

**Office of Enterprise Assessments
Assessment of the Pantex Plant
2017 Full-Scale Exercise**



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

CAT	Consequence Assessment Team
CNS	Consolidated Nuclear Security, LLC
CRST	Contingency Response Support Team
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
EAL	Emergency Action Level
ECT	Emergency Communications Team
EM	Emergency Manager
EMInS	Emergency Management Information System
EMS	Emergency Medical Service
EOC	Emergency Operations Center
EOM	Emergency Oversight Manager
EPHA	Emergency Planning Hazards Assessment
EPI	Emergency Public Information
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
ES&H	Environment, Safety and Health
ESDC	Emergency Services Dispatch Center
FBI	Federal Bureau of Investigation
FD	Fire Department
GE	General Emergency
HAZMAT	Hazardous Material
IAP	Incident Action Plan
IC	Incident Commander
ICT	Incident Command Team
IP	DOE Implementation Plan
JIC	Joint Information Center
NARAC	National Atmospheric Release and Assessment Center
NNSA	National Nuclear Security Administration
NOAA	National Oceanic and Atmospheric Administration
NPO	NNSA Production Office
NWS	National Weather Service
OC	Operations Center
OE	Operational Emergency
OFI	Opportunity for Improvement
OFMT	Offsite Field Monitoring Team
OWS	Outdoor Warning System
PA	Protective Action
PAC	Protective Action Criterion
PAR	Protective Action Recommendation
PF	Protective Force
PSS	Plant Shift Superintendent
RSD	Radiation Safety Department
SECON	Security Condition
TEL	Threshold for Early Lethality
TOC	Tactical Operations Center
WP	Work Practice

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) Office of Emergency Management Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the Pantex Plant 2017 full-scale exercise, *Chaos-17*, from February 7 – March 9, 2017. The purpose of the exercise was to test and validate the effectiveness of the emergency response organization (ERO) in accordance with the currently published emergency plan and procedures. *Chaos-17* was also intended to validate the complete set of newly developed plans and procedures developed in accordance with the DOE Implementation Plan (IP) responding to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2015-1, *Emergency Preparedness and Response at the Pantex Plant*, as well as to validate corrective actions addressing EA findings from the Consolidated Nuclear Security, LLC (CNS) 2014 full-scale exercise. However, CNS had not completed several key documents in time for this 2017 exercise and used the existing approved documents for the event response in cases where the revised documents were not available. EA performed this assessment at the request of the National Nuclear Security Administration Production Office (NPO) to provide an interim independent assessment of CNS progress and effectiveness in using the newly developed plans and procedures.

CNS effectively conducted this exercise in accordance with DOE requirements, and EA evaluated the performance of the ERO at the operations center (OC), tactical operations center (TOC), emergency services dispatch center (ESDC), emergency operations center (EOC), and the emergency public information and consequence assessment team (CAT) rooms at the EOC.

EA observed noticeable improvements in several areas since the 2014 assessment, including controlled site evacuation planning, offsite notification and update timeliness, and providing emergency updates to the next higher emergency management team. The use of the new automated information management system, Emergency Management Information System (EMInS), significantly improved the EOC's information collection and management processes, as well as the delivery of timely notifications to DOE Headquarters and the offsite authorities. Additionally, CNS significantly improved the CAT performance for providing accurate and timely initial, intermediate, advanced, and ongoing consequence assessments to the appropriate onsite and offsite personnel. Lastly, the exercise demonstrated CNS's basic concept for offsite field monitoring, which is still in the initial stages of development.

Despite these strengths, EA identified several issues related to three previously identified and recurring areas of concern: (1) weaknesses in communications and information management; (2) emergency action levels (EALs) and protective actions not derived from site-specific emergency planning hazards assessments; and, (3) inadequate and conflicting response procedures.

During the 2014 exercise, communications and information management weaknesses 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 and did not foster interoperability among onsite and offsite response facilities, which was needed for timely and accurate decision-making. Although the installation and implementation of a new EMInS has significantly improved CNS's ability to collect and disseminate timely information among onsite and offsite organizations, not all Pantex response facilities have implemented EMInS and some ERO teams are not proficient in using EMInS. Consequently, EA observed continued communications

and information management weaknesses during *Chaos-17* in the OC, ESDC, and TOC. These weaknesses continue to adversely affect responder performance and overall situational awareness.

During *Chaos-17*, the emergency response staff properly followed the EAL, but the outcome resulted in an unnecessary General Emergency classification and large offsite areas, ten-miles downwind, being placed under protective actions based on protective actions linked to the EAL. Although DOE policy requires the EAL and protective actions to be based on the emergency planning hazards analysis, this analysis projects the protective criterion is exceeded for only a short distance beyond the site boundary using a conservative approach. Also, later into *Chaos-17*, responders projected, using the advanced modeling program, that the protective action criterion is not exceeded off site, representing a Site Area Emergency. EA previously identified similar findings during assessments in 2014 and 2015. CNS has not yet revised the EALs and associated protective actions to address those findings and base protective actions on calculations derived from the emergency planning hazards assessments.

The third area of concern is command media, command media constitutes a hierarchy of documents that provide systematic flowdown of requirements from laws, regulations, rules, DOE directives, and management. Although EM-PLN-0019, *Pantex Plant Comprehensive Emergency Management Plan*, contains these requirements, CNS command media do not flow down all of these requirements into emergency plan implementing procedures. CNS implements the ten emergency management response elements through numerous inconsistent plans, manuals, handbooks, work practices, checklists, and forms, which are complicated by response procedures maintained by other response organizations that are not fully consistent with the command media. In several instances, procedural steps are not adequate to provide a consistent response outcome. The inconsistencies within the CNS command media process and the Pantex products were previously identified in the 2014 assessment and again during the NPO-requested assessment of the Pantex Plant emergency management program in November – December 2016; these inconsistencies are directly attributable to the EA observed weaknesses in command and control and situational awareness present in multiple parts of the ERO during *Chaos-17*.

CNS should review the *Pantex Plant Comprehensive Emergency Management Plan* and associated procedures to simplify the different types of command media, correct the inconsistencies, and provide adequate guidance for responding effectively and efficiently.

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1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Emergency Management Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the Pantex Plant 2017 full-scale exercise, *Chaos-17*, from February 7 – March 9, 2017. The purpose of the exercise was to test and validate the effectiveness of the emergency response organization (ERO) in accordance with the currently published emergency plan and procedures and DOE Order 151.1C, *Comprehensive Emergency Management System*. Although the current order revision is 151.1D, DOE has not incorporated 151.1D into the contract at Pantex. *Chaos-17* was also intended to validate the complete set of newly developed plans and procedures developed in accordance with the DOE Implementation Plan (IP) responding to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2015-1, *Emergency Preparedness and Response at the Pantex Plant*, as well as to validate corrective actions addressing EA findings from the Consolidated Nuclear Security, LLC (CNS) 2014 full-scale exercise. However, CNS had not completed some of the documents such as emergency action levels (EALs) in time for this exercise, and used existing approved documents for the event response in cases where the revised documents were not available. EA performed this assessment at the request of the National Nuclear Security Administration (NNSA) Production Office (NPO) and in response to the IP to provide an interim independent assessment of CNS progress and effectiveness in using newly developed plans and procedures.

2.0 SCOPE

This assessment evaluated the performance of the NPO and CNS ERO to initially respond to a simulated operational emergency (OE) and to then respond to events that subsequently led to the declaration of a General Emergency (GE). EA also assessed the conduct of the emergency management exercise.

3.0 BACKGROUND

CNS manages and operates the Pantex Plant on behalf of NNSA. Within NNSA, NPO provides Federal line oversight of CNS. With respect to management of emergencies, NPO responsibilities include serving as On-Scene Coordinator and Senior Energy Official, interfacing with off-site agencies, and communicating with the public. DNFSB Recommendation 2015-1 identified three areas of concern: 1) the drill and exercise program, 2) technical planning basis and decision-making tools, and 3) providing timely and accurate information to the public regarding offsite radiological releases. DOE submitted the approved IP to the DNFSB on June 16, 2016. CNS and NPO have since made significant changes to Pantex's program and procedures. Before *Chaos-17*, CNS finalized some products supporting the IP, including consideration of feedback from the November – December 2016 EA assessment, documented in the *Office of Enterprise Assessments Assessment of the Pantex Plant Emergency Management Program*, March 2017. *Chaos-17* was intended to validate these new plans, procedures, and processes. DOE Order 151.1C requires CNS to have a hazardous material (HAZMAT) program at Pantex because of the radioactive materials, high explosives, and toxic chemicals used and stored on site.

CNS developed an exercise scenario with three event scenes: a vehicle accident resulting in a mass casualty event, an active shooter, and explosions dispersing radioactive material. CNS initiated the full-scale exercise with a vehicle accident resulting in a mass casualty that included a Texas senator, within

the property protection area. This event required the plant shift superintendent (PSS) to implement the corresponding EAL resulting in an OE and the activation of the ERO. After the ERO was in place, exercise control introduced the next two events, which included a distraught employee who became an active shooter and caused a detonation of conventional explosives associated with a nuclear weapon. These two simulated events resulted in injuries and fatalities and the latter also dispersed radioactive material. The radioactive material release required the emergency manager (EM) to implement the corresponding EAL and upgrade to a GE. Section 5.0 provides EA's assessment of the ERO response to the scenario and of the conduct of the exercise by CNS.

4.0 METHODOLOGY

DOE Order 227.1A, *Independent Oversight Program*, describes and governs the DOE independent oversight program. EA implements this program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. Organizations and programs within DOE use varying terms to document specific assessment results. In this report, EA uses the terms "deficiencies, findings, and opportunities for improvement (OFIs)" as defined in DOE Order 227.1A. In accordance with DOE Order 227.1A, DOE line management and/or contractor organizations must develop and implement corrective action plans for the deficiencies identified as findings. Appendix C summarizes other important deficiencies not meeting the criteria for a finding highlighted in the report. These deficiencies should be addressed consistent with site-specific issues management procedures.

EA used portions of Criteria and Review Approach Document EA CRAD 33-05, *DOE/NNSA Emergency Management Exercise Review*, for this exercise evaluation. Additionally, EA's independent evaluators assessed the response to, and conduct of, the exercise scenario using the *Chaos-17* exercise package, exercise evaluation guidelines, and various response tools developed by CNS.

The members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. A detailed list of the documents reviewed, personnel interviewed, and observations made during this assessment, relevant to the findings and outcomes of this report, is provided in Appendix B.

5.0 RESULTS

Criterion:

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. (Paraphrased from DOE Order 151.1C)

Section 5.0 documents the results of EA's observations in the following response element areas: incident command team (ICT), emergency services dispatch center (ESDC), operations center (OC) and emergency operations center (EOC), executive team, emergency public information (EPI), consequence assessment team (CAT), and offsite field monitoring team (OFMT), as well as programmatic elements for plans and procedures and the conduct of the exercise.

