Inspection of Emergency Management at the

Pantex Site Office and the Pantex Plant

August 2005

Office of Independent Oversight and Performance Assurance
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Abbreviations Used in This Report

BWXT	BWXT Pantex, LLC
CY	Calendar Year
DOE	U.S. Department of Energy
EAL	Emergency Action Level
EM	Emergency Manager
EMD	Emergency Management Department
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
EPP	Emergency Preparedness Procedure
ERAP	Emergency Readiness Assurance Plan
ERG	Emergency Response Guidebook
ERO	Emergency Response Organization
ERPG	Emergency Response Planning Guideline
ES&H	Environment, Safety, and Health
ESTARS	Electronic Status Tracking and Routing System
FY	Fiscal Year
IHMTS	Integrated Hazardous Material Tracking System
LSPT	Limited Scope Performance Test
NA-43	NNSA Office of Emergency Management Implementation
NARAC	National Atmospheric Release Advisory Capability
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
OSC	On-Scene Commander
PAC	Protective Action Criteria
PER	Problem Evaluation Request
PSS	Plant Shift Superintendent
PXSO	Pantex Site Office

OVERSIGHT

1.0 Introduction

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA), within the Office of Security and Safety Performance Assurance, conducted an inspection of the emergency management program at the U.S. Department of Energy (DOE) Pantex Plant in July and August 2005. The inspection was performed by the OA Office of Emergency Management Oversight.

Within DOE, the National Nuclear Security Administration (NNSA) Office of the Deputy Administrator for Defense Programs is the cognizant secretarial office for the Pantex Plant. As such, it has overall Headquarters responsibility for programmatic direction and funding of most activities at the site. The NNSA Office of Emergency Management Implementation (NA-43) has specific line management responsibility at the Headquarters level for the site's emergency management program. At the site level, the NNSA Pantex Site Office (PXSO) has line management responsibility for Pantex operations and security. The Pantex Plant is managed and operated by BWXT Pantex, LLC (BWXT), under contract to NNSA.

The primary mission of the Pantex Plant is the assembly, disassembly, testing, and evaluation of nuclear weapons in support of DOE's stockpile maintenance program. Pantex also performs research and development in conventional high explosives, and serves as an interim storage site for plutonium pits removed from dismantled weapons. Activities at the Pantex Plant involve various forms of radiological and chemical hazardous materials that are present in significant quantities and that need to be effectively controlled. The Pantex Plant is located in the Texas Panhandle, approximately 17 miles northeast of Amarillo. The site encompasses approximately 9,000 acres of DOE-owned property, just over 2,000 acres of which are used to conduct the primary industrial operations, and 6,000 acres of property owned by Texas Tech University, which is managed for a variety of agricultural programs.

Throughout the evaluation of emergency management programs, OA reviews the role of DOE/NNSA organizations in providing direction to contractors and conducting line management oversight of contractor activities. OA is placing more emphasis on the effectiveness of DOE/NNSA line management oversight of emergency management programs. In reviewing NNSA line management oversight, OA focused on the effectiveness of PXSO in managing the Pantex Plant contractor, including such management functions as setting expectations, providing implementation guidance, monitoring and assessing contractor performance, and monitoring/evaluating contractor self-assessments.

In addition to the OA review of NNSA's emergency management oversight and operational awareness activities, this inspection evaluated the site's progress in addressing weaknesses identified during the November 2002 OA inspection. The inspection of the hazards survey and emergency planning hazards assessment (EPHA) was a focus area and went beyond an evaluation of corrective action effectiveness. However, in the areas of plans and procedures and training, drills, and exercises, the inspection scope was essentially limited to following up on previously identified weaknesses. The inspection team also conducted limited-scope performance tests (LSPTs) with a sample of the site's key decision-makers to evaluate their ability to employ available procedures, data sets, equipment, and skills when responding to postulated emergency conditions. Additionally, interviews were conducted with four fire department officers who would respond as on-scene commanders.

Section 2 of this report provides an overall discussion of the results of the review of the Pantex emergency management program elements that were evaluated. Section 3 provides OA's conclusions regarding the overall effectiveness of PXSO and the contractor in managing the emergency management program. Section 4 presents the ratings assigned as a result of this inspection. Appendix A provides supplemental information, including team composition. Appendix B identifies the findings that require corrective action and follow-up, and Appendices C through F detail the results of the reviews of individual emergency management program elements.

