Office of Enterprise Assessments Review of the Pantex Plant 2014 Full Participation Exercise

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Acronyms

ALOHA	Areal Location of Hazardous Atmospheres
CAT	Consequence Assessment Team
CNS	Consolidated Nuclear Security, LLC
DOE	U. S. Department of Energy
EA-33	Office of Emergency Management Assessments
EA	Office of Enterprise Assessments
EAL	Emergency Action Level
EM	Emergency Manager
EOC	Emergency Operations Center
EOM	Emergency Oversight Manager
EPHA	Emergency Planning Hazards Assessment
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
ESDC	Emergency Services Dispatch Center
GE	General Emergency
HAZMAT	Hazardous Material
IC	Incident Commander
ICP	Incident Command Post
ICT	Incident Command Team
ICV	Incident Command Vehicle
NARAC	National Atmospheric Release Advisory Center
NNSA	National Nuclear Security Administration
NPO	NNSA Production Office
OE	Operational Emergency
OEM	*Operational Emergency Manual*
OFI	Opportunity for Improvement
PAC	Protective Action Criteria
PAR	Protective Action Recommendation
PSS	Plant Shift Superintendent
SGT	Safeguards Transporter
SIP	Shelter-in-Place
SITREP	Situation Report
TDEM	Texas Department of Emergency Management

Executive Summary

The U.S. Department of Energy Office of Enterprise Assessments (EA) reviewed the August 6, 2014 Pantex Plant emergency management exercise over the period of August 4 to August 21, 2014. Consolidated Nuclear Security, LLC (CNS) operates the Pantex Plant, with oversight by the National Nuclear Security Administration and National Nuclear Security Administration Production Office. The Pantex Plant conducted the exercise to test its preparedness for responding to a severe weather event scenario involving widespread damage across the plant, mass casualties, and radiological and chemical releases.

During this exercise, the Pantex Plant emergency response organization exhibited generally good command and control of the event. The incident commander established a unified command and assessed the scope and magnitude of the emergency, which led to the development and implementation of a suitable incident action plan. The emergency manager effectively managed and controlled overall response activities. Executive team directors developed critical response objectives, established priorities to support the incident commander, address balance of plant requirements, mass casualties, and infrastructure damage.

Despite these strengths, EA's Office of Emergency Management Assessments identified several performance issues. CNS information flow processes were ineffective at acquiring, recording, and disseminating timely and accurate event information among the emergency response organization and offsite response organizations. The Pantex *Operational Emergency Manual* and other 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. Therefore, the exercise did not effectively validate CNS manuals or procedures, or ensure that the same objectives, if performed by different personnel, would be completed in a similar manner. The National Nuclear Security Administration Production Office identified these exercise issues in previous exercise after action reports, indicating ongoing weakness in the CNS exercise and readiness assurance programs.

CNS generally well managed and executed this exercise, which successfully highlighted programmatic and performance issues with the CNS emergency management program. CNS should revise the *Operational Emergency Manual* and associated procedures to provide adequate guidance for responding effectively and efficiently to a severe weather event and validate the adequacy of the manual and procedures through robust and self-critical evaluations of exercise performance.

CNS plans to take corrective actions for the performance issues identified by EA and those self-identified in the CNS after-action report. EA will review the effectiveness of the corrective actions in a follow-up review of the Pantex Plant emergency management program.

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Pantex Plant 2014 Full Participation Exercise

1.0 Introduction

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) evaluated the Pantex Plant response to an emergency management exercise that was conducted on August 6, 2014. EA's Office of Emergency Management Assessments (EA-33) conducted the review over the period of August 4 to August 21, 2014.

EA performed this review to evaluate the Pantex Plant's preparedness for responding to hazardous material (HAZMAT) events and to assess its compliance with DOE Order 151.1C, *Comprehensive Emergency Management System*. During this review, EA reviewed the ability of various site response organizations to recognize specific hazardous situations, notify appropriate onsite and offsite organizations and agencies, implement appropriate protective actions, perform consequence assessments, establish command and control of the simulated emergency event, mitigate the events, and plan for and initiate recovery operations in compliance with DOE requirements.

EA is scheduled to conduct a follow-up review of the Pantex Plant emergency management exercise program in April 2015, which will cover the planning and execution of the exercise as well as the corrective actions taken to address issues identified during the exercise.

EA's review of this exercise was the third of four reviews of site exercises that EA performed in 2014. EA plans to publish an annual emergency management lessons learned report reflecting analysis of results from all 2014 reviews conducted at DOE/ National Nuclear Security Administration (NNSA) sites.

2.0 Background

Consolidated Nuclear Security, LLC (CNS) is the operating contractor for the Pantex Plant. The NNSA Production Office (NPO) provides direction to and oversight of CNS.

CNS performed this full participation exercise to test and demonstrate the proficiency of the integrated emergency response capability of the Pantex Plant emergency response organization (ERO) in accordance with DOE Order 151.1C; its associated DOE Guide 151.1-3, *Program Elements, Emergency Management Guide*; and Pantex Plant emergency plans and procedures. CNS also used the exercise as an opportunity to demonstrate progress in planning and preparedness activities identified by Health, Safety and Security Operating Experience Level 1 (OE-1: 2013-01), *Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events*. The following paragraphs provide a brief overview of the exercise scenario and major events.

The initiating event for this full participation exercise was a tornado that moved toward the Pantex Plant, preceded by lightning strikes in the area. These events resulted in an explosion involving radiological material, a fuming nitric acid spill, an overturned Safeguards Transporter (SGT), an overturned vehicle, widespread damage, and mass casualties. The plant shift superintendent (PSS) initially implemented shelter protective actions in reaction to the approaching tornado. As a result, all plant personnel, including emergency response personnel, were sheltered. The PSS then received numerous calls that lightning had struck a building, which caused an explosion resulting in a radiological release. In response, the PSS classified the event as a General Emergency (GE), based on the emergency action level (EAL) corresponding to this facility.

The Operations Center and Emergency Services Dispatch Center (ESDC) received additional calls reporting damage and injuries throughout the exercise, including an overturned SGT, an overturned vehicle at the firing range with three trapped personnel, and a chemical release from a storage container. The PSS provided this information to the incident commander (IC), and together they established priorities for the response. Protective force personnel verified that the SGT was not breached and secured the area, cordoned off the incident scenes, and provided support to the Fire Department and other response groups as needed throughout the event under a unified incident command. The IC developed and implemented an incident action plan and requested emergency medical services and fire mutual aid assets.

The emergency operations center (EOC) became operational and established communications with state, local, and Federal entities. The emergency manager (EM) received a turnover briefing from the PSS and the EM duties were transferred from the PSS to the EM in the EOC. The EOC cadre then proceeded to develop messages for release to the public. The Texas Department of Emergency Management (TDEM) participated in the exercise as part of Disaster District 5B, located at the Department of Public Safety district headquarters in Amarillo. TDEM is responsible for state-level responses to emergencies. Additionally, local county agencies participated in the exercise and county representatives contacted the EOC when each county EOC was declared operational, and communications were established with the Pantex Plant EOC. The consequence assessment team (CAT) developed and provided the EOC cadre with event-based plume projections for protective action decision-making. In accordance with the exercise plan, the exercise was paused when key response objectives were met. The exercise then transitioned to a recovery tabletop discussion that involved the Pantex Plant recovery team and offsite organizations.

3.0 Assessment of Site Performance

This section provides the EA assessment, based on this exercise, of the ability of the Pantex Plant ERO to respond to severe events impacting multiple facilities, including positive aspects and areas of weakness. Appendix B details the reviews of the individual ERO exercise objectives that were evaluated by EA, including the Operations Center, the incident command team, and EOC.

At the start of the exercise, the Operations Center was staffed with experienced PSSs who quickly recognized the facility explosion as an emergency and classified the event as a GE. The PSS also immediately ordered implementation of shelter-in-place (SIP) protective actions for onsite workers in accordance with *Guide Sheet Alpha*; however, the PSS did not verify that SIP protective actions were implemented. To determine pre-planned protective actions, the PSS applies a flow chart associated with the EAL, known as *Guide Sheet Alpha* or *Guide Sheet Zulu*. These guide sheets only apply SIP protective actions and do not apply evacuation protective actions because CNS does not want personnel exiting secure buildings. (See **OFI-CNS-11**.) Furthermore, the PSS did not consider whether evacuation was a preferred protective action when structures were incapable of providing adequate protection as a result of infrastructure damage from the tornado or explosion. (See **Finding F-CNS-4** and **OFI-CNS-12**.)