5.1 Incident Command Team

CNS initiated the exercise with the report of an onsite vehicle accident resulting in mass casualties. The ESDC dispatched the Pantex Fire Department (FD) to the event and, upon arrival, the FD battalion chief assumed the role of incident commander (IC). The IC requested that the ESDC dispatch additional offsite assets, but additional assets were unavailable as part of the exercise design. Using onsite assets, the FD triaged, treated, and transported patients to both onsite and offsite medical treatment facilities.

The PSS activated the ERO and, as part of the activation, the ICT assembled at the tactical operations center (TOC) in accordance with HNDBK-0016, *Incident Command Teambook*. The ICT tracked event activities on copy boards and provided support as requested by the IC. ICT minimum staffing is 5, but for this event, 12 representatives from NPO, protective force (PF), FD, Radiation Safety Department (RSD), and emergency management organizations staffed the ICT in the TOC.

After 40 minutes, the IC declared an “all clear” at the vehicle accident, without the ICT located in the TOC assuming responsibility for managing the event response. However, before the ICT dispersed, the second two events occurred that resulted from a distraught employee who became an active shooter and caused a HAZMAT release, initiated by a malevolent act involving explosions within and adjacent to a production bay containing a nuclear weapon. These events caused casualties and fatalities, and the latter event dispersed radioactive material. During this portion of the exercise, the exercise director implemented an exercise freeze for about 25 minutes during a “real-world” security monitoring system issue. After CNS lifted the exercise freeze, PF and FD personnel responded to the active shooter and HAZMAT release events, while RSD personnel responded to the HAZMAT event. The ICT controller limited the FD activities at the active shooter scene by inappropriately instructing the FD IC not to deploy ambulances or track patients. The same FD battalion chief who was the vehicle accident IC was dispatched to the HAZMAT scene, was cleared through the security post to the material access area, and assumed the role of on-scene commander, not the IC. The PF deputy chief, deputy fire chief, and RSD manager, all located at the TOC, promptly assumed the roles of IC for their respective disciplines (PF, FD, RSD). The PF IC immediately vocalized for the team to function under a unified command and the other ICs agreed.

WP-EM-0365, *Emergency Management ERO WP*, invokes PX-5330, *ICT checklist*. The ICT included the following staff, with functional roles listed in parenthesis:

- NPO representative (NPO IC liaison officer)
- FD deputy fire chief (FD IC)
- FD senior advisor (FD operations section chief)
- RSD manager (RSD IC)
- RSD advisor (RSD support)
- PF deputy chief (PF IC)
- PF north shift commander (PF north operations section chief – vehicle accident, active shooter event)
- PF south shift commander (PF south operations section chief – HAZMAT event)
- PF advisor (site evacuation planner)
- PF advisor (vulnerability assessor)
- PF advisor (ICT scribe)
- Communications unit leader (EMInS recorder).

The individual ICs (PF, FD, RSD) located in the TOC adequately established incident response objectives and priorities for their individual teams, maintained effective communication with their respective operations section chiefs, and participated in periodic bridge line calls with the EOC executive team. The

PF and FD operations section chiefs collocated with the ICs in the TOC, while the RSD operations section chief stationed at the on-scene command post. The operation section chiefs, using informal, verbal incident action plans (IAPs), directed field responders to secure the scenes, transport patients, decontaminate personnel, and conduct onsite field monitoring (surface contamination and air monitoring), including at the on-scene command post. In addition, the ICT scribe effectively recorded extensive notes of the PF and FD field response status reports on the TOC copy boards, while the RSD IC recorded his own field response status reports on a separate copy board. Finally, the PF advisor, with the assistance of the EOC operations team security representative, developed an evacuation method to implement SSPLN-0048, (*U*) *Pantex Plant Evacuation Plan*. However, CNS has not developed a procedure for the ERO to implement evacuation as a protective action (PA), as previously noted in an EA finding from the 2014 exercise. Consequently, the PF advisor was required to develop, on a real-time basis, a method for evacuation and establish the necessary resources to implement the evacuation upon approval by the EM. Due to the lack of an established procedure, the team had to consider aspects of a safe sitewide evacuation, on a real-time basis, such as safe routes to access vehicles, vehicle contamination, personnel in carpools, as well as develop plant announcements, etc. (See **Finding F-CNS-01: CNS has not fully developed emergency plan implementing procedures to describe how the emergency plan must be implemented as required by DOE Order 151.1C, Attachment 2, Section 4.d. and OFI-CNS-01.**) Section 5.4 contains additional discussion on implementing a sitewide evacuation.

Additionally, EA observed weaknesses in ICT operations related to patient tracking, command and control, and situational awareness. CNS did not effectively track injured or contaminated patients, excluding the active shooter patients because of an inject from the ICT controller. The communications unit lead populated the Emergency Management Information System (EMInS) patient tracking board in accordance with EM-PLN-0088, *Pantex Incident Management Plan*. However, CNS did not correctly identify or confirm the status of 7 of the 17 patients and reported one additional patient above the actual number. Ineffective patient tracking is a continuing issue from the 2014 exercise. (See **F-CNS-01** and **OFI-CNS-02.**)

The ICT did not implement an effective command and control of the field response. The individual ICs were collocated, but did not fully integrate this multi-event response into a single unified response. A significant contributor to this condition was the lack of a functional assignment within the TOC or EOC to provide command unification. The individual ICs were completely focused on maintaining control of their respective field teams. Although they sporadically shared priorities and objectives with ICT personnel outside their disciplines, they had no overall IAP that consolidated individual discipline objectives and priorities in accordance with EM-PLN-0088. In effect, the ICT lacked an integrating functional position within the TOC and EOC. (See **F-CNS-01** and **OFI-CNS-03.**)

The lack of integration adversely affected the following ICT and field operations:

- There were competing requirements for PF to maintain control of badges, while the FD needed badge numbers for tracking injured or contaminated personnel, impacted patient tracking.
- PF permitted FD and RSD field personnel to enter the HAZMAT scene 30 minutes prior to PF conducting a sweep to ensure that no additional explosive devices were present. Therefore, FD and RSD personnel were placed in a potentially dangerous situation, contrary to PX-OG-006, Incident Management System.
- In order for PF personnel to conduct the sweep, the RSD IC redeployed field resources, contrary to RSD established response priorities and objectives, to provide monitoring assistance for a PF entry team, delaying a PF assessment of the event.
- During the first bridge line call, most ICT staff inappropriately continued with their functions and did not stop to listen or provide input, which negatively affected integrating ICT response assets by individual disciplines not understanding potential conflicts and synergies among their

respective priorities and objectives. In addition, the high noise level in the TOC made it difficult to understand communications during other bridge line calls.

- EM-PLN-0088 does not require the ICT to include production operations personnel with firsthand knowledge of facility operational conditions and status, which impaired field responders who had to make assumptions on conditions and status. In addition, ICT had minimal interaction with production operations personnel within the EOC operations team.

CNS had ineffective communications and information management between the ICT and EOC organizations, which degraded situational awareness and prevented a common operating picture. The EM and ICs did not make provisions for an orderly transition of responsibilities with the EOC by providing the ICT a detailed initial situation update and appraisal of any operational activities that were already in progress, what resources were available, and what resources were already committed as required by EM-PLN-0088. In addition, the first bridge call did not include a precise division of responsibilities as required by EM-PLN-0088, ensuring that all responsibilities have been assigned. Furthermore, the ICT staff did not provide a consolidated IAP to the EM or were not fully engaged in the bridge line calls as noted above. Finally, the ICT staff did not fully utilize EMInS to foster effective communications:

- The ICT communications unit leader primarily worked with the FD IC to populate and correct the patient tracking board and to input minimal information recorded by the ICT scribe into EMInS, which caused a lack of field incident information communicated to the EOC.
- The patient tracking board had multiple entries for the same patients, which caused confusion on patient status.

Inadequate situational awareness that prevented a common operating picture among response elements is a continuing issue from the 2014 exercise. (See **Deficiency: CNS did not provide continuous, effective, and accurate communication among response organizations as required by DOE Order 151.1C, Attachment 2, Section 12, and OFI-CNS-04.**)

Overall, the TOC, equipped with EMInS and space for the 12 ICT members, provides the fundamental infrastructure for the ICT to perform its function. The individual ICs (PF, FD, RSD) located in the TOC adequately established incident response objectives and priorities for their individual teams, maintained effective communication with their respective operations sector chiefs, and participated in periodic bridge line calls with the EOC executive team. The operation section chiefs followed informal IAPs to direct field responders to secure the scenes, transport patients, decontaminate personnel, and conduct onsite field monitoring (surface contamination and air monitoring) including at the on-scene command post. Operations section chiefs promptly reported field responders' status reports to the respective ICs. The PF advisor, with the assistance of the operations team security representative, developed a sitewide evacuation method. Nevertheless, EA noted deficiencies in ICT operations related to sitewide evacuation, patient tracking, command and control, and situational awareness. CNS has not developed a procedure for the ERO to implement evacuation as a PA. CNS did not effectively track patients. The ICT did not implement an effective command and control of the field response. Notably, the individual ICs did not integrate the multi-event command into a single unified response; a significant contributor to this condition was the lack of a functional assignment within the TOC or EOC to provide command unification. In addition, CNS had ineffective communications and information management between the ICT and EOC organizations that degraded situational awareness and prevented a common operating picture. Patient tracking and situational awareness were continuing issues from the 2014 exercise.

5.2 Emergency Services Dispatch Center

The ESDC is an independent facility within the emergency services building, physically separated from the OC and the EOC. At the start of the exercise, CNS staffed the ESDC with three dispatchers and the

ESDC communications unit leader. The ESDC appropriately dispatched the FD and emergency medical service (EMS), while the PF central alarm station separately dispatched the PF assets.

The ESDC received the initial notification of a motor vehicle accident with casualties, later categorized by the PSS as a mass casualty OE. The on-duty dispatchers received multiple telephonic reports regarding the vehicle accident and properly recorded each of the incoming calls in the *Emergency Services Dispatch Response Record* log, which CNS maintains separately from EMINs. In addition, the ESDC collected event information and, using a manual log process, appropriately dispatched the FD and EMS to the scene in accordance with MNL-352191, *Emergency Service Dispatch Center Manual*. Nevertheless, the information collected by the ESDC was not readily available to other ERO elements, thereby limiting situational awareness and a common operational picture. (See **OFI-CNS-05**.)

Once the FD assumed the role of IC from the PF at the vehicle accident event scene they maintained command authority throughout the remainder of the vehicle accident, the ESDC communications unit leader and the three dispatchers adequately supported the dispatching of FD emergency response personnel and equipment. Additionally, the ESDC, working within established offsite mutual aid agreements, appropriately requested fire and EMS assets from the Amarillo Medical Service; however, additional assets were unavailable as part of the exercise design. Throughout the exercise, as the number of patients, types of injuries, and location of the patients evolved, the ESDC adequately supported the ICT by attempting to de-conflict the number of patients and the corresponding badge numbers of individuals who had been reported injured.

Overall, the ESDC adequately dispatched Pantex emergency response equipment and emergency response personnel, and properly documented initial emergency information according to current procedures. However, the information collected by the ESDC was not readily available to the ERO as CNS manually records the information in a paper based system, thereby limiting situational awareness and a common operational picture of the response with other ERO elements.