2.0 Results

2.1 Positive Program Attributes

PXSO and BWXT have made noteworthy progress over the past three years in implementing an emergency management program that facilitates effective response to a wide range of potential initiating events. Positive attributes of the emergency management program are discussed below.

BWXT has effectively addressed the majority of the weaknesses identified during the November 2002 emergency management inspection conducted by OA. BWXT has implemented procedures that appropriately guide the development of the hazards survey and EPHA, and the current EPHA represents a significant improvement in completeness and rigor over that reviewed during the 2002 inspection. Additionally, BWXT has implemented an integrated hazardous material tracking system that provides timely information to the plant shift superintendents (PSSs) and first responders about facility hazardous material inventories. In most cases, plans and procedures have been revised to address the weaknesses identified in the 2002 OA inspection report, and emergency action levels (EALs) have been reformatted as logic flow diagrams for flexibility and ease of use during emergencies. To address challenges in maintaining a fully staffed and qualified emergency response organization (ERO), the ERO has been restructured and the site general manager has conveyed clear expectations to senior managers regarding the assignment of technically qualified individuals for a two-year minimum commitment to the ERO. Furthermore, although some implementation weaknesses persist, drill planning has been improved to promote consistent and effective evaluation of drill performance, with most drill packages now including objective criteria for evaluating drill performance as well as information on lessons learned and corrective actions from previous drills that is to be validated.

NNSA and BWXT are effectively using readiness assurance processes and tools to improve the Pantex emergency management program. PXSO is engaged in oversight of the BWXT emergency management program through such activities as document reviews and observations of drills/exercises, and PXSO is using contract performance measures to foster emergency preparedness program improvements. In support of PXSO, NA-43 facilitated an EPHA review by outside experts and conducted verification reviews of the corrective actions for the 2002 OA emergency management inspection that accurately reflected the status of most issues. Additionally, the BWXT emergency management department has implemented a self-assessment program that is well structured, comprehensive, and effective in identifying programmatic weaknesses and opportunities for improvement. The BWXT emergency management department is also using the sitewide issues management system appropriately to capture issues and track corrective actions to closure.

With few exceptions, PSSs and Pantex emergency response decision-makers on the emergency operations center (EOC) executive team demonstrated effective performance during LSPTs. The PSSs appropriately categorized and classified nearly all postulated emergency events presented to them, rapidly notified site workers and offsite entities, and formulated conservative protective actions for site personnel not in the immediate vicinity of the event scene. Contributing to their performance was effective teamwork and an array of well-conceived operator aids and other administrative tools, including computerized notification forms with drop-down menus that facilitate form completion and transmission; pre-coded scenarios for ERO notifications via pager messaging; and planned scripts for making event-specific, plant-wide announcements. The EOC executive teams provided appropriate overall strategic guidance and support for on-scene responders, and in most cases, effectively executed their responsibilities for event classification and providing accurate information to offsite agencies and the public.

2.2 Program Weaknesses and Items Requiring Attention

The OA team identified several areas where programmatic weaknesses may hamper the ability of Pantex emergency responders to respond appropriately to an emergency event. Specific weaknesses are discussed below.

The BWXT hazardous material screening process does not ensure that the EPHA appropriately evaluates all onsite chemicals that could produce classifiable emergencies. As a result of weaknesses in the BWXT hazardous material screening process, some hazardous chemicals present in various chemical processing facilities have not been appropriately assessed for their potential consequences on site workers and the public if these materials were released. Preliminary analyses conducted by the OA inspection team indicate that in several instances, the potential exists for classifiable emergencies beyond those identified in the EPHA. Because these chemicals have not been assessed, decision-makers may lack the information necessary to effectively mitigate the potential consequences of a release of these materials. Furthermore, BWXT has not implemented a mechanism within the procurement process for hazardous materials that ensures that the EPHA will be updated, as appropriate, prior to bringing new or increased quantities of materials on site, although BWXT is working to develop and implement such a mechanism within the next several months.