The PSS also provided initial information to offsite authorities in a timely manner; however, EA noted several weaknesses in the processes used. The Pantex Plant notification form is not designed to collect all the information required by DOE Headquarters, including damage, casualties, impact on site operations, and level of media interest, so not all required information was initially provided. Additionally, CNS did not provide follow-up notifications when emergency conditions changed. (See **Finding F-CNS-6** and **OFI-CNS-15**.) The PSS issued timely protective action recommendations (PARs) to state and local governments, using the notification form for a GE classification based on the guide sheet; however, CNS gave conflicting and incorrect protective action information to the public, using pre-authorized emergency

alerting system messages, and some important PAR information was not provided to offsite officials on the notification form. (See **Finding F-CNS-5**, **OFI-CNS-13,** and **OFI-CNS-14**.) Furthermore, the PSS requested the CAT to provide safe routing information for staffing the ERO. Because of data input complexities and a miscommunication between the PSS and the CAT, the

CAT did not complete the safe routing instructions, which led to the exercise director implementing a contingency message (i.e., activation of the ERO) so the exercise could proceed. (See **OFI-CNS-1** and **OFI-CNS-17**.)

Immediately after the exercise began, the fire chief assumed the role of the IC and effectively assessed the scope and magnitude of the emergency by asking for storm track information and HAZMAT inventories for known damaged facilities. The IC appropriately requested additional offsite assets, but additional assets were unavailable as part of the exercise design. Using the assets available on site, the IC developed, implemented, and tracked an appropriate incident action plan (using several informal forms, checklists, and a job aid) with treatment of injured workers as the top priority. (See **OFI-CNS-21**.) Additionally, the IC successfully established a unified incident command at the incident command post (ICP) in an appropriate location.

Nevertheless, EA-33 noted a few weaknesses in the IC operations. First, several factors limited the operability of the incident command vehicle (ICV) used to house the ICP including unavailability of cell phones, an unclear job aid, no access to WebEOC (an online tool for sharing information during emergencies), and a noisy generator that inhibited conversations within the ICV. (CNS self-identified the problem with the noisy generator.) (See **OFI-CNS-18**.) Second, the ERO did not ensure that the IC was aware of some critical information, such as the proximity of workers that were sheltered near a nitric acid spill and plume projections that were not provided to the IC until immediately before termination of the exercise. (See **Finding F-CNS-3** and **OFI-CNS-19**.) Last and most significantly, the Fire Department shift officers did not record the information received about all injured workers who requested medical treatment. As a result, medical support was not provided promptly and effectively to all injured workers. (See **Finding F-CNS-8** and **OFI-CNS-20**.)

The management structure enabled the EOC cadre to adequately set priorities and assign tasks to functional groups. The PSS served as the EM until the EOC was staffed and declared operational and a turnover briefing was completed. The EM and the NPO Emergency Oversight Manager verified the categorization and classification of each emergency event and validated the initial protective actions directed by the PSS. The EOC executive team effectively developed critical response objectives (e.g., saving lives, safeguarding nuclear material, and protecting public health and safety) and addressed balance of plant requirements, including those for mass casualties and infrastructure damage. Furthermore, the logistics group successfully conducted an internet search for needed offsite resources.

Nevertheless, EA-33 noted several weaknesses in EOC operations. The EM did not review the protective actions with the CAT to ensure they were commensurate with the emergency event and did not evaluate the need to change the implemented protective actions. (See **OFI-CNS-2**.) The EM also did not provide updated notifications to offsite authorities when new emergency events were discovered or occurred on site after assuming command from the PSS. (See **Finding F-CNS-6** and **OFI-CNS-15**.) Additionally, the EM had difficulty supporting next-of-kin notifications because the Human Resource Information System lacks the necessary information to complete the next-of-kin form. (See **OFI-CNS-3**.) Furthermore, CNS did not provide accurate and timely emergency status updates to DOE Headquarters in situation reports (SITREPs). Also, while not required, CNS does not provide DOE Headquarters access to the Pantex Plant WebEOC event information, and relies instead on the SITREP as the primary method to provide emergency status updates. However, the only SITREP sent to DOE Headquarters contained inaccurate and incomplete information. (See **Finding F-CNS-7** and **OFI-CNS-16**.) Additionally, the

logistics group only communicated their successful search for offsite resources in WebEOC, which the field response elements cannot access. (See **OFI-CNS-7**.) Further, the *Logistics Teambook* does not document communication requirements, the process for requesting and tracking response resources needed, or the process for requesting logistic support from local, state, and Federal agencies. (See **OFI-CNS-8**.)

The CAT demonstrated general familiarity with team assignments and created plume projections; made SITREP and WebEOC entries; and communicated with the EOC cadre, offsite authorities, and field elements. The CAT displayed familiarity with the types of HAZMAT involved in the exercise and appropriately considered both the chemical and radiological toxicity of radioactive material. Additionally, the CAT made use of meteorological data for plume modeling and considered weather forecasts that could affect HAZMAT dispersion.

Nevertheless, EA-33 noted several weaknesses in CAT activities. The CAT did not make use of many available tools and references and instead relied on checklists. The CAT did not perform timely initial assessments for use in safe routing instructions or protective action decision-making; did not validate the event classifications and protective actions; and did not use Areal Location of Hazardous Atmospheres (ALOHA), HotSpot, or EPICode modeling programs to determine projected exposures at receptors of interest to ensure the safety of personnel. (See **Finding F-CNS-2** and **OFI-CNS-4**.)

Contrary to CNS protocols, the CAT immediately used the National Atmospheric Release Advisory Center (NARAC) Website as well as inappropriate input data (i.e., incorrect time of release, incorrect quantity of uranium that represents an inhalation hazard, and the use of the least conservative uranium isotope for dose projections) to develop plume projections. Further, the CAT provided a 12-hour exposure plume projection (which estimates the dose for unprotected personnel that remain outdoors for 12 hours) to the EOC cadre rather than a more appropriate projection that identifies areas where DOE protective action criteria (PAC) may be exceeded. A projection based on PAC was developed and showed that PAC were not exceeded offsite but indicated the potential for radiological contaminated areas offsite. (See **Finding F-CNS-2** and **OFI-CNS-5**.) As all plume projections became available, important results were either not provided or not provided in a timely manner to the EOC cadre or to offsite authorities. These important results included areas that warranted evacuation because of uranium toxicity, areas where PAC were not exceeded off site (yet the site recommended the entire 10-mile emergency planning zone (EPZ) be sheltered), and areas that may be contaminated off site for use by State of Texas field monitoring teams. (See **Finding F-CNS-3** and **OFI-CNS-6**.). The CNS after action report identifies the need to provide the EOC executive team plume projections with PAC information and offsite authorities timely information as improvement items.

The site conducted the exercise recovery phase as a tabletop, and a positive exchange of information with state and local agencies took place. The tabletop was a positive training evolution and produced a very comprehensive recovery plan, but did not validate recovery plans and procedures or evaluate recovery team performance. (See **OFI-CNS-9**.)

Throughout the exercise and in multiple venues, EA-33 observed inadequate communications and information management that degraded situational awareness and prevented a common operating picture among the site, DOE Headquarters, and offsite organizations. Most significantly, CNS information flow processes were ineffective at acquiring, recording, and disseminating timely and accurate event information among the ERO and offsite response organizations. For example, the ERO encountered problems identifying and communicating the medical triage location and maintaining awareness of the status of injured personnel. (See **OFI-CNS-20**.) Likewise, the Pantex Plant WebEOC application did not provide an adequate information management tool for the Pantex Plant's response facilities and field response elements. (See **OFI-CNS-10** and **OFI-CNS-18**.) In addition, EA-33 observed inadequate

interoperability among onsite and offsite response facilities (i.e., Operations Center, EOC, joint information center/media center, local and state EOCs, and the DOE Headquarters EOC) because the offsite decision-makers were unable to see any WebEOC data or important technical products produced by the site that were needed for timely and accurate decision-making. (See **OFI-CNS-6** and **OFI-CNS-13**.)