5.3 Operations Center

The OC is the plant communications focal point with two qualified PSSs normally on duty 24 hours a day, seven days a week. The OC, along with security operations, continuously monitors the plant. At the start of the exercise, CNS staffed the OC with three qualified PSSs who quickly recognized and appropriately categorized the vehicle accident resulting in a mass casualty event as an OE not requiring classification, in accordance with EAL 2.04, *Site Wide Mass Casualty*. The PSS immediately assumed the duties of the acting EM and acting emergency oversight manager (EOM) and ordered plant personnel to avoid the area of the accident in accordance with PA *Guide Sheet Foxtrot*. In addition, the PSS activated the EOC cadre using the Pantex communicator NXT system. The EOC achieved minimum staffing within an acceptable 19 minutes of their pager activations. Additionally, within 26 minutes of the OE declaration, the PSS efficiently dispensed tasks listed on PX-5521, *Operations Center Operational Emergency Checklist*, among the OC staff; documented the completion of the tasks; adequately briefed the EOC EM and EOM; and transferred his authority to them.

The PSS also provided initial event information to offsite authorities in a timely manner using the automated EMINs. CNS has modernized the offsite notification process using EMINs, which enabled the OC to complete the required notifications in only nine minutes. Likewise, CNS has simplified the initial news release process using EMINs, which helped the OC issue the initial news release within 23 minutes of the OE declaration. EMINs has significantly improved the OC information management processes, which the OC staff also self-identified during their exercise hotwash. Nevertheless, the OC was unaware of the Texas senator's involvement in the accident. Consequently, the PSS did not include that newsworthy information in the offsite notifications and initial information provided to the joint

information center (JIC). Furthermore, because this information was not included, the DOE Headquarters Watch Office, senior DOE management, and the media would not be aware of the senator's involvement through the official channels.

When the active shooter and explosion events occurred, the PSS was no longer responsible as the EM, but the PSS provided support to the EOC EM in correctly classifying the explosion event. In addition, the EM tasked the PSS to make required notifications and implement *PA Guide Sheet Alpha* and *PA Guide Sheet Zulu* for the explosion event, which included sounding all offsite outdoor warning system (OWS) sirens; activating the Amarillo National Weather Service (NWS) radio system; and instructing residents and visitors in the emergency planning zone (EPZ) sectors 2, 3, 4, 5, A, and B to immediately shelter-in-place. CNS simulated activation of the offsite OWS sirens, activated the onsite OWS sirens, and effectively demonstrated the ability to warn onsite personnel who were outdoors of the need to take PAs. Additionally, the OC staff completed the required offsite notifications for the explosion event within specified time limits. Although the PSS did not initially provide the DOE Headquarters EOC duty officer with requested information on the HAZMAT in a nuclear weapon, the PSS did provide the information in a follow-up conversation.

Contrary to the explosion event, the PSS was not aware of the full extent of the active shooter event for over an hour after it began, including the number of patients involved in the event. Per CNS procedure, the PSS would support implementation of event notifications and onsite PAs, which did not occur for the active-shooter event. Once the PSS became aware, he recognized that DOE Headquarters had not received adequate notification of the event and transmitted the status in the next update of the offsite notification form. Nevertheless, CNS did not make proper notification to DOE Headquarters and did not provide appropriate information on the event, as required by DOE Order 151.1C.

Throughout the exercise, EA observed inadequate communications and information management that degraded situational awareness in the OC and prevented a common operating picture among the site, DOE Headquarters, and offsite organizations. (See **previous deficiencies** and **OFI-CNS-06**.) Most significantly, CNS's information flow processes did not fully acquire, record, and disseminate timely and accurate event information among the ERO and offsite response organizations in the following cases:

- The OC encountered problems communicating and maintaining awareness of the status of patients, which likely contributed to the OC not knowing about the senator's involvement in the accident or the patients involved in the active-shooter event.
- The OC did not effectively use the EMInS application to monitor event information until the EOC coordinator, late in the exercise, informed them that EMInS was available for use.
- The OC had minimal awareness of the PF and HAZMAT response activities occurring in other onsite response facilities (i.e., TOC, EOC, and JIC), which adversely affected notification and PA functions.
- The PSS did not participate in or listen to any bridge line calls, which significantly reduced awareness about the two security events.

Overall, the OC staff demonstrated good recognition of the initial emergency event; used procedures, checklists, and equipment; accurately categorized the mass casualty event; activated the ERO; and informed the site and offsite authorities of event conditions and PAs. The implementation of EMInS is a best practice that has significantly improved the offsite notification process, which enabled the OC to complete the required notifications in only nine minutes. Likewise, CNS has improved the initial news release process using EMInS. In addition, the PSS efficiently dispensed tasks among the OC staff, documented the completion of the tasks, adequately briefed the EOC EM and EOM, and efficiently transferred authority to them. EA attributes the OC's effectiveness directly to their use of the PX-5521 checklist. However, once the PSS transferred authority to the EOC, the OC encountered difficulty in

maintaining communications and information management that degraded their situational awareness and prevented a common operating picture among the site, DOE Headquarters, and offsite organizations. Specifically, EA observed an insufficient flow of information from the TOC and EOC to the OC, which adversely affected the functions of the PSS and OC staff that included incomplete or untimely offsite notification information and inadequate PAs for the active-shooter event.

5.4 Executive Team

The Pantex EOC is separated by a glass wall into a primary room and a secondary room. The executive team including the EM, EOM, NPO Action Officer, and the Security, ES&H, Production Operations Directors work in the primary room, and the supporting EOC cadres work in the secondary room. The NPO offsite liaison, CAT, EPI, and operations team rooms surround the secondary room. Personnel with communications, technical, liaison, and public affairs expertise, as required by DOE Order 151.1C, comprise the EOC cadre to support the EM.

At the start of the exercise, the EOC primary and secondary rooms were vacant when the PSS recalled the ERO members for a vehicle accident resulting in a mass casualty event involving a Texas senator. Within five minutes of the ERO activation, the PSS provided an update to the EOC coordinator who had arrived at the EOC, and an emergency communications team (ECT) member established the bridge line, which is the primary method of communications linking the ICT, TOC, and EOC. The ECT member also turned on the video feeds in the EOC, allowing the ERO members to view the vehicle accident event scene through the available security cameras. The NPO EOM and CNS EM arrived at the EOC and received a detailed situational briefing from the EOC coordinator. Once NPO and CNS personnel had met minimum EOC staffing requirements, the EM and NPO EOM verified the categorization and event classification and validated the initial PAs directed by the PSS. An appropriate turnover briefing was completed with the PSS, and the EM declared the EOC operational and assumed responsibility for the response within the required response times. Although the EM and EOM completed a timely transfer of command with the PSS, a bridge line call between the EOC and the IC to gain situational awareness on response actions was not conducted prior to assuming control of EM responsibilities from the PSS and did not take place for over an hour after operational control was assumed by the EOC and ICT stationed at the TOC. The lack of situational awareness regarding actions at the incident site contributed to confusion within the EOC regarding the number, identification, and disposition of the patients, and was also a factor in the continued omission of the Texas senator's involvement in the accident in the initial information provided to DOE Headquarters and the JIC.

As the exercise continued, the NPO offsite liaison initiated contact with offsite organizations, providing initial information within the required time, and the executive staff tracked the OE not requiring classification until an exercise freeze was initiated due to a "real-world" security monitoring system issue. After the exercise freeze was lifted, the exercise resumed with a report to the OC regarding a distraught employee who was familiar with explosives. The EM and EOM quickly reviewed EALs and discussed potential event categorization and PAs for a terrorist event and bomb threat with the EOC coordinator and PSS, and the CAT discussed potential explosive consequences with the Environment, Safety and Health (ES&H) Director. Prior to any decision on potential actions, two explosions occurred near a bay, closely followed by a report of an active shooter at a separate location.

The EM and EOM, with the support of the PSS and EOC coordinator, correctly identified and classified the HAZMAT event and tasked the PSS to make the required notifications and implement PA *Guide Sheet Alpha* and PA *Guide Sheet Zulu* for the HAZMAT release. This tasking included authorizing the initiation of the OWS; activating the Amarillo NWS radio system; and instructing personnel within the EPZ sectors 2, 3, 4, 5, A, and B to shelter-in-place, which extends offsite ten-miles in the downwind direction.

Throughout the exercise, the use of EMIInS improved the EOC's information collection and management processes and significantly aided with the delivery of timely notifications to DOE Headquarters and the offsite authorities.

The EM, EOM, and members of the executive team conducted their required actions as established within the team handbooks and work practice (WP) documents including:

- Providing timely notification to offsite authorities
- Reviewing press releases
- Supporting the IC
- Conducting consequence assessment
- Planning for emergency termination and recovery
- Documenting response actions.

Additionally, as directed by the applicable WP, the EM discussed with the executive team directors whether impacts of the explosion and radioactive material release impacted the plant's mission essential functions. The directors stated that there was no impact; therefore, continuity of operations was evaluated but not required.

EA observed improvement from the 2014 exercise in the planning and development of a controlled site evacuation. Evacuation planning was coordinated between the ICT and the EOC cadre. The simulated controlled evacuation was derived from SSPLN-0048, and was developed by the ICT and provided to the Security Director and ES&H Director for coordination. The evacuation plan was appropriately refined using Hotspot, National Atmospheric Release and Assessment Center (NARAC), and OFMT data to plan safe routing for evacuating employees. The ECT developed maps and graphics to brief the EM for approval and to provide situational awareness within the EOC. The Security and ES&H Directors also developed and provided scripted messages containing instructions on evacuation routes for site personnel, which were approved by the EM and EOM and announced to site personnel. CNS simulated the conduct of the evacuation, notification of site employees, and the supporting accountability processes. Nevertheless, CNS does not have a procedure to implement the evacuation plan, which required real time development and coordination of procedural action steps. (See **F-CNS-01** and **OFI-CNS-01**.) Furthermore, CNS has not developed the requirements to be executed under an elevated security condition (SECON).

While the execution of tasks by the executive team members was an improvement from previous exercises, the EM and EOM did not identify and discuss strategic goals and did not identify EOC group tasks as required by HNDBK – 0020, *NNSA Production Office Emergency Response Teambook*, and HNDBK – 0015, *Executive Team Book*. (See **previous deficiencies** and **OFI-OFI-07**.) Executive team members effectively coordinated on specific immediate tasks, but the lack of direction and focus on strategic actions and plans kept the staff more focused on short-term localized response actions than strategic planning actions, as evidenced by the SECON issue described below.

Event indicators from two malevolent activities, an active shooter and explosions, justified a change to the SECON level in accordance with DOE Order 470.4B, *Safeguards and Security Program*; however, SECON 3 was inappropriately maintained throughout the exercise. While discussions occurred between the EM and Security Director regarding a SECON change, the Security Director incorrectly informed the EM that the change in SECON was initiated by DOE Headquarters, which is contrary to DOE Order 470.4B and Pantex SSPLN-0047, *SECON Transition Plan*. Nevertheless, there was no SECON declaration based on the two malevolent events, and no SECON notifications were implemented. Additionally, SSPLN-0047 calls for the EOC to utilize the appropriate EAL for SECON change;

however, CNS has not issued an EAL for SECON change, which likely contributed to the EOC not recognizing the need to declare an elevated SECON level. (See **Finding F-CNS-01** and **OFI-CNS-08**.)