Some PXSO and BWXT corrective actions have not been effective in addressing key underlying issues associated with several findings identified during the 2002 OA inspection, particularly in the ERO training, drill, and exercise program. In a few instances, BWXT corrective actions have not rectified previously identified weaknesses. As before, the emergency management training program does not require that an individual complete the position-specific training curriculum assigned to them or demonstrate at least a minimal level of proficiency before being assigned to the ERO roster. Despite improvements in drill planning intended to ensure effective evaluation of drill performance, implementation of drill program requirements is inconsistent, and the improvements that were implemented in the drill program have not been applied to the exercise program. While the initial offsite notification process has been substantially improved, BWXT has not implemented mechanisms that ensure that accurate and appropriate information would be provided to offsite agencies and the public, as was observed during LSPTs. In the protective action area, sheltering throughout the entire 10-mile emergency planning zone remains the default protective action recommendation for any General Emergency event, irrespective of the consequences that have been calculated in the EPHA. Such a recommendation may not be the most appropriate based on potential health and safety consequences, and raises concerns regarding stakeholder perceptions of site credibility and the impact of overly conservative protective actions. Finally, as was identified in the 2002 OA report, PXSO has not conducted any formal assessments of the BWXT emergency management program.

During LSPTs, ERO members with responsibilities for consequence assessment and formulation of protective actions did not consistently ensure that on-scene responders and site workers were adequately protected. The environment, safety, and health teams, which are responsible for the consequence assessment function within the EOC, did not perform all of their required consequence assessment activities. Performance concerns included lack of familiarity in alternative methods for accessing the National Atmospheric Release Advisory Capability (NARAC) dispersion model when normal NARAC features are unavailable due to maintenance, and not confirming appropriate use of protective action information drawn from the Department of Transportation Emergency Response Guidebook (ERG). Additionally, mistakes in the use of the ERG by PSSs, EOC executive team members, and one of the on-scene commanders who was interviewed resulted in several instances of incorrect classifications, unprotected responders at risk due to their proximity to hazardous materials, and differing judgments regarding the most prudent protective action for workers close to the event.

3.0 Conclusions

OA's most recent inspection of emergency management at Pantex, conducted in November 2002, concluded that the program had strengths in many of the programmatic elements. The OA team also identified a number of programmatic weaknesses, including several fundamental deficiencies in the assumptions underlying the basis for the EPHA, the absence of an appropriate set of predetermined protective actions for site workers and the public, notable weaknesses in the EALs and some response procedures, and an ERO training program that did not require that ERO candidates complete their training and demonstrate position-specific competence before joining the ERO. Additionally, there were numerous weaknesses in the Office of Amarillo Site Operations (now PXSO) and BWXT assessment and corrective action/issues management processes. This 2005 OA inspection found that PXSO and BWXT have adequately addressed most of these weaknesses and have improvement initiatives underway in some other areas. However, a few concerns remain from the 2002 OA inspection, and this inspection identified an important weakness in the BWXT hazardous material screening process.

Of particular note is that the corrective actions implemented by PXSO and BWXT have been largely effective in addressing the weaknesses identified during the November 2002 emergency management inspection. The resulting changes include a substantially improved analytical basis for the emergency management program, a complete restructuring of the EAL set, and upgrades in other emergency response implementing procedures. Additionally, BWXT has enhanced its response posture by providing clear direction from the BWXT general manager regarding the establishment of a stable ERO population, restructuring the ERO and some EOC operations, and making better use of drills in evaluating ERO performance and identifying opportunities for further program improvements.

Other strengths were observed as well. NA-43 and PXSO conduct a variety of activities to maintain operational awareness of the BWXT emergency management program and are fostering program improvements through effective use of contract performance measures, assistance visits by outside experts, and corrective action verification and effectiveness reviews. Additionally, the BWXT emergency management self-assessment and issues management processes are being effectively used to identify and address programmatic weaknesses and opportunities for improvement. In the responder performance area, the PSS teams appropriately executed their emergency event responsibilities using a variety of well-conceived job aids. Additionally, the EOC executive teams demonstrated their ability to provide overall strategic guidance to the ERO and, with a few exceptions, actively engaged in the process for providing accurate event information to the public.

Notwithstanding the broad range of improvements made in the EPHA, this inspection identified a weakness in the hazardous material screening process that prevented some hazardous chemicals currently on site from being appropriately assessed for their potential consequences to site workers and the public in the event of a release. As a result, emergency responders may not have the information necessary to respond as promptly and effectively as they could if the consequences had already been analyzed and documented in the EPHA and the appropriate event-specific response procedures developed. Furthermore, BWXT has not established a formal linkage between the hazardous material procurement process and the EPHA maintenance process to ensure that the EPHA appropriately reflects the site inventory of hazardous chemicals.