CNS has written an after action report to document their evaluation of this exercise as required by DOE Order 151.1C. The CNS exercise report identifies one finding and twelve improvement items. CNS uses findings to indicate significant issues that merit managers' priority attention, e.g., failures related to a criterion that do not meet the intent of DOE policy, Federal or state laws, CNS procedures, or other applicable requirements. CNS uses improvement items to document deviations, concerns, or opportunities for improvement (OFIs) that, if implemented, would enhance the response; however, improvement items are not tracked for implementation and do not merit manager attention. The after action report partially reflects that CNS did not provide accurate, candid, and timely information to the news media and the public and was identified as the finding in the report. However, the CNS corrective action for the finding does not address that CNS gave incorrect protective action information to the public in the National Weather Service emergency alerting system message, and only considers revising the handbook and providing a sample news release or a list of required information for news releases.

4.0 Findings

As defined in DOE Order 227.1, *Independent Oversight Program*, findings indicate significant deficiencies or safety issues that warrant a high level of management attention and that, if left uncorrected, could adversely affect the DOE mission, the environment, worker safety and health, the public, or national security. Findings may identify aspects of a program that do not meet the intent of DOE policy or Federal regulation. Corrective action plans 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 corrective action plans and track them to completion.

EA identified the following eight findings during this review that were not self-identified as significant issues that merit managers' priority attention in the Pantex exercise after-action report:

Finding F-CNS-1: Contrary to (DOE Order 151.1C, CNS did not develop a procedure that effectively describes the implementation of the emergency plan.

Although an exercise objective stated that the ERO was to activate within one hour, the *Operational Emergency Manual (OEM)*, MNL-352187, does not require activation of the ERO within one hour. However, the *Pantex Plant Hazardous Materials Program Emergency Plan*, EM-PLN-0019, requires the EOC to be staffed and declared operational within one hour of declaration of an Operational Emergency, unless under protective actions. Consequently, the mix of plans, procedures, and aides did not provide an adequate level of detail to effectively accomplish ERO activation.

Finding F-CNS-2: Contrary to DOE Order 151.1C, CNS did not provide accurate and timely consequence assessments.

The CAT did not perform the initial consequence assessment activities of validating event classification and protective actions, providing safe route information, and providing timely estimates of exposure at receptors of interest, as described in the CNS protocols. The CAT provided an initial assessment based on a 12-hour exposure to uranium toxicity rather than a more appropriate assessment that identified areas

where DOE PAC might be exceeded within an hour. The CAT did not provide their initial assessment until approximately one and a half hours after the release occurred. It is important to have initial consequence assessment information quickly because DOE PAC is based on one-hour exposures that should be sufficient to avoid irreversible health effects.

Additionally, the CAT did not provide accurate or timely ongoing assessments. The CAT did not use available tools to develop accurate plume projections or provide all of the consequence assessment data as described in CNS protocols to complete the ongoing assessment process. Data input into dispersion modeling programs were incorrect for the quantity of uranium representing an airborne hazard and the least conservative isotope of uranium was used for dose projections. Additionally, the time of release was incorrect for all calculations. This affects material transport time (if meteorological conditions had changed) and calculated plume arrival time at receptors of interest. Also, the CAT did not provide the results of the NARAC uranium toxicity plume projections identifying areas that warranted evacuation to the EOC cadre. Finally, the CAT did not perform an independent calculation to validate their initial assessment results, as described in the CAT checklist.

Finding F-CNS-3: Contrary to DOE Order 151.1C, CNS did not provide continuous, effective, and accurate communications among response components.

The CAT did not brief the EOC cadre on plume projections that were based on DOE PAC, inform authorities that evacuations were warranted based on the uranium toxicity dispersion projection, reconcile differences between model results and the 10-mile protective actions taken, or provide offsite authorities with supplemental radioactive material release data. The CAT did not provide offsite authorities with offsite contamination projections until directed to do so by the environment, safety, and health director of the EOC cadre.

Inadequate communications and information management degraded situational awareness and prevented a common operating picture among the site, DOE Headquarters, and offsite organizations. Most significantly, CNS information management processes were ineffective at acquiring, recording, and disseminating timely and accurate event information among the ERO and offsite response organizations. These weaknesses resulted in significantly delaying the activation of the ERO and the initial dispatch of the Fire Department, recalling off-duty fire fighters, identifying and communicating the medical triage location, and maintaining awareness of injured personnel status. Furthermore, 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.

Finding F-CNS-4: Contrary to DOE Order 151.1C, CNS has not developed procedures to implement evacuation as a protective action.

CNS does not plan for evacuation as an onsite protective measure in their guide sheets because of the problematic nature of evacuation from secure facilities. However, some emergency conditions will/may require evacuation as the appropriate action to protect site personnel.

Finding F-CNS-5: Contrary to DOE Order 151.1C, 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. Importantly, the preplanned emergency alerting system message stated that local officials recommended that all residents and visitors in the Pantex Plant 10-mile EPZ immediately SIP, which conflicted with the PSS-issued PAR

to only SIP zones 2, 3, 4, A, and B. Furthermore, the initial preauthorized Pantex Plant press release, issued by the Operations Center, and the following two updated press releases issued by emergency public information personnel, further incorrectly identified that local officials recommended that Carson, Potter, and Armstrong county residents living within the 10-mile EPZ should continue to SIP.

Finding F-CNS-6: Contrary to DOE Order 151.1C, CNS did not provide accurate and timely follow-up notifications to offsite officials when conditions changed.

CNS made no follow-up notifications as required when emergency conditions changed. Consequently, offsite officials did not have relevant information to support timely and accurate decision-making.

Finding F-CNS-7: Contrary to DOE Order 151.1C, CNS did not provide emergency status updates to the next-higher emergency management team on a continuing basis.

The Operations Center transmitted only one DOE Headquarters SITREP, which contained inaccurate and incomplete information. Additionally, CNS had not provided DOE Headquarters with the capability to access the Pantex Plant WebEOC event information, relying on the SITREP as the primary method to transmit emergency status updates. Consequently, DOE Headquarters could not keep Departmental senior management and other Federal agencies properly updated as events evolved.

Finding F-CNS-8: Contrary to DOE Order 151.1C, CNS did not ensure that medical support for injured personnel was promptly and effectively implemented.

DOE Order 151.1C states that medical support for contaminated or injured personnel must be planned and promptly and effectively implemented. The Fire Department shift officers did not record the information received on all reported injuries, thus delaying treatment for those individuals. Furthermore, the ERO did not track all reported injuries to ensure that all personnel who needed assistance received appropriate medical care.

5.0 Opportunities for Improvement

This EA review identified twenty-one OFIs. These potential enhancements are not intended to be prescriptive or mandatory. Rather, they are suggestions offered by the EA-33 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.

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OFI-CNS-1: To improve the timeliness in activating and staffing the ERO, consider:

- Revising the *OEM* to indicate a one-hour requirement from the time of an event classification to activate and staff the ERO.
- Developing job aids to assist the PSS with providing timely safe route information.

OFI-CNS-2: Consider improving the implementation of protective actions by emphasizing in executive team drills and refresher training:

- The role of reassessing protective actions as described in the *OEM* and *Executive Teambook*.
- The need to understand and validate information on the plume projections provided by the CAT.
- The need to validate protective action and PAR decision-making.

OFI-CNS-3: Consider revising the Human Resource Information System to ensure that all the necessary information to complete the next-of-kin form is provided for use by the emergency contact coordinators during emergency events.

OFI-CNS-4: Consider improving the timeliness of initial consequence assessments by:

- Providing CAT personnel with calculated exposures at receptors of interest for the scenarios analyzed in the emergency planning hazards assessment (EPHA) that can be used for an immediate initial assessment.
- Emphasizing in CAT drills and refresher training:
  - The need to validate EALs and protective action decision-making
  - The role of ALOHA, EPICode, and HotSpot for initial consequences assessments as described in the *OEM*, *Consequence Assessment Teambook*, and CAT checklists
  - The need to use position checklists and record completed tasks
  - The importance of providing an initial assessment within an hour from the time of release to ensure personnel can take protective action measures.

OFI-CNS-5: Consider improving the quality of ongoing consequence assessments by:

- Emphasizing in CAT drills and refresher training:
  - The purpose and use of the plutonium and uranium source term selection tools
  - The importance of using the correct time of release in plume modeling to provide better dispersion transport information for protective action decision-making
  - The importance of using uranium-235 rather than uranium-238 isotopes in calculating projected dose exposures when both are involved.
- Revising CAT protocols to incorporate:
  - Calculations for chemical evaporation times to determine when a chemical release would cease to aid in decision-making for chemical release mitigation strategies and priorities
  - Quality control checks of dispersion modeling input and output data
  - Involvement of the NARAC support staff.