The lack of appropriate communications and situational awareness, which is a carryover from the 2014 exercise, was evidenced throughout the exercise. (See **previous deficiencies**.) While EMInS has assisted with data collection and provided a platform for more consistent information management processes, it remains underutilized and has minimally increased the situational awareness and communications during the simulated response. The lack of situational awareness and common operating picture resulted in incomplete actions and notifications required by DOE Order 151.1C and outlined in MNL-EM-352243 and HNDBK-0015:

- Most ERO members were unaware of the involvement of a Texas senator in the vehicle accident.
- ERO members were unaware of PF actions, which would have supported a SECON change determination.
- The EOC lacked a summary of PAs, including the information provided off site.
- SITREP #4 incorrectly listed the offsite impacts as unknown within the report.
- Throughout the exercise, the ERO and EM had difficulty maintaining accurate accountability of the patients, resulting in inaccurate information being provided to DOE Headquarters and offsite agencies.
- Termination criteria for the vehicle accident was not identified, and termination of the event was not completed. (See **previous deficiencies**.)

Overall, the executive team correctly categorized and classified the events within 15 minutes of recognition and made timely initial DOE and offsite agency notifications for all but one event, the active shooter. Additionally, EA observed improvements in several areas since the 2014 assessment, including evacuation planning efficiency, offsite notification and update timeliness, and providing emergency updates to the next higher emergency management team. While the addition of EMInS has significantly improved data collection, notification timeliness, and provides a platform for more consistent information management processes, the ERO cadre did not effectively use the tools within EMInS to maintain situational awareness and a common operating picture. Specifically, an inadequate flow of information existed between the TOC and EOC to the OC, affecting accurate reporting of information to DOE Headquarters and offsite authorities. DOE Order 151.1C identifies that effective command, control, and communications are critical functions in maintaining situational awareness and a common operating picture. Additionally, the EM and EOM did not identify and discuss strategic goals and did not identify EOC group tasks as required by HNDBK – 0015 and HNDBK – 0020. Lastly, the executive team did not elevate the SECON level based on the two malevolent events and did not implement elevated SECON notifications or preplanned response activities. Although SSPLN-0047 calls for the EOC cadre to utilize the appropriate EAL for SECON change, CNS has not issued an EAL for SECON change, which likely contributed to the EOC not recognizing the need to elevate the SECON level.

5.5 Emergency Public Information and Offsite Protective Action Recommendations

Upon activation of the ERO, an EOC public information officer and EOC writer reported to the EPI room in the EOC. MNL-EM-352250, *Emergency Public Information Manual*, outlines the duties of the EOC public information officer, which are to gather information from within the EOC to create short, factual sentences; obtain approval; and forward to the social media coordinator for release. During the exercise, CNS efficiently used social media as the primary channel for releasing information to the public and appropriately monitored it for public feedback. In addition, the JIC was activated and two press conferences were conducted that were not evaluated by EA. The 2014 exercise did not specifically assess EPI and offsite protective action recommendations (PARs), which were marginally addressed in the 2015 EA exercise report. During this 2017 exercise, EA more closely observed actions by members of the

ERO regarding offsite PARs. EA observed:

- A news release and public tweets containing offsite PARs
- Activation of the offsite OWS by the PSS
- The PSS contacting the NWS to activate the National Oceanic and Atmospheric Administration (NOAA) All Hazards Weather Radios, which included offsite PARs in the broadcast
- The initial news release for the GE containing offsite PARs.

However, per DOE Order 151.1C, a site is required to provide PARs to local officials, who are responsible for determining and implementing the appropriate PAs for the public, rather than providing PARs directly to the public. Broadcasting the recommended PAs directly to the public without the involvement or authorization of local government officials can result in the public receiving confusing or contradictory information.

Generally, the approximately 28 tweets released to either employees or the public were accurate and appropriate. However, some tweets contained unverified or inaccurate information on fatalities, casualties, offsite releases, and offsite PAs. Additionally, after the declaration of the GE, CNS continued to release information to the public via social media and press conferences regarding recommended offsite PAs. Specifically:

- NEWSRELEASE #1 at 9:26 a.m. cited the NOAA weather radio message instructing residents and visitors in select sectors or downwind of winds from 270 degrees to shelter-in-place immediately.
- Public Tweet at 10:06 a.m. that the small quantities reported to be released require protective actions within two miles to the east of Pantex, including FM2373.
- At the press conferences, offsite PARs were discussed and EPZ zones displayed.

These actions are contradicted by EM-PLN-0019, *Pantex Plant Comprehensive Emergency Management Plan*, which states, “Local jurisdictions are responsible for providing updated protective action information to the public.” (See **OFI-CNS-09**.)

Overall, social media and the press conferences were generally effective in disseminating information to the public, but the information provided was occasionally inappropriate and in contradiction to the CNS plan (i.e., providing PARs to the public). Additionally, broadcasting offsite PARs directly to the public by NWS NOAA radio or in news releases, without coordination or written agreements with the local jurisdictions, is contrary to requirements in DOE Order 151.1C and EM-PLN-0019, and can result in the public receiving confusing or contradictory information.

5.6 Consequence Assessment Team

CAT activities are governed by a new CAT manual, MNL-EM-352247, *Consequence Assessment Manual*, and new WP, WP-EM-0370, *Consequence Assessment*, that were implemented to correct CAT performance weaknesses EA identified during the 2014 exercise. CNS provides instructions for implementing DOE Order 151.1C consequence assessment requirements in these documents for performing timely initial assessments, continuous ongoing consequence assessments, informing the ERO of consequence assessment results, distributing plume plots to onsite and offsite authorities, and for providing support to field monitoring teams. The CAT uses EALs linked to PAs and radioactive material source term dispersion tools for timely initial assessments, a suite of Gaussian dispersion modeling programs for intermediate assessments, the NARAC dispersion modeling program for advanced assessments, along with EMIInS and the NWS website as key tools in executing CAT tasks that are outlined in position checklists. These methods progressively refine the consequence assessments to provide more accurate projections for EM protective action decision-making. Procedures direct the CAT

to interface with the PSS, ES&H Director, EOC coordinator, IC, RSD personnel, and the NPO offsite liaison coordinator about specific activities, as discussed below, in addition to briefing the EOC executive team about consequence assessment results.

At the start of the exercise, all CAT members were located at a nearby building, away from the CAT room, which is located in the secondary room of the EOC.

The CAT quickly assembled to support an OE and provide a timely initial assessment for a vehicle accident resulting in a mass casualty event. The PSS recalled the CAT with the rest of the ERO for the mass casualty event following the PSS's declaration of an OE. Because no HAZMAT was involved, no further CAT activities were required, such as the need for safe routing instructions for the ERO. Two CAT members arrived in the CAT room within two minutes of the ERO activation. The first two arriving members assumed the responsibilities of the CAT lead and data recorder throughout the exercise. The CAT lead, accompanied by the data recorder, immediately proceeded to the OC and reviewed mass casualty EAL 2.04 and, after a discussion with the EOC coordinator, agreed with the PSS's decisions regarding the EAL in use, categorization (an OE not requiring classification), and PAs identified on *Guide Sheet Foxtrot* in use, and then proceeded to the CAT room. PAs were to avoid the west gate, cease operations, and place materials in a safe configuration.

The CAT readied their workstations to prepare for any additional ongoing assessment activities, if needed. When the CAT lead returned to the CAT room, additional CAT members had arrived in the EOC and extras were redirected to the FD breakroom on a standby status. At that time, CNS had a fully staffed CAT with a lead, two data recorders, a model operator, and a data collector. One data recorder supported the lead and the other was dedicated to EMInS updates. CAT members logged onto EMInS; the NWS (simulation cell); and the EPICode, Areal Locations of Hazardous Atmospheres, and Hotspot dispersion modeling programs. CAT members appropriately referenced their checklists and kept narrative logs throughout the exercise.

The CAT lead kept ERO personnel adequately informed of current event conditions, while other CAT members monitored for changes to event conditions. Upon arrival of the ES&H Director to the EOC executive team room, the CAT lead provided him a situational briefing (6-8 casualties in a vehicle accident and no HAZMAT release) and then briefed the CAT members. The CAT lead declared the CAT operational and informed the ES&H Director of the CAT's operational status. The CAT then noticed differences between the weather stability class provided by the PSS on the initial notification form and the simulated NWS information. The CAT quickly confirmed that stability class F was the correct stability class when the exercise director initiated an exercise freeze due to a real-world security monitoring system issue.

The CAT resumed ongoing assessments once the exercise restarted. Soon after resumption of the exercise, the CAT received information of a distraught employee who was familiar with explosives. In response, the CAT reviewed EAL 2.10, *Bomb Detonation*, and *Guide Sheet Juliet* (a Federal Bureau of Investigation (FBI) bomb blast standoff distance chart). The CAT did not know the location or size of the explosives, if any, so the CAT lead discussed explosive consequences generically with the ES&H Director, with focus on consequences described on the chart for a delivery truck. The CAT also requested that the EOC mapping team graphically display bomb blast rings on a map for a delivery truck of explosives near the location of the distraught employee to serve as a visual representation. Before the bomb blast map was completed, two explosions occurred and the EM declared a GE.

The CAT effectively performed a timely initial assessment of the explosion event, while an intermediate assessment was in progress. The CAT reviewed EAL 4.03, *Nuclear Explosive or Special Nuclear Material Facility Explosion*, confirming the decisions made by the EM for event classification; PAs

(*Guide Sheet Alpha* to shelter in place site personnel); and PARs (*Guide Sheet Zulu* for sheltering sectors out ten miles in the downwind direction). The CAT lead then entered the OC and obtained explosive and source term information for the location involved in the explosions for further consequence analysis. At the same time, the EOC coordinator reported a neutralized active shooter situation to the CAT, which had no further actions for the CAT to confirm and allowed the CAT to focus on the HAZMAT release from the explosions. The CAT lead provided explosive and HAZMAT source term information to the model operator for use in performing an intermediate consequence assessment, using the Hotspot dispersion modeling program. Meanwhile, another CAT member performed an initial assessment using source term information and a plutonium pit dispersion tool, PX-5711, *Plutonium Source Term Selection Tool*. This tool is based on the emergency planning hazards assessment (EPHA) analysis that is derived from Hotspot during emergency preparedness activities (not during a response). The initial assessment, using PX-5711, concluded that no airborne concentrations of HAZMAT exceeded the threshold for early lethality (TEL) one-hour exposure value of 100 rem and projected that the one rem protective action criterion (PAC) is exceeded at a distance of 0.25 miles (0.40 kilometers) from the location involved in the explosion. The CAT lead then provided the EOC coordinator and the PSS with safe route information for use by site personnel staffing the offsite JIC, directing personnel around the potential plume footprint and out the west gate.