The OA inspection team also identified implementation weaknesses in several other program areas. In a few instances, BWXT and PXSO corrective actions have not completely rectified previously identified weaknesses, as indicated by the continued absence of a demonstration of proficiency by ERO candidates prior to being considered as fully ready to assume their emergency response duties; incomplete implementation of exercise planning improvements; and the lack of formal assessments of the BWXT

emergency management program by PXSO. Additionally, the PXSO and BWXT approach to issuing offsite protective action recommendations is not based on EPHA results but rather is being driven by historical precedent and the desires of offsite authorities. The impact is that persons in the entire 10-mile emergency planning zone are initially expected to shelter for any event having offsite consequences, irrespective of its severity. This has implications for DOE and site credibility, as well as public safety considerations, should unnecessarily conservative protective actions be initially recommended, potentially implemented by the public, and then rolled back or rescinded entirely. In the responder performance area, individuals responsible for consequence assessment did not fully or effectively execute all of their assigned functions, and there were inconsistencies in the use of protective action information drawn from the ERG by various emergency response decision-makers, although this is generally mitigated by the knowledge and experience of on-scene commanders. Finally, some weaknesses were evident in the EOC executive team processes for approving and controlling information provided to offsite agencies.

Overall, PXSO and BWXT have made significant improvements in the Pantex emergency management program over the past three years. While some program elements require further improvement, as discussed above, the emergency management program as a whole provides confidence that site workers and the public will be adequately protected should an emergency event occur at Pantex. PXSO and BWXT line management attention is warranted to ensure that the hazardous material screening process is clearly defined and consistently applied. NNSA, PXSO, and BWXT line management attention is also needed to promote the dissemination of protective action recommendations that are "most appropriate" for an emergency event.

4.0 Ratings

This inspection focused on an assessment of five key emergency management programmatic elements as well as the performance of primary emergency response decision-makers and support functions during LSPTs. No overall program rating has been assigned. The individual element ratings reflect the status of each Pantex Plant emergency management program element at the time of the inspection. The rating assigned below to the readiness assurance category is specific to those assessment, corrective action, and performance monitoring mechanisms applicable to the emergency management area.

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

Emergency Planning

Hazards Survey and Hazards Assessment ..... NEEDS IMPROVEMENT
Program Plans and Procedures ..... EFFECTIVE PERFORMANCE

Training, Drills, and Exercises ..... NEEDS IMPROVEMENT

Emergency Response

PSS Emergency Response Decision-Making ..... EFFECTIVE PERFORMANCE
EOC Executive Team Emergency Response Decision-Making ..... EFFECTIVE PERFORMANCE
Consequence Assessment and Follow-on Protective Action Formulation ..... NEEDS IMPROVEMENT

Readiness Assurance

NNSA Line Program Management ..... EFFECTIVE PERFORMANCE
BWXT Feedback and Improvement ..... EFFECTIVE PERFORMANCE

APPENDIX A
SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Planning Visit	July 12–13, 2005
Onsite Inspection Visit	July 25–August 2, 2005
Report Validation and Closeout	August 23–24, 2005

A.2 Review Team Composition

A.2.1 Management

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

A.2.2 Quality Review Board

Michael A. Kilpatrick
Dean C. Hickman
Robert M. Nelson
Patricia Worthington

A.2.3 Review Team

Steven Simonson, Deputy Director, Office of Emergency Management Oversight (Team Leader)
Deborah Johnson
Kathy McCarty
David Odland
Tom Rogers

A.2.4 Administrative Support

Kim Zollinger

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APPENDIX B
SITE-SPECIFIC FINDINGS

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

FINDING STATEMENTS	REFER TO PAGES:
1. BWXT has not ensured that all hazardous chemicals are screened and then assessed, as appropriate, for potential impact on site workers and the public, as required by Pantex BWXT IOP-1156, *Emergency Management Hazards Survey,* and DOE Order 151.1B, *Comprehensive Emergency Management System*.	13
2. BWXT has not implemented adequate mechanisms for monitoring and controlling information to ensure continuing effective communications with offsite authorities throughout an emergency, as required by DOE Order 151.1B.	16
3. The BWXT emergency management training and qualification program does not ensure that ERO personnel are proficient to perform their assigned response duties during an emergency, as required by DOE Order 151.1B and the Emergency Management Department FY05 Annual Training Plan.	22
4. The BWXT exercise planning and evaluation process does not ensure that program and performance weaknesses are systematically identified and evaluated for corrective action, as required by DOE Order 151.1B and the Pantex emergency plan.	24
5. During limited-scope performance tests, the ES&H teams did not ensure that consequence assessment information was understood by decision-makers formulating protective actions and did not perform their assigned EAL and classification verification reviews, as required by DOE Order 151.1B and site procedure EPP-6001, *Emergency Management Team*.	31
6. During limited-scope performance tests, Pantex emergency response personnel did not demonstrate consistent understanding and application of methods used to formulate protective actions, as required by DOE Order 151.1B.	31
7. PXSO has not implemented a program for conducting formal, documented assessments of the Pantex emergency management program, as required by DOE Order 151.1B and PXSO Procedure 110.2.1, *PXSO Assessment Program*.	36