OFI-CNS-6: Consider improving communications from the CAT to onsite and offsite authorities by emphasizing in CAT drills and refresher training:

- The role, use, and importance of providing offsite authorities supplemental radioactive material release data.
- The importance of providing the EOC cadre and offsite authorities plume projections that are based on DOE PAC.
- The role of the CAT in reconciling, with the EOC cadre, differences in event classification and protective actions with initial and ongoing assessment products.
- The importance of providing offsite authorities with timely offsite contamination projections to support field monitoring activities.

OFI-CNS-7: Consider enhancing logistics team communications by including requirements for establishing and maintaining communications in the *Logistics Teambook* or other procedures.

OFI-CNS-8: Consider improving both the internal and external processes for obtaining offsite logistics support during an event by specifying clear responsibility for the process, from request through completion, consistent with:

- Federal Emergency Management Agency National Response Framework guidance
- TDEM plans
- TDEM Region 5 Disaster District 1 protocols and procedures.

OFI-CNS-9: Consider including the recovery and termination element with appropriate objectives in future exercises.

OFI-CNS-10: Consider improving communications among response facilities, field response elements, and offsite command centers to provide a common operating picture of the emergency response and shared situational awareness among all teams by:

- Installing and fully implementing an information management system similar to the Emergency Management Information System currently used by CNS at the Y-12 National Security Complex.
- Defining information flow processes within the Pantex Plant's response facilities and field response elements.
- Fostering interoperability with offsite response facilities (i.e., joint information center, local and state EOCs, and the DOE Headquarters EOC) and enabling access to unclassified emergency response information such as notification forms, emergency status updates, plume projections, significant events data, and field monitoring data.
- Expanding the use of computerized information management systems, capable of rapidly interfacing with other systems that may be vital during an emergency response, to communicate a common operating picture and shared situational awareness by:
  - Providing a real-time perception of what is occurring at the incident scene
  - Providing awareness of what the ERO is doing in relation to the incident
  - Enabling the ERO to predict changes to the incident
  - Supporting ERO objectives that forecast future actions.
- Defining expected actions for achieving and maintaining situational awareness among all teams.

OFI-CNS-11: Consider establishing a process for verifying and tracking the completion of SIP for specific onsite facilities.

OFI-CNS-12: Consider improving protective action planning by incorporating evacuation as a protective measure, when necessary, in *Guide Sheet Alpha*.

OFI-CNS-13: Consider improving offsite PARs specific to Pantex Plant events by:

- Providing information to appropriate state and county agencies on bounding event scenario distance to PAC and plume arrival times at specific offsite receptors.
- Coordinating offsite PARs, based on the analysis of scenario results documented in the EPHAs, with offsite agencies.
- Confirming that initial PARs provided to offsite authorities include the distance to PAC and reflect a bounding estimate of consequences relative to PAC, as derived from the EPHA analyses.
- Ensuring that the PAR provides the time available for carrying out the protective action before the onset of the impact.
- Planning with responsible offsite agencies for the expansion of protective actions outside the EPZs when conditions warrant.

OFI-CNS-14: Consider improving the process for providing accurate, candid, and timely information to the news media and the public by ensuring that only verified information is provided in official notifications, emergency status updates, news releases, and emergency public information releases.

OFI-CNS-15: Consider improving the usability, timeliness, and accuracy of information provided to offsite officials by:

- Using an electronic version of the Pantex Plant notification form rather than a hand-written form.
- Sending the Pantex Plant notification forms electronically rather than via facsimile.
- Specifying a single ERO position with responsibility for follow-up notifications once the EOC becomes operational.

OFI-CNS-16: Consider improving the usability, timeliness, and accuracy of emergency status updates to DOE Headquarters by:

- Providing all the information required by DOE Order 151.1C in the Pantex Plant SITREP.
- Assigning dedicated Federal staff in the EOC to maintain connectivity and communications with the DOE Headquarters EOC and compile the SITREP.
- Sending the Pantex Plant SITREP electronically rather than via facsimile.
- Ensuring each emergency status updates to DOE Headquarters contains the latest data by conferring with EOC personnel or referring to the following sources of information:
  - Emergency information management system
  - News releases
  - Pantex Plant notification forms
  - Plume projections.
- Providing an explanation when information is changed in a subsequent update.
- Allowing DOE Headquarters to have access to the Pantex Plant's emergency information management system.

OFI-CNS-17: Consider improving the ERO activation process by providing the PSS with a web-based geographical information system tool, such as the CNS developed Y-12 Area Mapping System, to enable the PSS to determine safe route information and identify buildings and areas for the ERO to avoid when responding.

OFI-CNS-18: Consider improving the usability of the ICV by implementing the following actions:

- Locating another source for cell phones to be used by exercise controllers and evaluators so communication options are not compromised in the ICV during exercises.
- Revising the job aid in the ICV to clearly state the specific steps needed to make onsite telephone calls.
- Expediting the resolution of the software incompatibility issues between WebEOC and the Emergency Communications Network.
- Ensuring that the software program on the laptop computer used to view plume model computer files is associated as the default program for those types of files to allow rapid viewing of plume models.

OFI-CNS-19: Consider enhancing the IC's ability to quickly and accurately assess the magnitude of emergencies by ensuring that the ERO immediately provides plume models and information on the status of workers near a HAZMAT release to the IC.

OFI-CNS-20: Consider developing a more comprehensive process to track injured workers by implementing the following actions:

- Ensuring all information on reported injuries is forwarded to the IC.
- Confirming that it is safe for personnel to exit facilities and self-report to the triage area or onsite medical facility before directing personnel to do so.
- Assigning the responsibility to track all injured personnel to an ERO position within the EOC.

OFI-CNS-21: Consider consolidating the various informal forms, checklists, and job aid used by the IC to document the incident action plan into one approved form/checklist, referenced in the *Incident Command Teambook*, to facilitate the quick and accurate development of an incident action plan.

Appendix A
Supplemental Information

Dates of Review

August 4 – August 21, 2014
Exercise: August 6, 2014

Office of Enterprise Assessments

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

Quality Review Board

William A. Eckroade
T. Clay Messer
Thomas R. Staker
Karen L. Boardman
Michael A. Kilpatrick

EA Reviewers

Randy Griffin – Lead
John Bolling
Deborah Johnson
Teri Lachman
Tom Rogers

Appendix B
Independent Assessment of Exercise Objectives

The exercise was designed, coordinated, conducted, and documented in accordance with EM-PLN-0023, *Emergency Management Training, Drill, and Exercise Program Plan*. Consolidated Nuclear Security, LLC (CNS) developed the exercise using 79 exercise objectives.

The Office of Enterprise Assessments (EA) and its Office of Emergency Management Assessments (EA-33) selected 31 of the CNS objectives for independent review in the following seven areas:

1. Emergency Operations Center (EOC)
2. Consequence Assessment Team (CAT)
3. Logistics Team
4. Recovery Team
5. Emergency Services Dispatch Center (ESDC)
6. Operations Center
7. Incident Command Team (ICT)

This appendix identifies the selected objectives and provides EA's independent assessment for each. This approach enables Pantex Plant Federal and contractor managers to consider EA perspectives in their evaluation of the exercise and in the development of corrective actions and additional improvements.

Emergency Operations Center

PAN-EOC.6 – Given activation of the Emergency Response Organization (ERO), staff and activate equipment, facilities, and materials within one hour in accordance with MNL-352187, Operational Emergency Manual (OEM).

The Pantex ERO operates on a tiered hierarchy duty-roster concept, whereby one person is on call for each ERO position. When on call, the individual must be within a one-hour response time to the assigned duty location. However, some of the Pantex Plant emergency planning hazards assessment (EPHA) analyzed events may result in response facilities becoming inaccessible, potentially for extended periods of time. Events of most interest are hazardous material (HAZMAT) releases with potential large consequences because these events are when command and control centers are most vital and they identify the most planning needs for HAZMAT programs.