The CAT performed an accurate and timely intermediate assessment for the plutonium dispersion. The CAT had a complete and verified Hotspot plume plot, based on exercise data, on EMInS for classification review and EM approval to allow distribution to offsite authorities within 18 minutes from the time of the explosions. After the CAT lead verified the plume plot assessment, the lead briefed the ES&H Director of the results and participated in the bridge line call. The Hotspot results indicated PAC exceeded out as far as 3.4 kilometers (2.1 miles), which goes beyond the site boundary for a short distance. At that time, the EOC coordinator asked the CAT lead about an isolation zone, where TEL is exceeded according to calculations, and was told that there was no isolation zone but to still keep the on-scene responders upwind of the release. The CAT lead based this information on the plutonium pit dispersion tool, which indicated no TEL concentrations were exceeded; however, the CAT did not notice that a Hotspot graphically indicated TEL was exceeded out to about one quarter of a kilometer (0.16 miles) from the event location. The CAT lead briefed the EOC executive team on the Hotspot results while the model operator prepared an advanced plume plot using the NARAC dispersion modeling program. The NARAC model report indicated TEL was not exceeded, demonstrating that the Hotspot report was conservative. Following the exercise, CNS attributed the difference between the plutonium pit dispersion tool and the Hotspot results during the exercise to be the result of using the 95th percentile weather in the EPHA calculations, as allowed in DOE Guide 151.1-2, *Technical Planning Basis*, which the plutonium dispersion tool is based on, versus the exercise weather conditions that existed and were used by the model operator, as further discussed later.

The CAT completed an accurate, advanced assessment for the plutonium dispersion in a timely manner and appropriately briefed the EOC executive team on the results. The CAT lead returned to the CAT room and verified the NARAC plume plot approximately five-minutes after the CAT lead's briefing to the EOC executive team on the Hotspot results. The NARAC report confirmed that no TEL concentrations were projected and no PAC concentrations were projected off site, based on a 96-hour exposure report (PAC concentrations for DOE PA purposes are for one-hour exposures, which is what the Hotspot reports are based on and, therefore, what EPHA products are based on). The 96-hour NARAC report exceeded PAC out to 721 meters and remained within the site boundary, and the CAT lead briefed the EOC executive team on this report. While the CAT lead suggested to the EM and EOM the use of aerial measurement teams and the Federal Radiological Monitoring and Assessment Center for further assessments and a reduction of areas under PAs based on the NARAC report, the EM and EOM appropriately decided to wait until OFMT survey results were reported before taking further actions.

The CAT continued to support the response by verifying that onsite and offsite authorities had received information developed by the CAT. The CAT lead verified receipt of information by having discussions with the classification officer, EM, EOM, NPO offsite liaison officer, and the ICT. The NPO offsite liaison officer confirmed to the CAT lead that all offsite authorities, except the Texas Department of Public Safety and the Armstrong County EOC, had received plume plots via EMInS. The CAT lead suggested to the NPO offsite liaison to try fax and email mechanisms to complete the plume plot distributions, while the CAT proceeded to use NARAC personnel to help distribute plume plots to the remaining two offsite authorities. Although NARAC personnel were not planned participants in *Chaos-17*, NARAC personnel were successful in providing plots to and obtaining confirmation from the Texas Department of Public Safety and the Armstrong County EOC. After the exercise, CNS personnel attributed the difficulty in getting plume plots to the last two offsite authorities to be problems at the receiver locations – internet issues, new personnel, and limited participation in the exercise.

The CAT continued to support the response by monitoring for changes in conditions. Near the end of the exercise, the simulation cell introduced new weather conditions by switching to actual weather. At that time, the CAT appropriately concluded that the postulated dispersed plutonium in the area was on the ground and only represented a resuspension concern. The model operator then completed a NARAC plume plot for resuspension using the new weather data. The results indicated no PAC was exceeded.

The CAT properly supported the OFMT activities. The model operator supported the CAT RSD liaison by sharing NARAC deposition plots for survey planning and for plotting data collected by the OFMTs onto a NARAC deposition map. The CAT RSD liaison provided the model operator OFMT reported data that the model operator collected on a spreadsheet for loading onto the NARAC map. The model operator had difficulty with loading data onto the NARAC map, which CNS later determined to be syntax errors that the NARAC program could not parse and CNS had noted it for a corrective action in a CAT critique meeting.

The CAT effectively supported the EOC coordinator in evaluating event conditions for terminating the event. At the request of the EOC coordinator, the CAT reviewed predetermined event termination criteria against the status of response activities. The CAT reported to the EOC coordinator that the termination criteria were not met until OFMT activities were completed and the contaminated areas were isolated and secured.

The large difference between the EAL's PAR, affecting a 10-mile downwind area and the 0.25-mile distance identified by the plutonium pit dispersion tool, is caused by CNS's continuation of the longstanding practice to declare a GE and follow the PARs in the EAL for involvement of any radioactive weapon part, regardless of the quantity of the HAZMAT involved. This practice deviates from DOE Guide 151.1-2, which provides instructions to use the projections under adverse weather conditions where PAC is exceeded for identifying areas under PAs. (See **OFI-CNS-10**.) EA has observed that, during exercises in 2014 and 2015, CNS followed the EALs, but that the EALs led to GE classifications without a supporting technical basis (neither scenario had PAC exceeded off site). During *Chaos-17*, the technical basis for the GE declaration is supported (but could have been avoided by timely road closures per DOE Order 151.C) because Hotspot indicated PAC is exceeded for a short distance beyond the site boundary meeting the definition of a GE per DOE Order 151.1C. However, the EAL's PAR for ten miles downwind from the site is not supported by EPA analysis. Although CNS is developing new EALs, the new EALs were not ready for use during *Chaos-17*.

Overall, CNS has significantly improved CAT performance since the 2014 exercise. The CAT provided accurate and timely initial, intermediate, advanced, and ongoing consequence assessments to the appropriate onsite and offsite personnel. Large differences between onsite and offsite areas under PAs and consequences assessment results still exist and are caused by differences in the basis for their

development. Large differences will continue to exist until CNS derives event classifications and PAs linked to the EALs from EPHA analyses, which serve as the emergency management program technical planning basis.

5.7 Offsite Field Monitoring Teams

CNS's OFMT is an emerging capability at the Pantex Plant. As part of the IP, CNS added OFMT capabilities to obtain offsite radiological data before other offsite radiological monitoring capabilities arrive. As such, CNS issued a revised procedure WP-0119, *Radiological Consequences*, and assembled two OFMTs to test this procedure for the first time during a full-scale exercise. The procedure is initiated by the RSD CAT liaison directing the OFMTs from the CAT room. CNS also developed the contingency response support team (CRST) and associated procedures. A CRST member receives some emergency management training and provides support consisting of driving, communications, documentation, equipment set up, and assistance in monitoring air, ground, and personnel under the supervision of the radiation safety technician. Therefore, an OFMT minimally consists of a radiation safety technician with support from a CRST member. During this exercise, two radiation safety technicians and two CRST members served as an OFMT.

CNS demonstrated the concept and ability to conduct offsite field monitoring in accordance with WP-0119. At the start of the exercise, the RSD CAT liaison relocated to the CAT room as part of the ERO activation and directed the OFMTs in close coordination with the CAT modeler, following the radioactive material release. This coordination encouraged significant interaction between the CAT and the RSD CAT liaison and allowed the RSD CAT liaison to provide and analyze the information needed to direct the OFMT in accordance with WP-0119. Prior to the deployment, the CAT RSD liaison completed a thorough, written brief to the teams providing mission objectives, safety, communications, turn-back values, and personal protective equipment requirements. The RSD IC granted permission to deploy the OFMTs to the RSD CAT liaison as required by procedure. Both teams deployed in approximately one and one-half hours following the release of radiological material.

While all information was properly captured in the end, CNS's method for transmitting OFMT data is inefficient and prone to errors. Two OFMTs deployed via the west gate because of the potential of contamination at the east gate based on a review of the NARAC plots by the CAT RSD liaison. Teams reported five data points back to the RSD CAT liaison, including a number of points near the east security gate indicating it was free of contamination. One OFMT reported contamination immediately south of the east gate on Highway 2373 and the other OFMT reported contamination at the intersection of Highway 2373 and County Road 8. All reporting was verbal via an unsecure radio or an unsecure phone line, which led to an inefficient transfer of information with potential for errors and unknown personal monitoring of the information. On numerous occasions, the CAT RSD liaison had to ask that the data be repeated and, on one occasion, he asked that they contact him via the phone line rather than the radio. (See **OFI-CNS-11**.)

Overall, OFMT is an emerging capability at the Pantex Plant. CNS demonstrated the concept and ability to deploy OFMTs, and approach and identify an edge of a plume and surface contamination following release of radioactive material to offsite areas. The RSD CAT liaison, located in the CAT room, properly directed the teams. The RSD CAT liaison conducted a detailed and thorough brief, and teams deployed in one and one-half hours following the release of radiological material. However, the verbal method for transmitting OFMT data is inefficient and prone to errors.

5.8 Plans and Procedures

CNS defines command media as the hierarchy of documents that provide a systematic flowdown of contractual requirements from laws, regulations, rules, DOE directives, and management. CNS command media include policies, strategy documents, CNS enterprise procedures, and site procedures. The current CNS emergency management command media structure reflects a flowdown from the emergency plan (program description) to manuals (which define roles and responsibilities for the 15 emergency management program elements), and then to WP documents that provide the “how-to” instructions for the 15 program elements. A longstanding CNS decision to flow down DOE Order 151.1C requirements only to manuals required the development of new WP documents to prescribe processes, rules, and actions to achieve desired outcomes, and to provide directions and communicate contractual requirements for the performance of emergency management.

Although CNS has made numerous improvements to its command media, CNS has not yet achieved a totally integrated and effective set of command media. Important to the *Chaos-17* exercise, CNS has not adequately integrated emergency response actions within the emergency plan and subordinate documents resulting in independent tactical operations, inaccurate patient tracking and a lack of situational awareness. (See **Finding F-CNS-02: The CNS emergency plan does not fully document an integrated emergency management program that describes the provisions for a response to an OE as required by DOE Order 151.1C, Attachment 2 Section 3.b.(3) and Finding-CNS-01.**) For example:

- During Chaos-17, the PF, FD, and RSD operated independent tactical operations with no one assigned responsibility for integrating response actions in the TOC or EOC operations team, which EA attributes to not having the appropriate command media and also to having additional FD and RSD departmental incident command procedures, neither of which flow down from the emergency plan.
- There was no production operations support provided directly to the ICT during Chaos-17, and CNS has not fully incorporated the facility operating organizations into the emergency plan and associated command media relative to the ICT to show how the transition from an abnormal event to an emergency response occurs, which places field responders in jeopardy due to an informational deficiency.
- Although the installation and implementation of EMInS has significantly improved CNS’s ability to collect and disseminate timely information among onsite and offsite organizations, during Chaos-17, communications and information management weaknesses continued to adversely affect responder performance and overall situational awareness, because CNS has not fully integrated the use of EMInS into the command media for the OC, ESDC, and TOC.
- During Chaos-17, CNS did not correctly identify or confirm the status of 7 of the 17 injured personnel and reported one additional patient above the actual number in the exercise, and CNS has inconsistently described patient tracking procedures in emergency management command media and FD procedures.
- Although CNS correctly described in SSPLN-0047 requirements for all five SECON levels, CNS did not recognize the need for a SECON level change during Chaos-17 based on the two malevolent events, which EA attributes to a lack of integration between the emergency plan and SSPLN-0047.
- During Chaos-17, the PF developed, on a real-time basis, a method to implement the site evacuation based upon SSPLN-0048; however, CNS has not fully integrated SSPLN-0048 and the emergency management command media, and no procedure exists to implement evacuation as a PA.
- The CNS OFMT is an emerging capability demonstrated during Chaos-17; nevertheless, the emergency plan and command media do not fully describe an agreed-to concept of operations

between responsible offsite organizations and NPO. (Note: This is a different agreement than the one mentioned below between CNS departments.)