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APPENDIX C
EMERGENCY PLANNING

C.1 Introduction

Hazards surveys and emergency planning hazards assessments (EPHAs) are developed to identify and assess the impact of site- and facility-specific hazards and threats and establish an emergency planning zone. U.S. Department of Energy (DOE) and National Nuclear Security Administration (NNSA) sites and facilities must use the results of the EPHAs so that emergency management programs can be established that are commensurate with the identified hazards. The hazards survey and EPHA serve as the planning foundation for the emergency management program; their rigor and accuracy are heavily dependent on the effectiveness of the screening process by which hazardous materials are initially identified and evaluated, and the rigor and accuracy of the analyses contained within the EPHA. Similarly, the completeness of the institutional processes for developing a hazards survey and EPHA are key to developing emergency program protocols and implementing procedures that provide the necessary detail, including decision-making thresholds, for effectively executing the response to an emergency, irrespective of its severity.

This 2005 evaluation included a review of the Pantex hazards survey and EPHA and their treatment of hazards associated with several Pantex facilities and transportation activities. OA also reviewed the Pantex emergency plan implementing procedures, with particular emphasis on the emergency action levels (EALs), EAL implementation guidance, and response procedures and operator aids that are vital in supporting Pantex emergency responders in categorizing and classifying emergencies, formulating onsite protective actions and offsite protective action recommendations, and notifying offsite entities. These reviews focused on improvements made in response to weaknesses identified during the inspection conducted by the Office of Independent Oversight and Performance Assurance (OA) in November 2002.

C.2 Status and Results

C.2.1 Hazards Survey and Hazards Assessment

The November 2002 inspection determined that the Pantex EPHA did not provide a technically sound program basis and, consequently, did not provide adequate assurance that site workers and the public would be adequately protected during and after significant events. This conclusion was based on critical weaknesses that were identified in the EPHA development and maintenance process, hazards identification mechanisms, the spectrum of events that was considered, the event classification scheme, and event analyses. This 2005 OA inspection found that BWXT Pantex, LLC (BWXT) has effectively addressed the majority of the deficiencies identified during the November 2002 OA inspection. Furthermore, BWXT has incorporated additional improvements to the EPHA that were identified by the NNSA Office of Emergency Management Implementation (NA-43) assessment conducted in April 2004. However, weaknesses in the hazardous material screening and EPHA maintenance processes diminish the overall effectiveness of the EPHA as the basis for the site's emergency management program.

BWXT has implemented two internal operating procedures, IOP-1156 and IOP-1158, for preparing the site emergency management hazards survey and EPHA, respectively. These procedures effectively identify requirements and expectations reflected in DOE Order 151.1B and the associated DOE emergency management guide. Although the procedures lack a discussion of the roles and responsibilities necessary for hazards survey and EPHA development and maintenance, they provide detailed instructions on the methodology, content, and format for developing the hazards survey and EPHA documents. BWXT has developed a separate, stand-alone hazards survey that addresses such appropriate elements as an overall description of facilities and activities on the site; hazardous material identification and screening processes; a summary of the potential health, safety, and environmental impacts of events internal to facilities; and the applicable planning and preparedness

requirements. The EPHA has also been revised to better reflect DOE requirements and expectations. Some noteworthy revisions are: (1) identifying offsite hazards for both fixed facility and near-site transportation hazards and NNSA hazardous material shipments off site; (2) including transportation events within facility boundaries; (3) incorporating a wide spectrum of events for radiological/chemical materials; and (4) calculating the consequences of potential toxicological hazards due to a release of depleted uranium. Furthermore, BWXT has ensured that the EPHA remains unclassified by separating classified security event scenarios to promote information sharing with offsite agencies.

