS has a plan to correct the issue by December 4, 2015, by implementing a new emergency information management system.

New Issues:

- The public address system used to announce onsite protective actions could not be heard throughout the site, notably at the Office of Secure Transportation facility. In addition, Zone 11 reported that they did not hear the exercise "freeze" announcement when the exercise was momentarily suspended (see **OFI-CNS-C1**).
- In some public address announcements, the first part of the messages were cut off, so the OC had to repeat the announcement (see **OFI-CNS-C2**).
- In addition to the previously discussed ERO paging system limitations, the OC did not know whether an ERO page went out to the intended ERO group (see **OFI-CNS-C3**).

Overall, CNS has made good strides in strengthening its OC capabilities, as evidenced by the successful implementation of a much improved notification process, which included follow-up notifications, as required by DOE Order 151.1C, when emergency conditions change. EA noted continued deficiencies in some system and programmatic areas, as well as in responder proficiency. Comparable to the 2014 exercise, EA observed inadequate communications and information management that degraded situational awareness and prevented a common operating picture among the site and offsite organizations. The Pantex Plant WebEOC application did not serve as an adequate information management tool for the Pantex Plant response facilities and field response elements. However, CNS is actively working on a plan

to correct this issue by having a new emergency information management system fully operational by the published date of December 4, 2015.

Incident Command

Immediately after the exercise began, an Assistant Fire Chief assumed command of the Fire Department assets and quickly declared a mass casualty event, while the protective force IC assumed command at the event scene. The protective force IC established communications with the tactical operations center, while the Assistant Fire Chief established communications with the EOC. Although there was some coordination between the Fire Department and protective force personnel at the event scene, the command staff for both organizations mostly performed their tasks independently, resulting in confusion as to who was the IC. The Pantex Plant emergency plan states that there is only one IC, who can come from one of three CNS organizations, depending on the type of OE (security, fire, or radiological). The Assistant Fire Chief adequately assessed the magnitude and safety concerns associated with the mass casualty event and the subsequent nitrous oxide release and vehicle-borne improvised explosive device (VBIED). The Assistant Fire Chief also appropriately allocated the onsite response assets, assigned an operations section chief and a triage officer for the event scene, and promptly requested additional onsite and offsite assets to augment the response. The Fire Department incident command team (ICT) developed an incident action plan using the form prescribed by the *IC Teambook* (HNDBK-0016), which clearly documents the response priorities. Further, the Assistant Fire Chief provided several briefings on the EOC telephone bridge line regarding the Fire Department's emergency response efforts.

Improvements Noted:

- CNS improved the operability of the equipment in the Fire Department incident command vehicle (ICV), which is a mobile command post equipped with a laptop computer, telephones, radios, and white boards.
- The ICT promptly received plume projections from the CAT via email and was able to display the results in the ICV using the laptop computer.
- CNS has insulated the interior of the ICV to reduce the noise from the generator used to power the ICV, allowing the Assistant Fire Chief to brief the EOC from the ICV and hold conversations with the rest of the ICT.

Continuing Issues:

Tracking of Patients:

- The Fire Department triage officer obtained badge numbers for only seven of the ten injured workers and did not track where the injured workers were transported off site for treatment.
- Protective force responders took the badges from the deceased victims and did not permit the triage officer to note the badge numbers or otherwise determine their names.
- The Assistant Fire Chief provided the EOC with conflicting information about the total number of victims; he correctly reported the number of victims as ten injured and five deceased (per the exercise plan), but near the end of the exercise amended that number to include two more deceased and one more injured.
- The *IC Teambook*, *ICT Checklist* (PX-5330), *Incident Management System* (Fire Department Guideline PX-OG-006), and *Operational Emergency Manual* (OEM) do not discuss the responsibility and process for tracking patients (see **OFI-CNS-C4**).

Unified Incident Command:

- During the initial stages of the exercise, the Fire Department attempted several times to establish communications with the protective force IC via the central alarm station, but was unsuccessful.

- The protective force delayed the Fire Department from pre-staging assets closer to the event scene in a safe location for over 30 minutes, partly due to the lack of communications between the protective force IC and the Fire Department.
- The protective force IC and the Assistant Fire Chief did not coordinate on a location for a unified incident command. Once released by the protective force, the Fire Department ICV relocated from the fire station to a parking lot a safe distance from the event scene with a view of the back and side of the building, while the protective force incident command post was located at the event scene.
- A protective force ICT representative did not arrive at the ICV and establish communications between the protective force IC and Fire Department ICT until 1 hour and 20 minutes after the exercise began.
- The protective force IC and the Assistant Fire Chief did not communicate directly during the exercise, confer over which organization would serve as the IC, and did not establish a unified IC as required by the National Incident Management System.
- Adding to the confusion over a unified IC, the *ICT Checklist* listed the Assistant Fire Chief as the ICT IC, rather than the protective force IC.
- The *IC Teambook*, *ICT Checklist*, *Incident Management System* guideline, and OEM do not discuss the process or the roles and responsibilities for setting up and executing a unified incident command (see **Finding F-CNS-C1** and **OFI-CNS-C5**).