- During Chaos-17, EA observed CNS simulate the activation of the offsite OWS sirens and NWS NOAA weather radios, and issue new releases, the latter two containing offsite PARS. However, CNS does not address in the emergency management command media agreements with state or local jurisdictions the activation or use of the sirens or NOAA radios, or the dissemination of offsite PARS via NOAA weather radio and new releases.

EA identified most of the procedure issues discussed above in the assessment conducted during November – December 2016, documented in the *Office of Enterprise Assessments Assessment of the Pantex Plant Emergency Management Program*, April 2017. The following paragraphs further discuss details of specific procedure weaknesses.

EA observed patient tracking as a weakness caused by numerous levels of and conflicting command media. CNS has developed 12 documents associated with mass casualty and patient tracking with four personnel responsible for tracking patient status, three of which have EMInS input responsibility. EM-PLN-0088 assigns EMInS patient tracking responsibility to the ICT communications unit leader. In contrast, WP-EM-0365, *ERO Manual*, considered by CNS as the emergency plan implementing procedure, assigns responsibility for patient tracking to the medical team. Inconsistent with WP-EM-0365 and EM-PLN-0088, ERO position-specific checklists assign patient tracking responsibilities to the medical team and operations team FD officer, not to the ICT communications unit leader. CNS has described mass casualty and patient tracking inconsistently, not only in the two plans governing the activity but also in the supporting manuals, WPs, checklists, and FD procedure. Also, during the exercise, the ECT, which is not responsible for any aspect of patient tracking, developed a separate manual list for patient tracking, attempting to reconcile the EMInS patient tracking board. (See **F-CNS-01** and **F-CNS-02**.)

SECON integration is another area related to command media weaknesses, specifically, the lack of coordination between security and emergency management for the initiation of a SECON change. While CNS has correctly captured in SSPLN-0047 the DOE Order 470.4B requirements for all five SECON levels, CNS has not adequately defined within the WPs the procedural steps for Pantex to declare elevated SECON level. The purpose of the SECON system is to establish standardized protective measures for a wide range of threats and to help disseminate appropriate, timely, and standardized information for the coordination and support of DOE crisis or contingency activities, but there are no steps that outline the procedures and responsibilities for executing a SECON change. Additionally, SSPLN-0047 calls for the EOC to utilize the appropriate EAL for SECON change; however, CNS has not issued an EAL for SECON change. (See **F-CNS-01**.)

The lack of defined OFMT roles and responsibilities and the development of inadequate operating procedures are another example of weak command media. Prior to the exercise, an informal agreement between the RSD and the Emergency Management Department existed, whereby the OFMTs were to determine the edge of the plume only and were not to clear sectors and provide data for lifting PARS. During the exercise and following the initial determination of the north and south edge of the plume, the EOC coordinator requested that the CAT RSD liaison redirect the teams to section 4B and 5B to determine whether PARS could be lifted from these sectors. The CAT RSD liaison was not prepared to deploy teams beyond finding the initial edges of the plume. The CAT RSD liaison experienced some difficulty redirecting the teams to new locations, because none of the procedures contained pre-defined monitoring points similar to the ones found in Chapter One of Annex D of the Texas Emergency Management Plan. Subsequently, the teams experienced some difficulty locating the additional monitoring points. (See **OFI-CNS-11**.)

Furthermore, OFMT procedures do not address all aspects of effective OFMT management. The procedures do not address the turnover of data and the coordination that would be required when additional offsite field monitoring assets from the state and Federal government arrive. In addition, the procedures do not address the clearing of sectors and the lifting of PARs. Due to the nature of the spread of contamination in such an event, and the variables associated with weather and disposition, the clearing of sectors and lifting of PARs is complicated and requires a significant amount of forethought and planning. Finally, the CAT RSD liaison briefed and controlled the OFMT, rather than the RSD health physicist located in the RSD office in building 12-42, contrary to WP-0119. (See **OFI-CNS-11**.)

EPI and PARs are the final areas noted by EA to be related to command media weaknesses. The public in all five jurisdictions within the Pantex EPZ have NOAA weather radios, and three jurisdictions have offsite OWS sirens—Carson, Randall and Armstrong counties. Two counties have submitted letters to DOE regarding activation of the offsite OWS sirens and NOAA weather radios during an event at the Pantex Plant. The letter from the Carson County Judge (January 6, 2015) to the Department of Energy states that:

- He gives Pantex authorization to activate the Public Warning Emergency sirens if the Carson County Judge and Emergency Management Coordinator (EMC) are unavailable.
- The Pantex Plant Shift Superintendent (PSS) has the authority to activate the Emergency Notification System and to notify National Weather Service during a General Emergency if County Judge and EMC are unavailable.

The letter from the Armstrong County Judge (April 6, 2016) states:

- This letter will give Pantex authorization to activate the Public Warning Emergency siren in Armstrong County...Pantex will sound the siren on any initial General Emergency, regardless of the EOC being activated.
- After the Armstrong County EOC is activated and on the bridge line, Armstrong County will assume responsibility for sounding the siren.
- The siren will be sounded by Pantex during an initial General Emergency and during an update to the emergency that would require residents to take immediate action.

The above letters contain conditions that are not integrated and coordinated into CNS plans, manuals and checklists. How CNS implements the initial warnings and notifications is only addressed in MNL-352190, *Pantex Plant Operations Center Manual*, which states:

- The Pantex plant has coordinated with the NWS Amarillo Office and local jurisdictions to use the system to warn the public in the Pantex plant Ten-Mile EPZ of an emergency event at the plant involving the off-site release or potential off-site release of chemical or radiological materials (i.e., OE classified as a General Emergency).
- The Pantex plant is only authorized to request initial activation of the NOAA Weather Radio system for public warning. Activation of the NOAA Weather Radio system will be received by local media outlets that may rebroadcast the warning information on the Emergency Alerting System (EAS).
- Follow-up information and adjustments to public protective actions are at the discretion of authorized local government officials.

The PSS checklist does not require the PSS to first determine the availability of the Carson County Judge and Emergency Management Coordinator (EMC), or the status of the Armstrong County EOC prior to activation of the off-site OWS or NOAA weather radio, and these activities were not performed during the exercise. Additionally, the off-site OWS sirens cannot be individually or selectively activated. A likely situation where all of the conditions stated by the counties for siren activation are met is not addressed in CNS procedures. NPO has not entered into agreements with the state or local jurisdictions

regarding this issue; hence, CNS has not integrated local requirements for the activation of the OWS and NOAA weather radios into an integrated emergency management system. (See **Finding: F-CNS-03: CNS has not integrated local requirements into an emergency management system as required by DOE Order 151.1C, Attachment 2, Section 2.c.(2) and OFI-NPO-01.**)

Throughout the exercise, CNS disseminated PARs directly to the public via social media and during press conferences contrary to EM-PLN-0019, which states, “Local jurisdictions are responsible for providing updated protective action information to the public.” Additionally, DOE Guide 151.1-4 states “Due to the critical importance of response measures taken in the early stages of an emergency, such as implementing timely PAs, the content of initial emergency notification messages should focus on information needed to facilitate these essential activities, including developing and providing PARs to offsite authorities for notification of the public.” Officials responsible for the health and welfare of their constituents use the PARs in decision-making. Those officials have the authority and responsibility to implement PAs that they determine are appropriate, which may differ from those recommended by CNS. Broadcasting the recommended PAs directly to the public without the involvement or authorization of local government officials can result in the public receiving confusing or contradictory information. (See **OFI-CNS-12.**)

In addition, the information provided in the Pantex Notification Form does not provide local decision-makers with all of the available information necessary to protect their citizenry. Specifically, the Pantex Notification Form does not collect information such as:

- Actual or projected doses or dose rates that exceed PAC at a critical location (e.g., the site boundary, municipal jurisdiction, school, hospital, reservoir) relative to the organization receiving the notification.
- Recommended PAs with timing considerations, where applicable.

Although this information was known in the EOC prior to the Pantex Plant Notification Update at 10:58 a.m., state and local official were not provided this information. The EA 2015 report also addressed shortfalls in notification form design. CNS has not integrated local requirements for providing state and local officials with adequate information for making offsite PARs into an integrated emergency management system. (See **F-CNS-03** and **OFI-CNS-13.**)

Additionally, CNS provided information to the public that did not include criteria permitting a clear and full understanding of the areas affected within the EPZ. Rather than defining areas in easily identifiable geographic or political terms (as stated in DOE Guide 151.1-4), the initial NWS public warning for the GE referred to zones 2A, 2B, etc., and directed people to the Pantex Area Emergency Preparedness Calendar or the front cover of the American Telephone and Telegraph yellow pages to determine zone boundaries. Neither of these references may be readily available (one siren is located at the I-40 rest stop), which could result in confusion or delay in the public implementing PAs. Subsequent news releases and tweets referring to zones did not refer to the calendar or yellow pages for further information. CNS has not integrated local requirements for transient and other populations into an integrated emergency management system. (See **F-CNS-03** and **OFI-CNS-14.**)

Overall, CNS has made improvements to the emergency management plans and procedures that comprise the command media at Pantex. However, CNS procedures do not implement a fully viable, integrated, and coordinated comprehensive emergency management response program originating from the emergency plan. Various and numerous documents are not integrated and continue to contain a number of inconsistencies and errors, particularly in the areas of patient tracking, SECON emergency planning integration, OFMT procedures, implementing local requirements, and issuing PARs directly to the public.

5.9 Conduct of the Exercise

CNS adequately designed the *Chaos-17* full-scale exercise scenario, derived from an approved EPHA and establishing a sound technical basis for the exercise. Exercise planning and preparation appropriately used an effective, structured approach that included specific objectives, scope, time lines, injects, and controller instructions for a realistic scenario. CNS developed the exercise package postulating three events, a vehicle accident resulting in a mass casualty, active shooter, and explosions in a weapons production area. The last combined a malevolent act with a HAZMAT release that affected the onsite and offsite populations. The complex exercise scenario had three separate event responses that required a fully integrated command structure for separate mass casualty, security-related, and HAZMAT-related response actions.

CNS effectively executed the exercise to enable evaluation of the CNS sitewide integrated response by simulating realistic emergency events and conditions. In support, CNS effectively used a simulation cell, sufficiently staffed with experienced and knowledgeable participants, to portray the agencies and individuals who would likely participate during a real event. The simulation cell generated responses to players' questions, received player phone calls, and delivered prepared scenario injects using telephone calls, radio messages, and facsimiles to represent actions, activities, and conversations with individuals who were not participating in the exercise. As a result, the simulation cell was able to maintain exercise realism and allowed the participants to simulate the necessary coordination expected during a real event.