Beyond those changes discussed above that were intended to specifically address previously identified weaknesses, BWXT has incorporated additional EPHA improvements. The EPHA is well-organized and appropriately identifies facility and site boundaries for use in consequence assessment calculations and in developing EALs and the emergency planning zone. Other positive aspects include using three sets of meteorological conditions in calculating the event consequences and appropriately documenting source term quantity and form, analytical assumptions, and results. Facility management is involved in developing, reviewing, and approving the EPHA, and the completed hazards survey and EPHA are being submitted to the Pantex Site Office (PXSO) for review, comment, and approval. Furthermore, a draft EPHA, which at the time of the inspection had gone through internal review and comment, incorporates additional useful detail and considers additional hazardous chemicals (e.g., methylene bisphenyl isocyanate; sulfur dioxide; ammonia; N,N-dimethylformamide; hydrochloric acid; nitric acid) that were identified in an authorization basis document.

An effective hazardous material screening process (which establishes the need for a quantitative EPHA) is based on a thorough identification of the hazardous materials present in the facility, which in turn relies to a great extent on an accurate site inventory of hazardous materials. BWXT's procedure for developing a hazards survey properly defines the hazardous material identification and screening processes. For example, an EPHA assessment is appropriately required if hazardous chemicals exceed the lower of the threshold quantities listed in the Code of Federal Regulations or if the release of these materials could result in exceeding a protective action criterion (PAC) beyond the vicinity of the release location under worst-case analyzed conditions. However, with the exception of lithium hydride, depleted uranium, chlorine, and explosive hazards, which are analyzed in the current EPHA, the screening process being used is inconsistent with the hazards survey procedure and DOE expectations because it removes from consideration chemicals that do not exceed (or do not have) a published screening threshold or are expected to exceed PAC beyond the release site, irrespective of the potential release effects.

To evaluate the effectiveness of the hazards identification process employed in the hazards survey and EPHA, and to determine the impact of the above-mentioned weakness in the hazardous material screening process, walkdowns of multiple facilities, including chemical processing facilities, were conducted with facility representatives and the EPHA developer. Both the current and the draft EPHAs and, where applicable, the facility active chemical list were reviewed prior to the walkdown. These walkdowns confirmed that the active chemical list for each of the facilities was accurate. The OA inspection team then performed a set of preliminary analyses to determine the impact of the weaknesses in the chemical screening process. These analyses indicate that in several instances, hazardous chemicals present on site that had not been analyzed by BWXT could, if released, cause PAC to be exceeded at the site or facility boundary under worst-case analyzed conditions. For example, acetic acid, acetic anhydride, ammonium hydroxide, fuming nitric acid, phosphoric acid, and tetrahydrofuran, used in various chemical processing facilities, were not analyzed in the EPHA, although these materials constitute potentially significant toxic hazards. Furthermore, the walkdowns also confirmed that the quantities of ammonia, N,N-dimethylformamide, and hydrochloric acid present in the same chemical processing facilities were greater than the quantities analyzed in the draft EPHA. For example, the draft EPHA uses a release of 90 pounds of ammonia from one of the chemical processing facilities; however, the facility walkdown confirmed the active chemical list quantity of 150 pounds of ammonia. The weakness identified in the hazardous chemical screening process negatively impacts the completeness and thoroughness of the EPHA analyses. Consequently, emergency responders may not have all the response procedures and other tools necessary to provide adequate protection to site workers and the public in the event of a release of these materials.

Finding #1: BWXT has not ensured that all hazardous chemicals are screened and then assessed, as appropriate, for potential impact on site workers and the public, as required by Pantex BWXT IOP-1156, *Emergency Management Hazards Survey*, and DOE Order 151.1B, *Comprehensive Emergency Management System*.

Furthermore, BWXT has not developed a sitewide mechanism that ensures that the EPHA is updated in a timely manner to reflect significant changes in hazardous material inventories; the absence of such a mechanism remains an incomplete corrective action from the 2002 OA inspection. BWXT has implemented an integrated hazardous material tracking system (IHMTS) that tracks all chemicals and is intended to provide timely information to the plant shift superintendents (PSSs) about hazardous material inventories. However, because the process does not include a direct, user-friendly link between IHMTS and the EPHA developer, inventory changes may not be appropriately identified and considered for impact. BWXT has an initiative underway to implement an enhancement to the Pantex work control system application that will identify hazardous chemicals throughout the site that exceed the screening threshold quantity set by the emergency management department and will automatically notify emergency planners whenever a chemical is being procured that will exceed the screening threshold.