The ERO was not staffed within the indicated objective timeframe of one hour from the time of event classification. The inability of the Operations Center to provide safe route information for the ERO prevented the ERO from being immediately activated. The plant shift superintendent (PSS) requested the on-call CAT to determine safe route instructions without providing the event data needed for plume projection modeling. This delayed activation of the ERO and Fire Department (discussed further in objective PAN-CAT.3) as the modeler waited for the missing information, which was eventually provided by a contingency message inject. Further, the *OEM* does not contain a one hour requirement for activation of the ERO as indicated by the exercise objective. Additionally, the *Pantex Plant Hazardous Materials Program Emergency Plan*, EM-PLN-0019, states that during working hours, the EOC will be staffed and declared operational within one hour of declaration of an Operational Emergency (OE), unless under protective actions. Consequently, the mix of plans, procedures, and aides did not provide an adequate level of detail to effectively accomplish ERO activation. (See **Finding F-CNS-1** and Section 5.0, **OFI-CNS-1**.)

Finding F-CNS-1: Contrary to U.S. Department of Energy (DOE) Order 151.1C, CNS did not develop a procedure that effectively describes the implementation of the emergency plan.

PAN-EXEC.2 – Given a recall of the Executive Team, staff and prepare to manage/control the OE in accordance with the OEM.

The executive team was functionally staffed and prepared to manage the OE in accordance with the *OEM*. Once activated and staffed, the management structure of the EOC adequately provides for collection and dissemination of data within the EOC, setting priorities, assigning work to functional groups, and keeping key emergency response staff abreast of emergency response status. The emergency manager (EM) obtained a briefing on the emergency event from the PSS in accordance with the *OEM*. The *OEM* invokes the *Executive Teambook* as the process guide for conducting the executive team functions and recommends that the focus of the PSS briefing to the EM should be on event consequences, protective actions, response status, and response issues. The PSS and EM discussed the recommended protective actions provided in the emergency action level (EAL) for the explosion. The EM provided the initial and periodic briefings to the EOC cadre on the status of the emergency and current significant response priorities and activities.

PAN-EXEC.3 – Given an OE, the Executive Team establishes and maintains communications with groups/teams in accordance with EM-PLN-0019, Pantex Plant Comprehensive Emergency Management Plan or EM-PLN-0030, Emergency Communications Plan.

The EM and Emergency Oversight Manager (EOM) prioritized tasks and appropriately communicated the tasks to the EOC cadre in accordance with the *Pantex Plant Comprehensive Emergency Management Plan* and the *Emergency Communications Plan*. Executive team directors requested information from their respective support groups and teams within the EOC. Executive team directors performed EM/EOM requested tasks in a timely manner.

PAN-EXEC.4 – Given minimum staff (one qualified responder for each position), EM and EOM maintain command (responsibility) of the event throughout the exercise in accordance with the OEM.

The EM and EOM maintained command of the event throughout the exercise in accordance with the *OEM*. The EM requested a turnover briefing from the PSS when the EOC was staffed and declared operational, one hour and twenty minutes after the General Emergency (GE) declaration. The PSS provided the turnover briefing and transferred OE management and control to the EM. The EM and EOM developed strategic goals throughout the event (i.e., saving lives, safeguarding special nuclear material, restoring critical infrastructure, and mitigating future property and environmental damage). Although the EM identified, prioritized, and assigned tasks throughout the emergency event, the EM ineffectively managed interfaces with offsite agencies. The EM did not provide updated notifications and did not ensure that CAT produced plume projections were provided to offsite agencies. (See Section 5.0, **OFI-CNS-15.)**.

PAN-EXEC.5 – Given initial event information, update the categorization and classification, as necessary, in accordance with the OEM.

The EM and EOM partially demonstrated updating the categorization and classification in accordance with the *OEM*. The EM and EOM verified the classification determination of the explosion made by the PSS by reviewing the appropriate EAL and reviewing the plume projection developed by the CAT in accordance with the *OEM*. The initial event (i.e., an explosion) had been classified as a GE per the facility EAL by the PSS. The EM and EOM also reviewed the EAL for the fuming nitric acid spill and determined the event to be a Site Area Emergency. Because a GE had already been declared, the EM and

EOM were not required to update the classification. However, the EM and EOM did not review the EALs for the overturned safeguards transporter (SGT) or mass casualties and did not discuss that the plume projections for the explosion were based on 12-hour exposures for unprotected workers and not on DOE protective action criteria (PAC). Further, the EM and EOM did not discuss the fact that these plume projections did not support a GE declaration. Additionally, the EM did not provide updated notifications to offsite agencies that included information on the other emergency events occurring on site (i.e., overturned SGT, mass casualties, or the nitric acid spill). (See Section 5.0, **OFI-CNS-15**.)

PAN-EXEC.6 – Given an OE, validate or update and implement protective actions in accordance with the OEM.

The EM and EOM did not update and implement protective actions in accordance with the *OEM*. The EM and EOM used the appropriate EALs to validate the initial protective action decision of a plant-wide shelter-in-place (SIP) with offsite protective actions implemented for a 10-mile radius made by the PSS. The initial protective actions were implemented for a tornado siting and retained throughout the exercise. The EM and EOM reviewed the appropriate EALs for the fuming nitric acid spill and determined that no changes to protective actions on site were required. The EM and EOM also reviewed the plume projections obtained from the CAT. However, the EM and EOM did not consider the structural conditions of effected buildings, location of personnel within the fuming nitric release, and whether personnel may need to be evacuated from the areas. Further, the EM and EOM did not question the plume projection information presented by the CAT to ensure that protective actions implemented on site were still appropriate in accordance with the *OEM* and *Executive Teambook*. (See Section 5.0, **OFI-CNS-2**.)

PAN-EXEC.7 – Given initial event information and the appropriate EALs, determine and update protective action recommendations (PARs) to the state and local jurisdictions in accordance with the OEM.

The EM and EOM did not update PARs to offsite agencies in accordance with the *OEM*. The EM and EOM used the appropriate EALs to validate the initial PARs for the state and local jurisdictions implemented by the PSS. The EM reviewed the plume projections obtained from the CAT; however, the EM did not discuss why offsite protective actions were implemented for a 10-mile radius when the plume projection developed by the CAT indicated that the distance to the PAC was not exceeded off site. As a result, the EM did not provide appropriate information to offsite agencies regarding PARs. (See Section 5.0, **OFI-CNS-13**.)

PAN-EXEC.9 – Given an OE with serious injuries, fatalities, or missing personnel, activate the Emergency Contact Coordinator to provide injury or death notification in accordance with the OEM.

The EM activated the emergency contact coordinator and ensured that the Operations Center section manager completed the next-of-kin notification form, in accordance with the *OEM*. The emergency contact coordinator filled out the next-of-kin form with all the information that could be obtained from the Human Resource Information System. However, the Human Resource Information System does not provide all the necessary information needed to complete the form. This issue was identified as an improvement item by CNS. (See Section 5.0, **OFI-CNS-3**.)

PAN-EXEC.11 – Given multiple OEs, establish priorities that involve multiple facilities, casualties, and security systems in accordance with the OEM.

The executive team directors effectively developed critical response objectives in accordance with the *OEM*. The directors established priorities for response to support incident command and addressed

balance of plant requirements including those for mass casualties and infrastructure damage. The directors updated the priorities as actions required to support immediate response activities such as personnel accountability and emergency response resources.

Consequence Assessment Team

PAN-CAT.3 – Given an OE, initiate timely initial assessment of the event in accordance with the OEM.

The CAT did not perform an initial timely assessment of the event in accordance with the *OEM*. The *OEM* provides some descriptions of CAT actions for performing timely initial assessments and invokes the *Consequence Assessment Teambook* as the process guide for conducting CAT functions. The *Consequence Assessment Teambook* describes three levels of consequence assessments (i.e., elementary, intermediate, and advanced levels). The CAT did not use the elementary or intermediate levels that make use of quick and easy plume centerline projections; simplified consequence calculations using hand calculations, overlays, or simplified computer models, such as Areal Location of Hazardous Atmospheres; EPICode software; and HotSpot model packages described in the protocols. Instead, the CAT used the advanced level, which uses the National Atmospheric Release Advisory Center (NARAC) software to predict consequences in a more accurate, but less timely fashion. As a result of using NARAC and delays in assembling the CAT, the initial timely assessment was not available until approximately one and a half hours after the release. Additionally, the mix of CNS plans, procedures, and aides require the CAT to review and confirm the initial event classification and protective actions through use of the applicable EAL and document the review on Pantex Form 5195, *CAT Initial Confirmation*. However, the CAT did not perform this review or provide any consequence assessment information for nearly an hour and a half (and likely would have been longer if not aided by an exercise control inject to cease waiting on safe route information and activate the ERO). Exceeding an hour is significant because DOE PAC is based on personnel being able to perform protective actions within one hour of exposure. The significance of this would have been greater if the exercise had been designed using a material-at-risk at the higher end of the consequence spectrum. (See **Finding F-CNS-2** and Section 5.0**, OFI-CNS-4**.)