In addition, CNS controllers appropriately provided players with earned information when player actions would have provided them. Of note, the CNS controller in the OC provided a telephone handset extension to EA, which enabled EA to listen to the notification calls made to the DOE Headquarters Watch Office. This practice is an inexpensive and effective solution to enable evaluators to hear both sides of a conversation. At one point, the exercise director issued an exercise freeze that was properly executed and lifted after resolving an actual security issue.

CNS also provided controllers and simulation cell personnel with adequate exercise-specific training, rules of conduct, and appropriate guidelines on interactions with players. Venue controllers executed most of the exercise package as designed, and CNS executed a hotwash at each venue immediately after the exercise to gather and document the participants' observations for future improvements. Hotwash facilitators utilized a checklist to ensure the consistency of information collected. Of note, the OC personnel conducted a very comprehensive discussion of exercise interactions and made numerous self-critical observations, for example:

- The PSS lacked situational awareness of key activities occurring in the EOC
 - Active shooter
 - FBI onsite response
 - Bomb detonation rather than SNM explosion EAL use
 - Different plume/PA maps in use in the EOC
 - PSS not part of bridge line calls.
- The OC missed four public address system announcements that EPI personnel posted for PSS action.

CNS also conducted a controller/evaluator debrief the day following the exercise to determine whether exercise objectives were met, based on an initial synthesis of the observations and information gathered during the exercise. CNS evaluators then proceeded to analyze the response in more detail, using the evaluation criteria prescribed in the *Chaos-17* exercise evaluation guidelines.

Although CNS conducted the exercise in accordance with DOE requirements, EA noted several problems in exercise conduct. A CNS controller incorrectly issued non-approved simulations, not permitting the

FD to respond with EMS or track patients for the active shooter event, which detracted from validation of ERO response capabilities. In addition, the only controller in a key decision-making location conducted a 15-minute tour during the exercise, which jeopardized exercise safety and control. (See **OFI-CNS-15.**) Other problems in exercise conduct included:

- Utilizing most evaluators as controllers also, which reduces the ability to critically evaluate ERO performance
- An EPI controller coaching a responder, which minimizes the validation of the ERO response element
- Trusted agents participating as exercise responders, which does not fully test program elements because those individuals know the scenario beforehand.

Overall, CNS effectively designed and conducted the full-scale exercise in accordance with DOE requirements. The exercise scenario was very complex with three separate event responses that required a fully integrated command structure for separate mass casualty, security-related, and HAZMAT-related response actions. CNS effectively conducted the exercise in a manner that enabled an evaluation of the CNS site-level integrated response. CNS controllers also appropriately provided players with earned information. Of note, the CNS controller in the OC provided a telephone handset extension to EA, which enabled EA to listen to the notification calls made to the DOE Headquarters Watch Office. Following the exercise, hotwash facilitators conducted adequate debriefs to gather comments from all participants. Of note, the OC provided the most complete hotwash and included numerous self-critical observations. Nevertheless, EA noted problems in the exercise conduct. A CNS controller incorrectly issued non-approved simulations and CNS used trusted agents as players in the exercise. Finally, the only controller at a key decision-making location conducted a 15-minute tour during the exercise, which jeopardized exercise safety and control.

6.0 FINDINGS

Findings are deficiencies 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. DOE line management and/or contractor organizations must develop and implement corrective action plans for EA appraisal findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 227.1A to manage these corrective action plans and track them to completion. In addition, deficiencies that did not meet the criteria for a finding are listed in Appendix C, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

Finding F-CNS-01: CNS has not fully developed all of the emergency plan implementing procedures to describe how the emergency plan must be implemented as required by DOE Order 151.1C, Attachment 2, Section 4.d.

- CNS has not developed a procedure for the ERO to implement SSPLN-0048, *Pantex Plant Evacuation Plan* giving consideration to evacuation under HAZMAT conditions, preplanned employee announcements, review and approval roles and responsibilities, and establishment of accountability of site personnel post evacuation.
- CNS patient tracking practices were not effective, as a result of not having integrated patient tracking concepts, descriptions, position-specific burdens, configuration of EMInS patient tracking board, and roles and responsibilities from EM-PLN-0019 and EM-PLN-0088 in an implementing procedure and aligned with the FD procedures for consistency.
- CNS operated independent tactical operations with no one assigned responsibility for integrating response actions in the TOC or EOC operations team, as a result of not having

developed an implementing procedure or aligned PF, FD, and RSD organizational command media with EM-PLN-0088 and EM-PLN-0019.

- CNS did not recognize the need for a security level change based on the two malevolent events, as a result of not having defined the procedural steps for Pantex to institute a SECON change or provide an EAL, as called for in SSPLN-0047.
- Communication and information management weaknesses adversely affected responder performance and overall situational awareness, attributed largely to not having fully integrated the use of EMInS into the command media for the OC, ESDC, and TOC.

Finding F-CNS-02: The CNS emergency plan does not fully document an integrated emergency management program that describes the provisions for a response to an OE as required by DOE Order 151.1C, Attachment 2 Section 3.b.(3).

- CNS has not adequately integrated SECON concepts and protocols within the emergency plan and other emergency management command media.
- CNS has not included SSPLN-0048 concepts, descriptions, and roles and responsibilities into EM-PLN-0019.
- CNS has not included EM-PLN-0088 concepts, descriptions, and roles and responsibilities into the EM-PLN-0019; it does not integrate the implementation of the incident command system to eliminate the need for additional departmental PF, FD, and RSD procedures.
- CNS has not fully incorporated the facility operating organizations into the emergency plan and associated command media relative to the ICT to show how the transition from an abnormal event to an emergency response occurs.
- The PF, FD, and RSD operated independent tactical operations with no one assigned responsibility for integrating response actions in the TOC or EOC operations team due to the lack of an adequate unified command description in EM-PLN-0088 and EM-PLN-0019.
- The CNS OFMT emergency plan and command media do not fully describe an agreed-to concept of operations between the responsible offsite organizations and NPO.
- CNS has not integrated patient tracking concepts, descriptions, and roles and responsibilities from EM-PLN-0088 into EM-PLN-0019.

Finding F-CNS-03: CNS has not fully integrated local requirements into an emergency management system as required by DOE Order 151.1C, Attachment 2, Section 2.c.(2)

- CNS has not integrated local requirements for the activation of the offsite OWS and NOAA weather radios into an integrated emergency management system.
- CNS has not integrated local requirements for providing state and local officials with adequate information for making offsite PARs into an integrated emergency management system.
- CNS has not integrated local requirements for providing PARs to transient and other populations into an integrated emergency management system.

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified some opportunities for improvement (OFIs) to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in appraisal reports, they may also address other conditions observed during the appraisal process. EA offers these OFIs only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

CNS

OFI-CNS-01: To improve performance of the sitewide evacuation, consider:

- Developing an appropriate evacuation plan implementing procedure to implement the evacuation plan.
- Defining the protocols to properly address key actions, such as:
 - Safe routes for vehicle access
 - Carpooling considerations
 - Contaminated vehicles
 - Preplanned messages
 - Mass transportation.
- Assessment of critical factors to be considered during an evacuation under HAZMAT conditions such as:
 - Meteorological conditions
 - Safe routing access to vehicles
 - Access to vehicles for carpool
 - Vehicle contamination and impoundment
 - Mass transportation due to vehicle inaccessibility
 - Vehicle monitoring
 - Plume projections
 - Onsite and offsite field monitoring team results
- Development of preplanned employee announcements for directing evacuation
- Assignment of evacuation method planning, review, implementation, and approval roles and responsibilities
- Establishment of accountability of site personnel post evacuation.

OFI-CNS-02: To improve patient tracking, consider:

- Developing a procedure for tracking the location and status of patients; the process should consider logical data collection points (e.g., medical transports, medical center walk-ins, and reports from facility accountability coordinators) and designate a central point for collecting accountability reports.
- Revising the patient tracking status board in EMInS.
- Revising the PF and FD procedures to be consistent with the EM-PLN-0019 and EM-PLN-0088.
- Defining or assigning adequate roles and responsibilities within plans and procedures for patient tracking utilizing EMInS.
- Revising the position-specific burdens required during mass casualty situations, which overloaded the FD IC and ICT communications unit lead.

OFI-CNS-03: To improve emergency plan implementing procedures, consider:

- Adopting the CNS enterprise administrative command media process model that allows the flowdown of DOE Order 151.1C requirements directly into procedures.
- Defining manuals as procedures consisting of chapters, with each chapter capable of being an individual procedure.
- Consolidating each of the ten response element manuals and their associated WPs into single documents that focus on the implementation of emergency response.
- Converting manuals MNL-352189, MNL-352190, and MNL-190884 into a procedure consisting of chapters, with each chapter capable of being an individual procedure.

- Converting the five programmatic element manuals (technical planning basis, program administration, training and drills, exercises, and readiness assurance) into process documents that provide only information and guidance.
- Designating MNL-190881 as a standalone report for the technical planning basis, similar to RPT-MISC-404620.
- Integrating appropriate information from the incident management plan into the emergency plan and establishing proper flowdown of requirements for the incident command system implementing procedure.
- Consolidating the incident management plan and site- and department-level incident command system procedures into a single document.
- Adding an “effective date” on all command media documents showing the calendar date on which the document or change is required for use and compliance becomes mandatory.
- Using EIPs (combination of manuals and WP documents) as the basis for the baseline exercise evaluation criteria needed in the Exercise Builder software.
- Develop a patient tracking procedure that include:
 - PF and FD field components roles and responsibilities for badge information collection
 - Triage officer responsibility for communicating patient tracking information to the ERO
 - EMInS patient tracking board input roles and responsibilities.
- Developed an implementing procedure for EM-PLN-0088 that includes:
 - Defining scene control roles and responsibilities for PF, FD, and RSD responders under malevolent act conditions, including situations with HAZMAT and injured personnel, with search and rescue required
 - Defining RSD qualified responder roles, responsibilities, and authorities
 - Establishing an integration functional role for the ICT under unified command that does not detract from the primary function of the PF, FD, and RSD ICs, who were fully burdened with tactical operations during *Chaos-17*
 - Establishing a written IAP early in the event for use by the operations section chiefs and EOC
 - Establishing information format and transfer requirements for the ICT and EOC during bridge line calls
 - Establishing the use of EMInS in the TOC and ICT
 - Integrating production operations personnel into the ICT.