Finally, OA's evaluation of the Pantex EPHA included a review of the degree to which the EALs incorporate information and analytical results from the EPHA to appropriately drive classification and protective action decision-making. EALs have been developed for the hazardous materials analyzed in the EPHA, and discretionary EALs have been developed to compensate for unanticipated situations to ensure that timely decisions can be made. Although the EPHA contains the protective action distances for the hazardous material events that were analyzed, none of the associated EALs specifically incorporate the EPHA-derived protective action distances. Instead, the site makes use of a default protective action of sheltering the entire site in concert with the Department of Transportation Emergency Response Guide (ERG) to determine protective action distances for chemical releases. While the ERG is analytically based and should provide conservative protective actions, its use in lieu of EPHA results may result in delayed or inappropriate classifications and formulation of appropriate protective actions because:

- Use of the ERG is more susceptible to misinterpretation because of the need to differentiate between non-specific qualifiers such as "small" and "large" spills and "day" versus "night" meteorological conditions.

- The ERG provides only generic information regarding radiological materials. This information may not capture required protective actions for the radiological materials used and stored at Pantex.

- ERG information is not specific regarding the connection between event classification (per DOE policy) and the distance at which protective action criteria (e.g., emergency response planning guideline – 2) are exceeded.

- The ERG does not consider site-specific meteorological conditions.

Including useful features and information, such as a tabular summary of classifiable events and associated predetermined protective actions for each facility and hazardous material quantities that are consistently expressed in commonly used and easy-to-interpret units, in the EALs or associated response procedures would help to ensure that response activities and notifications are commensurate with the degree of hazards associated with the event. This will become increasingly important as additional chemical releases are analyzed in the EPHA and the associated EALs are developed, and as the site moves to an offsite protection strategy that includes event-specific protective action recommendations. EAL construction and content is discussed in more detail in Section C.2.2 of this report.

To summarize, BWXT has implemented a formal process for developing the hazards survey and EPHA that has produced a stand-alone hazards survey and EPHA that address the appropriate elements. As a result, the EPHA has improved content, rigor, and analytical quality; it better reflects DOE expectations and requirements; and it has substantially strengthened the site's emergency planning basis. The EPHA analyses and results are clearly presented in a well-organized document, which facilitates review and update. However, inconsistencies exist between the

hazards survey development procedure and BWXT's actual practices in screening hazardous chemicals. Consequently, as currently implemented, the hazardous chemical screening process does not ensure that hazardous chemicals having the potential to affect the health of site workers and the public if they are released are appropriately assessed. The impact of this weakness is that emergency responders may not have all of the necessary response procedures and tools to effectively respond to postulated events. To address concerns regarding EPHA maintenance, BWXT is in the process of implementing an enhancement to the Pantex work control system application and developing an associated threshold screening process to readily identify changes in the hazardous material inventory that must be evaluated. This is an incomplete corrective action from the 2002 OA inspection. Finally, the use of the ERG in some EALs instead of the EPHA as a source of protective action information for hazardous material releases may limit the effectiveness of the EALs in supporting initial decisions on event classification and the formulation of appropriate protective actions, particularly as the EPHA population of hazardous chemicals grows.

C.2.2 Program Plans and Procedures

The November 2002 inspection determined that BWXT implementing procedures and EALs did not provide an adequate basis to ensure that emergency categorization, classification, and protective action decisions made in response to an emergency would be accurate and subsequently communicated to site workers and offsite authorities in a timely manner. This conclusion was based on weaknesses identified in EAL content, expectations for EAL use, definition of the categorization and classification process, personnel accountability procedures, and notification systems and equipment. This 2005 OA inspection found that BWXT has made considerable improvements in emergency management program plans, procedures, operator aids, and EALs to facilitate consistent and accurate emergency decision-making and that, collectively, these protocols now provide a solid basis for responding to an emergency event. However, actions taken to address weaknesses in accountability procedures and ongoing communications with offsite authorities during emergencies have been less effective in achieving overall improvement in those areas.

BWXT has completely restructured the EALs using event-based logic diagrams. This approach has had the advantage of significantly reducing the number of EALs available for categorizing or classifying emergencies while at the same time addressing a broader spectrum of potential emergency events and leading the user to a consistent categorization or classification level for a wide variety of observed conditions. For the hazards that have been analyzed in the EPHA, application of an EAL logic diagram leads the user to a specified EAL guide, which contains a list of emergency actions for the PSS related to onsite and offsite notification protocols. For events that may involve a hazardous material that has not been analyzed in the EPHA, the EALs appropriately direct the user to consult the ERG to identify the recommended isolation zone distance for the affected material and to use that information to determine the appropriate event categorization or classification level.