Finding F-CNS-C1: CNS's control at the event/incident scene was not effective or consistent with the National Incident Management System's Incident Command System (DOE Order 151.1C).

New Issues:

- The Assistant Fire Chief used an outdated bomb threat standoff card when he learned of the pickup truck with a VBIED, which he assumed equaled a sedan (since the card does not list a pickup truck), leading to a standoff distance of 1750 feet rather than the current guidance of 1900 feet. This distance also differed from the PSS's assumption that the truck was a sport utility vehicle (SUV)/van with a standoff distance of 2400 feet (see **OFI-CNS-C6**).
- The ICT did not demonstrate adequate use of their checklist. The IC completed only a portion of the *ICT Checklist*, and no parts of the *ICT Checklist* were marked as completed by the other members of the ICT (see **OFI-CNS-C7**).

Overall, CNS demonstrated sustained good performance in the Assistant Fire Chief's assessment of the emergency. CNS improved the process for developing an incident action plan and reduced the impact of a noisy generator on the usability of the ICV. However, EA observed continuing issues in-patient tracking that were noted in the 2014 exercise. More significantly, the CNS Fire Department and protective force responders did not establish a unified incident command as required, leading to confusion about who was in charge, delaying the Fire Department's response to the incident scene, and limiting the Fire Department's situational awareness of the various emergencies. Other issues that EA noted were the use of an outdated bomb threat standoff distance card, inconsistent interpretation of the card, and inadequate use of the *ICT Checklist*.

Emergency Operations Center

The PSS activated the EOC after the protective force IC gave an "all clear" message for the postulated active shooters and received the activation page. Once the EOC was operational, the PSS provided a turnover briefing to the emergency manager (EM) and emergency operations manager (EOM) and discussed the protective actions provided in the EAL set for each developing emergency event. The EM

provided the initial situational update and frequent briefings to inform the EOC cadre of the status of the emergency and current significant response priorities and activities. Executive team directors effectively developed critical response objectives, established priorities for response to support incident command, and addressed balance of plant requirements, including those for mass casualties. Executive team directors also provided continuous status updates to their respective support team staff (e.g., logistics group, operations group, recovery team) within the EOC.

Improvements Noted:

- The EM obtained continual updates from the CAT on the status of the chemical material release and hazards involved with the vehicle bomb.
- The EOM effectively managed interfaces with offsite agencies.
- The logistics group appropriately acquired needed emergency response resources (i.e., ambulances, medical helicopters, and a refrigerator truck).
- The EOC cadre has improved its use of position-specific checklists.

Continuing Issues:

Situational Awareness:

- Although the exercise scenario was a security event, neither the EM nor the PSS asked the protective force IC to establish communications through the bridge line; the EM requested only that the Assistant Fire Chief get on the bridge line.
- Executive team bridge line discussions were conducted incorrectly, because of the assumption that the Assistant Fire Chief was the IC.
- The EOC knew that a VBIED had been located for over 30 minutes before the EM notified the Assistant Fire Chief. Lack of prompt notification delayed the Assistant Fire Chief's assessment of the potential hazards.

CNS's Guidance to use Position-Specific Team Handbooks and Checklists:

- CNS has developed a directive, *Emergency Response Organization Membership Policy*, to provide guidance on membership and participation in the ERO. Although the EOC cadre appropriately completed their checklists, the directive only recommends that ERO members refer to their team handbook and any applicable checklist for further guidance; it does not require members to follow their handbooks or position checklists or to provide a record of completed tasks (see **OFI-CNS-C8**).

Overall, CNS has made progress in strengthening the EOC cadre response capabilities, but some issues remain. During this exercise, the EOC cadre appropriately followed and filled out the duty station checklists and recorded completed tasks, and the logistics group followed proper protocol in acquiring needed emergency response resources. However, EA observed continuing issues with situational awareness. Further, CNS has still not established a process that formally requires ERO cadre members to use team handbooks and checklists in conducting their position-specific duties.

Consequence Assessment Room

At the start of the exercise, the CAT leader was located in the consequence assessment room because it is his normal work location. The remaining CAT members arrived after the protective force gave an "all clear" message for the postulated active shooters and received an ERO activation page. As CAT members arrived, the leader assigned model operators and data collectors/recorders tasks for performing initial and ongoing consequence assessments. Important assignments included event classification and protective action verifications (using EALs, bomb threat standoff distance cards, and map overlays),

modeling a chemical dispersion, postulating "what if" consequences, and keeping key ERO members informed of CAT results through discussions, briefings, and WebEOC entries.