Finding F-CNS-2: Contrary to DOE Order 151.1C, CNS did not provide an accurate and timely consequence assessment.

PAN-CAT.4 – Given an OE, provide continuous ongoing assessment in accordance with the OEM.

The CAT partially performed ongoing assessment activities described in the *OEM*. The CAT made use of current and forecasted meteorological data and identified all of the HAZMAT to be analyzed. The CAT used initial meteorological data provided by the PSS for the initial plume projections, monitored ongoing weather conditions using exercise meteorological data, and checked the weather forecast through the following day. The CAT appropriately identified plutonium, uranium, and nitric acid as the HAZMAT requiring analysis. In doing so, the CAT appropriately considered the chemical toxicity of uranium and plutonium as well as radiological dose projections because they also represent radioactive hazards.

Nevertheless, the CAT did not use available tools to develop accurate plume projections or provide all of the consequence assessment data as described in the *OEM* to complete the assessment process. Specifically, the following tasks described in the *OEM* were not performed:

- The CAT did not use PX-5517, *CAT Uranium Source Term Selection Tool*, to refine the source term from the Move Right system; the intent of the tool is to more accurately estimate the amount of monolithic uranium metal that becomes an airborne hazard after an explosion.

- The CAT did not reconcile why offsite protective actions were implemented for a 10-mile radius when consequence assessment results indicated no PAC were exceeded off site.

- The CAT did not assess and make estimates of consequences at a particular time for each receptor of interest.

- Although two uranium isotopes were involved in the release, the CAT used uranium-238 as a surrogate source term rather than the more radioactive and therefore, more conservative uranium-235 isotope, for dose projections.

- The CAT did not run the model based on time of release, but instead used the time modeling was initiated, over an hour later; this affects material transport time (if meteorological conditions had changed) and calculated plume arrival time at receptors of interest.

- The CAT did not consider that the spilled nitric acid would have evaporated in approximately three hours after the release.

- CAT personnel mostly used electronic versions of checklists, which led to no records of completed activities.

- CAT personnel did not perform several tasks on the checklists, including:

    - Validating the initial event classification and protective actions implemented.
    - Using HotSpot dispersion modeling program to validate radiological release data.
    - Displaying a plume model that indicates where PAC is exceeded.
    - Completing the *CAT Initial Confirmation* form, and having the form reviewed by the EM and EOM before faxing it to state authorities.

EA-33 also noted that CNS protocols do not require quality control checks of consequence assessment input data and output products before results are distributed. (See Section 5.0, **OFI-CNS-5**.)

PAN-CAT.5 – Given an OE, the CAT ensures internal and external communications with groups/teams and off-site agencies in accordance with EM-PLN-0030, Emergency Communications Plan or the OEM.

The CAT partially demonstrated proper communications in accordance with EM-PLN-0030, *Emergency Communications Plan* and the *OEM*. The CAT primarily used voice communications within the EOC and monitored WebEOC, the situation report (SITREP), the radiation safety group radio channel, and email for external communications. A significant miscommunication occurred between the PSS and the CAT leader related to providing safe routing information requested by the PSS in order to activate the EOC. Because the CAT leader was sheltered at his normal work station (i.e., outside the EOC), he waited for the PSS to provide input for the requested plume modeling. The PSS never provided any information to the CAT leader, so the exercise director implemented a contingency message and instructed the PSS to activate the ERO using safe routing instructions provided by a controller. (See Section 5.0**, OFI-CNS-17**.)

Additionally, the CAT did not provide some important information to the EOC cadre or offsite authorities in a timely manner. Specific tasks not performed include:

- Presenting the EOC cadre with plume projections that were based on DOE PAC instead of plume projections that were based on 12-hour exposures for unprotected workers.

- Sharing the results of the uranium toxicity plume projection that identified areas that warrant evacuation based on DOE PAC.

- Providing state authorities with a completed form PX-5204, *Supplemental Data for Radiological Emergency Events*, to enable the state to perform independent modeling in an unclassified manner. The CAT did not clear the information for offsite release and was conservatively concerned about releasing potentially sensitive unclassified information.

- Sharing radioactive material deposition plume projections with offsite authorities, showing possible offsite contamination below DOE PAC, until directed to do so by the environment, safety, and health director of the EOC cadre, which could have been a very significant issue if the material-at-risk had posed greater consequences.

Collectively, these omissions and delays did not provide for effective and accurate communications between the CAT and other organizations regarding the initial and continuous ongoing consequence assessments. (See **Finding F-CNS-3** and Section 5.0, **OFI-CNS-6**.)

Finding F-CNS-3: Contrary to DOE Order 151.1C, CNS did not provide continuous, effective, and accurate communications among response components.

PAN-CAT.7 – Given an OE, develop advanced NARAC plume model projections on hazardous materials releases in accordance with the OEM.

The CAT used NARAC to develop plume projections for radioactive material toxicity and radiation hazards as well as for a nitric acid spill; however, as previously discussed, the modeling contained input errors and did not involve NARAC support staff in Livermore, California. (See Section 5.0, **OFI-CNS-5**.)

Logistics Team

PAN-LOG.3 – Given an emergency event, the Logistics Team establishes and maintains communications with groups/teams in accordance with the OEM.

The logistics team had adequate methods for communication during the exercise, but the communication requirements were not documented in the *OEM*. The logistics room had a computer with Internet and WebEOC access, along with adequate telephone lines. Additionally, WebEOC was continuously displayed on a dedicated monitor in the room. However, neither the *OEM* nor *Logistics Group Teambook* specified communications requirements or referenced communication procedures to be followed by the logistics team. (See Section 5.0, **OFI-CNS-7**.)

PAN-LOG.4 – Given an emergency event, the Logistics Team completes requested tasks in accordance with the OEM.

The logistics team successfully located requested offsite response assets, but the processes for requesting, tracking, and monitoring needed assets were not documented in the *OEM*. Requests for logistic support were made to the Logistics Director, who relayed the requests to the logistics team to be filled. During the exercise, two requests were made for offsite resources (i.e., a refrigerated trailer and ambulances). The logistics team used the Internet to locate a refrigerated trailer (through a local rental agency) and an ambulance in Lubbock, Texas, and posted the results in WebEOC. However, neither the *OEM* nor *Logistics Group Teambook* specified how needed response resources were to be requested, tracked, monitored, or closed. The *Logistics Group Teambook* contained an *Emergency Event Action/Information*

form that could be used for this purpose, but the form's use is not discussed in the teambook, and the form was not used during the exercise. In addition, the *Pantex Plant Hazardous Materials Program Emergency Plan* discusses in broad terms that assistance is available from the state of Texas, but the *OEM* and *Logistics Group Teambook* fail to address how to request logistic support through local, state, or Federal agencies. (See Section 5.0, **OFI-CNS-8**.)

Recovery Team

PAN-REC.1 – Given emergency operations, discuss the development, coordination, and approval of an on-site Recovery Plan in accordance with the OEM.

In accordance with the exercise plan, CNS conducted a discussion-based recovery operations tabletop after the exercise was paused, rather than developing a recovery plan in accordance with the *OEM* or *Recovery Teambook*. In the latter stages of the exercise, the recovery group prepared an *Initial Recovery Planning-Executive Briefing* PowerPoint slide presentation for the afternoon tabletop. Positive interaction between the ERO and offsite agencies during the tabletop resulted in an extensive recovery plan being developed; however, the tabletop did not validate recovery plans and procedures or evaluate recovery team performance. (See Section 5.0, **OFI-CNS-9**.)

PAN-REC.2 – Given an Operational Emergency, discuss the formal termination process of the emergency response in accordance with the OEM.

By design, the exercise was paused before the emergency was terminated and the continuation of recovery operations was deferred to the afternoon tabletop. (See Section 5.0, **OFI-CNS-9**.)

Emergency Services Dispatch Center

PAN-ESDC.2 – Given an emergency event, collect event information and dispatch the Fire Department in accordance with MNL-352191, ESDC Manual.