OFI-CNS-04: To improve performance of situational awareness and a common operating picture among response facilities, consider:

- Defining emergency information flow processes between the onsite and offsite response organizations.
- Revising procedures to assign the responsibility for capturing, validating, and disseminating specific event information.
- Expanding the use of incident management tools to allow a rapid interface with other systems necessary to communicate a common operating picture and shared situational awareness by:
 - Providing a real-time description of events at the incident scene
 - Providing details of the ERO’s response to the incident
 - Enabling the ERO to predict changes during the incident
 - Supporting ERO objectives that forecast future actions
 - Integrating incident management tools with other web-based geographical information systems to provide ERO personnel with views, data, and analysis tools for the site, the surrounding area, and interiors of many onsite buildings, including:
 - Meteorological monitoring data
 - Plume projections

- Damage assessments
- Field monitoring data
- Site master planning data and engineering drawings (such as site drawings, utility drawings, and facility floor plans)
- Personnel data
- Facilities information management data.
- Revising procedures to define expected actions for achieving and maintaining situational awareness among all teams.
- Assessing the TOC for effective information management:
 - EMINs board displays
 - Size requirement for ICT staff
 - Define board responsibilities
 - Capture ICT scribe information.
- Assigning an ICT integration functional position within the TOC.
- Assessing the TOC against field command center roles and responsibilities.
- Assigning an individual to capture ICT scribe notes in EMINs.

OFI-CNS-05: To improve ESDC information management, consider implementing an electronic log dispatching process within EMINs so that electronic log information can be viewed by all ERO elements.

OFI-CNS-06: To increase situational awareness and improve performance in the OC, consider having the on-duty PSS assume a response coordinator's position on the EOC executive management team following the transfer of command to the EOC EM, which will provide a needed resource to the EM and enable the OC to have a dedicated EOC point of contact for ongoing OC response tasking.

OFI-CNS-07: To improve performance of the EOC executive team, consider:

- Developing a standardized update agenda.
- Developing an action tracking list that identifies strategic goals and tasks required to accomplish those goals, and assign responsibility within EMINs.
- Briefing the status of action tracking list by the responsible director during each scheduled update to ensure ERO visibility, synchronization, and coordination.

OFI-CNS-08: To improve performance of the EOC executive team SECON recognition, consider developing appropriate emergency plan implementing procedures and an EAL to describe how a SECON change will be implemented.

OFI-CNS-09: To improve the appropriateness and accuracy of information provided to the public, CNS should consider including in the prerequisite EPI training for EPI personnel who have social media responsibilities, as well as ERO team members with approval authority, enhanced training in regard to:

- An overview of emergency management and EPI systems, with emphasis on understanding the information needs of the public, the media, and offsite agencies, and how EPI can fill those information needs.
- How to effectively and proactively gather, verify, coordinate, and release timely, accurate, and consistent information, specifically regarding fatalities, casualties, offsite releases, offsite PAs, and rumors.
- Clarify which information in the initial news release and notification form can be utilized for release as media facts and tweets.

OFI-CNS-10: Consider revising the EALs to support a response commensurate with the hazards and improve the response by:

- Establishing EAL entry conditions that identify event classification levels based on HAZMAT quantity and dispersion mechanisms.
- Identifying areas under EAL PAs based on distance to PAC calculations in the EPHA.
- 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 GE responses.

OFI-CNS-11: To improve performance of the OFMT, consider:

- Documenting the roles and responsibilities of the OFMT.
- Developing pre-defined monitoring points similar to those in Chapter One of Annex D of the Texas Emergency Management Plan, which CNS self-identified.
- Developing methods for providing OFMT data other than verbally, such as the use of Rad responder or the Federal Radiological Monitoring and Assessment Center's radiological triage programs.
- Updating WP-0119:
 - To reflect that the individual directing the OFMTs is collocated with the CAT.
 - To address the turnover of data and coordination with additional offsite field monitoring assets, as recommended by DOE Guide 151.1-3.
- Developing a procedure to address clearing a sector and lifting PARs.

OFI CNS-12: Once NPO has coordinated offsite warnings and PARs with state and local jurisdictions in memorandums of understanding and agreement in principle, consider integrating these requirements into the Pantex Plant emergency management system.

OFI-CNS-13: To improve decision-making by local officials, consider collaborating with state and local jurisdictions, and using DOE Guide 151.1-3, revise the Pantex Notification Form to include relevant information needed by civil authorities when making PA decisions, including areas projected to exceed PAC at critical locations and recommended PAs with timing considerations.

OFI-CNS-14: To improve planning with local jurisdictions and better protect the public, consider utilizing the concepts, rationale, and processes outlined in DOE Guide 151.1-2 for developing the EPZ. Emphasis should be on using natural or jurisdictional boundaries to define PA zones to assist offsite authorities by providing a finer planning and response structure, in order to provide the public with a clear and full understanding of the areas affected during a GE.

OFI-CNS-15: To improve conduct of the exercise, consider:

- Assigning two controllers and a separate evaluator to critical information and decision points, such as the ICT located at the TOC.
- Minimizing the use of controllers who also serve as evaluators, especially in high profile exercises such as *Chaos-17*.
- Assigning a tour guide for VIP groups and not relying on controllers to conduct tours due to the conflict of the safety function of the control group.
- Eliminating the use of trusted agents in exercises and graded drills.

NPO

OFI-NPO-01: Consider establishing (agreement in principle and memorandum of understanding) with state and local jurisdictions an understanding regarding offsite warnings and implementation of

offsite PARs. If NPO implements warning and notification standards differently than the generally accepted standards contained in DOE Order 151.1C, NPO should determine whether an exclusion from DOE Order 151.1C is warranted prior to entering into these agreements.

Appendix A Supplemental Information

Dates of Assessment

Onsite Assessment: February 7 – March 9, 2017

Office of Enterprise Assessments (EA) 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, Deputy Director, Office of Environment, Safety and Health Assessments
C.E. (Gene) Carpenter, Jr., Director, Office of Nuclear Safety and Environmental Assessments
Kevin G. Kilp, Acting 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
William E. Miller
C.E. (Gene) Carpenter, Jr.
Gerald M. McAteer
Michael A. Kilpatrick

EA Site Lead for Pantex Plant

Jimmy S. Dyke

EA Assessors

Kurt W. Runge - Lead
John D. Bolling
Dirk L. Foster
Randy L. Griffin
Gerald M. McAteer
Thomas Rogers
William J. Scheib

Appendix B

Key Documents Reviewed, Interviews, and Observations

Documents Reviewed

- DOE Order 470.4B, *Safe Guard and Security Program*, 7/21/2011
- EM-PLN-0019, *Pantex Plant Comprehensive Emergency Management Plan*, Issue No. 9
- EM-PLN-0034, *Continuity of Operations Plan*, Issue No. 1, 6/29/15
- EM-PLN-0088, *Pantex Incident Management Plan*, Issue No. 1, 8/24/16
- SSPLN-0047, *SECON Transition Plan*, Issue No. 2
- ERO checklists
- HNDBK – 0015, *Executive Team Book*, Issue No. 9
- HNDBK - 0020, *NNSA Production Office Emergency Response Teambook*, Issue No. 8
- HNDBK-0074, *Contingency Response Support Team Teambook*, Issue No.1
- ISC-404620, *Pantex Plant Emergency Planning HS*, Issue No. 5, 7/8/13
- MNL-EM-352237, *Emergency Management Department Technical Planning Basis Process Program Manual*, Issue No. 1, 11/14/16
- MNL-EM-352240, *Emergency Management Exercises Manual*, Issue No. 2, 11/1/16
- MNL-190881, *Pantex Plant EPHA*, Issue No. 10, 8/12/16
- MNL-190884, *Emergency Action Levels*, Issue No. 7, 11/2/16
- MNL-352189, *General Employee Response Manual*, Issue No. 6, 10/5/16
- MNL-352190, *Operations Center Manual*, Issue No. 5, 11/3/16
- MNL-EM-352247, *Consequence Assessment Manual*, Issue No. 1, 7/2016
- MNL-EM-352250, *Emergency Public Information Manual*
- PX-5521, *Operations Center Operational Emergency Checklist*, Issue No. 19, 8/17/16
- PX-OG-006, *Incident Management System*, Issue No. 6, 10/28/15
- WP-EM-0363, *Emergency Management Exercises*, Issue No. 2, 9/23/16
- WP-0119, *Radiological Contingency*, Issue No. 3
- WP-EM-0370, *Consequence Assessment*, Issue NO. 1, 12/27/2016
- WP-EM-0373, *Emergency Management Emergency Public Information WP*, 2/6/17

Interviews

- CNS
 - Emergency Services, Senior Manager
 - Emergency Management Department, Manager
 - Emergency Management Operations, Section Manager
 - Emergency Management Program, Section Manager
 - Exercises Program Manager
 - Emergency Management Department OFMT Lead
 - EOC Public Affairs Officer
 - FD Assistance Chief (IC)
 - FD Chief (Senior Advisor)
 - Hazards Analyst
 - Pantex Plant Shift Superintendent
 - Pantex Plant Shift Superintendent, Manager
 - Procedures Management, Lead
 - PF (IC)
 - RSD CAT Liaison
 - RSD (IC)

- Senior Hazards Analyst
- Social Media Coordinator
- Radiation Safety Advisor

Appendix C Deficiencies

Deficiencies that did not meet the criteria for a finding are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

Deficiency: CNS did not provide continuous, effective, and accurate communication among response organizations as required by DOE Order 151.1C, Attachment 2, Section 12.

Although this is a continuation of EA 2014 exercise assessment finding, the deficiency cited is an aspect not covered by the previous finding: **F-CNS-3: Contrary to DOE Order 151.1C, CNS did not provide continuous, effective, and accurate communications among response components.**

- The EM and ICs did not make provisions for an orderly transition of responsibilities with the EOC by providing the ICT a detailed initial situation update and appraisal of any operational activities that were already in progress, what resources were available, and what resources were already committed as required by EM-PLN-0088.
- The first bridge line call did not include a precise division of responsibilities as required by EM-PLN-0088, ensuring all responsibilities have been assigned.
- The ICT staff did not provide a consolidated IAP to the EM or were not fully engage in the bridge line calls.
- The ICT communications unit leader primarily worked with the FD IC to populate and correct the patient tracking board and input minimal information recorded by the ICT scribe into EMInS.
- The patient tracking board had multiple entries for the same patients, causing confusion on patient status.
- The OC encountered problems communicating and maintaining awareness of the status of patients, which likely contributed to not knowing of the senator's involvement in the accident or the patients involved in the active-shooter event, and the OC had minimal awareness of the PF and HAZMAT response activities occurring in other onsite response facilities (i.e., TOC, EOC, and JIC), which adversely affected notification and PA functions.
- CNS's lack of situational awareness and common operating picture resulted in incomplete actions and notifications required by DOE Order 151.1C, and outlined in MNL-EM-352243 and HNDBK-0015.
- Contrary to DOE Guide 151.1-4, CNS did not make a formal announcement or acknowledgment that the response activity was ending or has been substantially scaled back.
- Throughout the exercise, the ERO and EM had difficulty maintaining accurate accountability of the patients, resulting in inaccurate information being provided to DOE Headquarters and offsite agencies.
- The decision to terminate an OE not requiring classification is a formal announcement or acknowledgment that the situation is stabilized and that the response activity is ending or has been substantially scaled back. During *Chaos-17*, the vehicle incident involving the Texas senator was categorized as an OE not requiring classification, and while the event response was stabilized and had been declared "all clear" after 40 minutes from initiation, the EOC did not identify termination criteria or terminate the event properly.