Improvements Noted:

- The initial consequence assessment was timely, accurate, and in accordance with written protocols:
  - The CAT leader reviewed all applicable EALs to verify that event classification and protective action decision-making made by others was correct.
  - The CAT leader performed an accurate analysis of a nitrous oxide release using the EPICode dispersion modeling software immediately after verifying proper EAL application.
  - The CAT leader made immediate use of bomb blast standoff cards once explosives were introduced into the scenario.
  - The CAT leader made use of new tools in the form of map overlays for quickly establishing HAZMAT plume projections and bomb blast protective action zones.
- The ongoing consequence assessments were timely, accurate, and in accordance with written protocols:
  - The CAT model operator performed an accurate analysis of a nitrous oxide release using the National Atmospheric Release Advisory Center (NARAC) dispersion modeling software.
  - The CAT model operator performed analysis of "what if" scenarios by postulating and modeling a potential car bomb loaded with sarin gas to establish a bounding worst-case scenario using the NARAC dispersion modeling software.
- The CAT members used their position-specific checklists as a record of completed actions.
- The CAT used new tools developed after the 2014 exercise. For example:
  - A hazardous material plume projection map overlay
  - A bomb blast stand-off distance map overlay
  - Event information status charts.

Continuing Issue:

- EA observed a lack of ERO discussions during the 2014 and 2015 exercises about why events are classified as General Emergencies and why offsite authorities and the media are given PARs when no protective action criteria are exceeded off site (see **OFI-CNS-C9** and Section C.8).

During the past two exercises observed by EA, EALs were followed properly but did not result in correct event classifications. EA observed that in both 2014 and 2015, the EALs used for making General Emergency classifications were properly followed but resulted in General Emergency classification without a supporting technical basis (neither scenario had protective action criteria exceeded off site). During the 2015 exercise, the CAT's analysis of the explosion within the shipping and receiving building considered only the dispersion of nitrous oxide, not the other HAZMAT that may be in the building and serves as the basis for a building 16-19 General Emergency declaration. DOE Order 151.1C allows CNS to screen nitrous oxide from a quantitative assessment in the EPHA because of its health category of 2 in the National Fire Protection Association (NFPA) 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, so no analysis is required for this chemical. Although the CAT Teambook guides CAT members to review the hazards survey and EPHA to aid in the initial assessment, they did not review those documents. Furthermore, EA found that those documents would not be useful references for an initial assessment because they do not identify the HAZMAT that may be in the building and the associated projections of consequence. EA noted that the only chemicals the EPHA identifies in the building are health category 1 or 2 based on NFPA 704 (argon, nitrogen, and R-22), all of which DOE Order 151.1C allows to be screened from an EPHA quantitative assessment (see **OFI-CNS-C9**).

New issues:

- The lack of common bomb threat standoff cards for the CAT, IC, and OC, and for the EALs establishing protective actions (see **OFI-CNS-C6**).
- The written protocols do not provide an expectation for the CAT to support a field monitoring team for hazardous chemical releases, as they do for radioactive material releases (see **OFI-CNS-C10**).

Other weaknesses noted in 2014, such as using the source term selection tool, providing safe routing instructions when no CAT members are collocated with the PSS, and distributing offsite technical products (classified plume plots and radiological data), were not retested during the 2015 exercise because of differences in the exercise scenarios.

Overall, the CAT has improved its performance since the 2014 exercise. The CAT made use of most applicable consequence assessment tools, including three tools added since 2014, resulting in timely and accurate consequence assessments in accordance with CNS protocols. One area not fully investigated by the CAT, or other ERO members, is why General Emergencies are declared and offsite protective actions are recommended when no protective action criteria are exceeded off site. The 2015 exercise scenario also revealed the lack of common bomb threat standoff cards for all users and lack of plans for field monitoring following chemical releases.

Conduct of Exercise

Improvements Noted:

EA's conduct-of-exercise evaluation considers the administration and evaluation of the exercise. EA noted the following improvements in these areas:

- CNS exercise evaluators recognized many of the same weaknesses noted by EA and voiced their observations during the exercise critique.
- CNS provided an adequate number of exercise controllers and evaluators with appropriate subject matter expertise at the exercise venues.
- The Fire Department ICT controller allowed players to receive information through normal channels and did not provide unearned information.
- The role players and moulage applied to the injured and deceased victims provided the responders with a more realistic event scene and allowed evaluators to more objectively assess the responders' performance.
- "Hotwashes" with the players after the exercise were more self-critical than in 2014.

Overall, CNS has improved its conduct of exercises since 2014. For the 2015 exercise, additional subject matter experts were added as evaluators and were relieved of controller responsibilities. Furthermore, participant hotwashes and the controller/evaluator critique provided more self-critical and meaningful evaluations.