The ESDC received multiple alarm signals for the emergency events, properly documented each signal, collected event information, and dispatched the Fire Department in accordance with the *ESDC Manual.*

Operations Center

PAN-PSS.2 - Given an emergency event, collect event information in accordance with the OEM, or MNL-352190, Operations Center Manual.

The Operations Center partially demonstrated proper communications in accordance with the *OEM* and MNL-352190, *Operations Center Manual*. The Operations Center was well staffed with three experienced PSSs, a Move Right operator, and the Operations Center section manager. The Operations Center personnel successfully demonstrated the use of properly working pagers, radios, telephones, and weather monitoring display equipment. However, EA-33 observed several instances of inadequate communications among the site, DOE Headquarters, and offsite organizations. The PSS was unable to acquire safe route information from the on-call CAT because of a PSS and CAT miscommunication, which delayed activation of the ERO (discussed further in objective PAN-CAT.3). Additionally, the IC made multiple requests to the PSS to recall off-duty fire fighters; nonetheless, the PSS did not start the recall until 35 minutes after the initial call from the IC and despite that the mass casualty response would have relied on the recall of off-duty fire fighters. Similarly, the IC did not immediately tell the PSS once a triage location was determined, which delayed transmitting this information to the plant population and the onsite medical department. Furthermore, the PSS did not have situational awareness of number and

severity of injuries. Moreover, the PSS did not consistently demonstrate the ability to collect event information and maintain situational awareness throughout the ERO and offsite response organizations. The Pantex Plant WebEOC application contained inadequate emergency information and did not enable the Pantex Plant ERO to share important event information among the response facilities and field response elements. The PSS and other key response functions (IC, ESDC, emergency public information, and protective force) do not have access to WebEOC, which does not allow them to generate, receive, and monitor significant event information. Most significantly, EA-33 determined that although the Operations Center has general procedures (e.g., *OEM* and *Operations Center Manual*) for key aspects of the emergency management program, CNS uses an experience-based, rather than a process/procedure-based, approach to decision making for most emergency responses. The experience-based system relies more heavily on the PSS and Operations Center staff to implement the emergency plan and make time-urgent decisions based on their knowledge of a given situation.

EA-33 also observed inadequate interoperability among onsite and offsite response facilities (local, state, and DOE Headquarters EOCs); key personnel outside the Pantex Plant EOC were unable to view WebEOC information and technical products (such as consequence assessment plume models), information which is needed for timely and accurate decision-making. In addition, the handwritten initial notification form sent to DOE Headquarters and local and state agencies omitted key information (discussed further in objective PAN-PSS.6). Likewise, the SITREP sent to DOE Headquarters omitted key information and contained incorrect data. Furthermore, event information contained in emergency alerting system messages and Pantex Plant press releases conflicted with the offsite PARs issued by the Operations Center (discussed further in objective PAN-PSS.4). Also, offsite response organizations were not provided consequence assessment plume projections to support offsite protective action decision-making (discussed further in objective PAN-CAT.5). As a result, numerous communication weaknesses degraded situational awareness among the site, DOE Headquarters, and offsite organizations, which adversely impacted the timeliness and effectiveness of some response activities. (See **Finding F-CNS-3** and Section 5.0, **OFI-CNS-10**.)

PAN-PSS.3 - Given an emergency event, categorize and classify the event as an OE, GE, no later than fifteen minutes after event recognition, identification, and/or discovery in accordance with the OEM.

The PSS quickly recognized the initiating emergency event and classified the event as a GE. The PSS used the appropriate EAL to classify the event and referenced the appropriate guide sheets to determine the required protective actions (*Guide Sheet Alpha* for onsite protective actions, *Guide Sheet Zulu* for offsite PARs).

PAN-PSS.4 - Given an OE, implement time urgent protective actions in accordance with the OEM.

The PSS immediately ordered the implementation of SIP protective actions for onsite workers in accordance with *Guide Sheet Alpha*; however, the PSS did not verify that SIP was implemented for any specific facilities as required by the *OEM*. (See Section 5.0, **OFI-CNS-11**.) The EOC cadre recognized that the integrity of a facility can be compromised after a severe event (such as an explosion, fire, or large HAZMAT release), and requested the PSS to perform personnel accountability, approximately one hour and twenty minutes after SIP was ordered. Significantly, SIP is the only onsite protective action listed in *Guide Sheet Alpha* because of the problematic nature of evacuation from a secure facility like the Pantex Plant. (See **Finding F-CNS-4** and Section 5.0, **OFI-CNS-12**.)

Finding F-CNS-4: Contrary to DOE Order 151.1C, CNS has not developed procedures to implement evacuation as a protective action.

PAN-PSS.5 - Given initial event information, use the EALs to determine or recommend to the EM PARs to state and local governments in accordance with the OEM.

The Operations Center partially demonstrated the proper use of EALs to provide PARs to state and local governments in accordance with the *OEM*. The PSS issued timely PARs; however, some important PAR information was not provided to offsite officials. Missing from the PAR was the distance where PAC would be exceeded based on a bounding estimate of consequences, as derived from the EPHA analyses. (See Section 5.0, **OFI-CNS-13**.) Additionally, preplanned offsite protective action messages in the National Weather Service emergency alerting system and in the Pantex Plant press releases conflicted with the PARs issued by the PSS. The PSS made offsite notifications and included PARs for the specific zones indicated by *Guide Sheet Zulu* to SIP. Additionally, the PSS was preauthorized to activate the offsite warning system (simulated during the exercise) and emergency alerting system, implementing the PARs for the public. However, the preplanned message on the emergency alerting system incorrectly stated that local officials recommended that all residents and visitors in the Pantex Plant 10-mile emergency planning zone (EPZ) immediately SIP rather than just the specific zones noted by the PSS. Furthermore, the initial preauthorized Pantex Plant press release, also issued by the PSS, and the following two press releases, issued by emergency public information personnel, also incorrectly stated that local officials recommended that county residents living within the 10-mile EPZ should continue to SIP. (See **Finding F-CNS-5** and Section 5.0, **OFI-CNS-14**.)

Finding F-CNS-5: Contrary to DOE Order 151.1C, CNS did not provide accurate, candid, and timely information to the news media and the public.

PAN-PSS.6 - Given emergency event categorization and classification, make regulatory notifications within fifteen minutes of declaration of the OE in accordance with the OEM.

The Operations Center partially demonstrated proper regulatory notifications in accordance with the *OEM*. The PSS ensured the required offsite notifications were made in a timely manner. The initial notification form was hand-written by the PSS and the approved form was faxed to the offsite notification points. This was followed by a phone bridge conference call to state and local agencies. Additionally, a separate phone call was made to the DOE Headquarters Watch Office to confirm receipt of the information. All notifications were completed within fifteen minutes from the time of event classification, as required by DOE Order 151.1C.

Although the PSS demonstrated timely offsite notifications, several weaknesses were noted in the notification process. The Pantex Plant offsite notification form is not designed to collect all of the information required by DOE Order 151.1C, including damage, number of casualties, operational impact to site activities, other offsite notifications made, and the level of media interest. Additionally, the PSS and EOC cadre did not send out updated notifications as required by DOE Order 151.1C and the *OEM*, when emergency conditions changed. Importantly, additional emergency events (overturned SGT and nitric acid spill) or recognition of severity (mass casualty event) did not result in additional offsite notifications. Consequently, offsite officials did not have relevant information to support timely and accurate decision-making. (See **Finding F-CNS-6** and Section 5.0, **OFI-CNS-15**.)

Finding F-CNS-6: Contrary to DOE Order 151.1C, CNS did not provide accurate and timely follow-up notifications to offsite officials when conditions changed.

The PSS also transmitted one SITREP to DOE Headquarters, which contained inaccurate and incomplete information. For example, the SITREP listed the incorrect EAL, did not identify that the first three news releases recommended SIP for the entire 10-mile EPZ (rather than the intended zones 2, 3, and 4), incorrectly identified the HAZMAT involved in the explosion, listed all casualty and notification information fields as unknown (when information was known), and provided incomplete points-of-contact information. In addition, CNS had not allowed DOE Headquarters to access the Pantex Plant WebEOC event information, and instead relied on the SITREP as the primary method to transmit emergency status updates and ensure effective communications between the site and DOE Headquarters throughout the emergency. Consequently, DOE Headquarters would not be able to satisfy the demands of Departmental senior management and meet the requirements associated with requests from the White House. (See **Finding F-CNS-7** and Section 5.0, **OFI-CNS-16**.)

Finding F-CNS-7: Contrary to DOE Order 151.1C, CNS did not provide emergency status updates to the next-higher emergency management team on a continuing basis.

PAN-PSS.7 - Given an OE, activate the ERO to the primary or alternate location in accordance with the OEM.

The Operations Center partially demonstrated proper ERO activation in accordance with the *OEM*. The PSS initiated recall of the ERO using the Pantex Plant Communicator System and public address system once the PSS was provided with safe route information. However, the PSS was unable to acquire safe route information through identified means, which ultimately required the exercise director to prompt recall through the issuance of an exercise contingency message (discussed further in objective PAN-CAT.3). As a result, the PSS did not initiate a timely activation of the ERO and time-urgent emergency functions were unjustifiably delayed. (See Section 5.0, **OFI-CNS-17**.)

PAN-PSS.11 - Given an activated EOC, transfer EM duties (command and control) to the arriving EM and EOM in accordance with the OEM.

The PSS appropriately transferred EM duties to the EOC EM and EOM in accordance with the *OEM*.

Incident Command Team

Pan-ICT.1 – Given an emergency condition(s), Incident Command response equipment, communications, and/or materials are operational and readily available for use in accordance with the OEM.

The IC had available most equipment and materials necessary to conduct emergency response operations as specified by the *OEM*. The IC initially directed response operations from the fire station because of the plant-wide SIP protective action. Once the IC determined that fire fighters could safely exit the fire station, the IC relocated the ICP to the incident command vehicle (ICV), located just outside the fire station for the last half of the exercise. The ICV is a mobile command post and is equipped with a laptop computer and telephones (i.e., handset and speaker phones) that are connected to the Emergency Communications Network, radios, a printer, and white boards.

However, several factors limited the usability of the ICV. Cell phones, normally kept in the ICV, were unavailable because they were loaned to the exercise controllers and evaluators for use during the exercise, which limited the communication options for the ICT. In addition, the ICT had difficulty using the telephones in the ICV because a job aid did not clearly state how to dial onsite telephone numbers. Furthermore, the laptop in the ICV lacks access to WebEOC (due to software incompatibility issues between WebEOC and the Emergency Communications Network), so consequence assessment plume projections had to be received via email. Once the plume projections were received, software capable of

displaying the plume projections had to be located on the ICV laptop, causing a small delay. (See Section 5.0, **OFI-CNS-18**.) Finally, the significant level of noise from the generator used to power the ICV rendered the speaker phones in the ICV unusable, prevented the ICT from hearing the IC's briefings to the EOC, and inhibited conversation among the ICT. CNS also identified this issue in their after-action report as an improvement item and has a contract out for bid to replace the ICV generator.

Pan-ICT.2 – Upon arrival at the event scene, assess the event situation in accordance with the OEM.

The IC adequately assessed the magnitude and safety concerns associated with the various incidents as required by the *OEM* and the *Incident Command Teambook*, although the ERO did not forward some critical information to the IC. The IC assessed the nature and magnitude of the incident scenes by asking for a weather map showing the storm track and a listing of the inventory for the affected facilities. In addition, the IC confirmed for the SGT incident scene that the container was not breached, that there were no injuries or fire, and that security had cordoned off the area. Further, the IC summarized this information and provided a timely assessment of the emergency to the PSS. However, the ERO did not provide some key information that would have enhanced the IC's assessment of the emergency. The IC did not receive the plume projections prepared for the explosion until three hours after the explosion occurred. In the interim, the IC developed his own map using the storm track direction to indicate a wedge-shaped area to avoid around the explosion site because of possible contamination. Upon learning about the nitric acid spill, the IC directed that the spill be cordoned off at the facility fence line, but no one in the EOC informed the IC that 12 workers were sheltered within that fence line. (See **Finding F-CNS-3** and Section 5.0, **OFI-CNS-19**.)

The IC appropriately requested additional onsite and offsite assets to augment the response. The IC immediately requested offsite mutual aid, but no assets were available by exercise design. The IC also requested the recall of all off-duty fire fighters and the activation of the Fire Department Support Team. However, it took three requests from the IC before the PSS started the recall of off-duty fire fighters. CNS also noted this issue in their after-action report as an improvement item.

The IC appropriately prioritized the response to injured workers, but the Fire Department shift officers did not record the information received on all injuries requiring treatment. The IC requested a list of injuries reported to the ESDC and PSS, and asked for updates periodically throughout the exercise. The IC then prioritized the order of response for the site's ambulances to the reported injuries. Upon learning that the onsite medical facility was overwhelmed, the IC established a triage area and used the Fire Department Support Team to assist with triage operations. The IC also requested vans be used to take injured workers who were mobile to the triage area and made preliminary plans to search damaged buildings for additional injured workers. However, the Fire Department shift officers did not ensure that the IC was aware of all injured workers who requested medical attention. The Fire Department shift officers only forwarded information on half of the reported injuries to the IC during the first hour of the emergency. Moreover, the IC did not receive information on injuries reported after the first hour because the ESDC erroneously directed injured workers who called for assistance to report to the triage area, regardless of the severity of the injury and in violation of the SIP protective action that was still in effect for the plant population. Further exacerbating the issue, the *OEM* does not discuss who is responsible for compiling a list of injured personnel based on information from the ESDC, PSS, onsite medical facility, and triage area to ensure all injured personnel received treatment. (See **Finding F-CNS-8** and Section 5.0, **OFI-CNS-20**.)

Finding F-CNS-8: Contrary to DOE Order 151.1C, CNS did not ensure that medical support for injured personnel was promptly and effectively implemented.

Pan-ICT.3 – Upon arrival at the event scene, establish IC in accordance with the OEM.

Upon the initial report of tornado damage on site, the fire chief appropriately established an incident command within the fire station (because of the plant-wide SIP protective action). The fire chief declared that he would serve as the IC during the initial briefing to the EOC on the telephone bridge line. The IC established incident command as required by the *OEM* and the *Incident Command Teambook.*

Pan-ICT.4 – Upon arrival at the event scene, establish an Incident Command Post (ICP) in accordance with the OEM.

The IC established an ICP at appropriate locations in conformance with the *Incident Command Teambook*. The ICP was initially located in the fire station until the IC determined that the fire fighters could safely exit the fire station. The IC then relocated the ICP to the ICV, located immediately outside the fire station, where he joined the rest of the ICT. This ICP provided a central location that was a safe distance from the various incident scenes and was easily identifiable to any arriving resources.

Pan-ICT.5 – Given an emergency event, establish Unified Incident Command in accordance with the OEM.

The fire chief successfully established a unified incident command with the ICT, comprised of an IC assistant, EOC communicator, and representatives from security, radiation safety, and DOE, as required by the *OEM* and the *Incident Command Teambook*. Per CNS procedures, a representative from the Fire Department, security, or radiation safety can fulfill the role of IC. The fire chief, initially confined to the fire station until the tornado threat had passed, assumed the role of IC at the onset of the emergency. When the IC was able to meet with the ICT, the security representative stated that the emergency was not a security event. The fire chief then continued to serve as the IC and led the unified incident command throughout the remainder of the exercise.

Pan-ICT.6 – Given a HAZMAT emergency event, develop, implement, and track an Incident Action Plan in accordance with OG-006, Incident Management System.

The IC developed, implemented, and tracked an appropriate incident action plan as required by the *Incident Command Teambook*, although the components of the plan were recorded on a variety of documents. Once the initial reports of injured workers around the plant site were received, the IC met with all Fire Department personnel, provided an initial briefing on the incident, and clearly established that the top priorities were treating injuries and ensuring the safety of personnel. The IC then maintained a frequent presence on the EOC telephone bridge line, and provided briefings on the emergency response efforts, needed resources and information, and other response/mitigation information. When additional information was received (e.g., overturned vehicle, nitric acid spill, and pictures of the damaged bay), the IC quickly incorporated that information into the incident action plan. The IC assistant started work on a plan for long-term operations that included fire fighter rotations, lighting for nighttime operations, and provisions for a temporary morgue. The IC documented the incident action plan using a combination of several informal forms, checklists, and a job aid, as the *Incident Command Teambook* does not reference a particular form or format to use. (See Section 5.0, **OFI-CNS-21**.)