The EALs and EAL guides are supplemented by an EAL implementation guide and emergency response checklist (OPAID-001). The emergency response checklist is particularly well-developed. Required response actions are divided into logical groups with clearly specified directions for implementation so that the on-duty PSS can readily assign a group of actions to other PSSs who are present and track their completion. Another notable feature of the checklist is that it is used to formally document the transfer of command authority from the PSS to the BWXT emergency manager (EM) and PXSO emergency oversight manager when the turnover briefing from the PSS to those individuals has been completed. BWXT has also continued to refine other PSS operator aids to make them increasingly user-friendly and to serve as a comprehensive written record of the decisions made and actions taken during an emergency.

Emergency response implementing procedures have also been improved since the 2002 OA inspection, particularly those related to offsite notifications. BWXT has established several redundant communications mechanisms to ensure that timely and accurate emergency information is provided to offsite authorities. Procedures require that offsite authorities be notified of any emergency by three independent mechanisms: a written notification form sent by facsimile, verbal notification via a conference call, and pagers associated with the plant's paging system that have been issued to key offsite authorities. Rapid implementation of these mechanisms is facilitated by the use of drop-down menus to complete the notification form electronically, pre-programmed and abbreviated numeric codes for initiating the group conference calls and facsimile transmittals, and pre-coded pager messages that identify that a Pantex

emergency has occurred and its associated categorization or classification level. As described in Appendix E of this report, the PSSs used all of these mechanisms effectively during performance tests to complete their initial and early follow-on notifications to offsite authorities.

While, overall, the EALs and EAL guides provide a comprehensive and technically accurate foundation for emergency categorization and classification decision-making, a few instances were identified where either the EALs do not appear to lead the user to the appropriate categorization/classification or the EAL cannot be implemented as written. Additionally, the EALs and EAL Guides for security events are not as well designed as the EALs and EAL Guides for other types of events. For example:

- The EAL for a criticality event requires the decision-maker to determine whether fissionable quantities of material are present in order to ascertain whether the event warrants emergency classification. However, the type and amount of material that constitutes a fissionable quantity has not been defined. Further, if the possibility of a critical excursion can be ruled out, and no other emergency event has occurred, the EAL inappropriately directs the user to declare an operational emergency.

- The EAL for a fire in a chlorine facility directs the decision-maker to confirm whether chlorine cylinders are actually involved in the fire. If that is the case, the decision-maker is returned to the start of the logic diagram without declaring an emergency.

- EALs do not generally address event categorization or classification of an event based on the potential for a release. For example, application of the bomb threat EAL results in an operational emergency upon locating a confirmed or suspicious explosive device and does not consider whether detonation of the device could result in a release of hazardous materials.

- EAL Guide 204 for a weapons of mass destruction attack only addresses activating the Communicator Scenario associated with an operational emergency, while application of the EAL can result in either an operational emergency or General Emergency.

- The EAL for theft or loss of special nuclear material or other hazardous material directs declaration of a General Emergency, but the associated EAL Guide is for an operational emergency not requiring further classification. Further, this overly conservative classification based on any report from security that hazardous material is missing may not be commensurate with the risk from the release of the material involved and precludes consideration of whether the material is likely to still be contained within the Material Access Area.

The existing operator aids are superb resources for use during emergencies; however, attempts by the PSSs to apply EAL Guides and PSS operator aids concurrently could be confusing. An excellent operator aid exists for use by the PSS to determine and record announcements concerning event status, plant protective actions, and recall of the emergency response organization (ERO) that are made using the public address system. However, most of the EAL Guides also contain specific text for making these public address announcements and, in many cases, the scripted text is contradictory or does not provide the most appropriate response action. For example, the script for making the general public announcement of an emergency directs all personnel, including ERO responders, to shelter in place until further instructed, but the ERO recall announcement on the same page directs ERO personnel to report to their emergency duty stations. Further, the EAL Guides for an onsite chlorine release, onsite tritium release, and offsite release of chemicals that could affect the Pantex plant direct the PSS to announce that the emergency operations center (EOC) decontamination facility has been activated. However, since this decontamination facility is only designed for use to mitigate the potential effects of a particulate radioactive material release, it is not useful for a chlorine or tritium release. Activation of the decontamination facility under these conditions could unnecessarily delay EOC activation with no benefit to responder protection. BWXT has recognized these shortcomings and plans to address them during the next update of the EALs that will occur following issuance of the revised EPHA.

While revisions to the EALs, response procedures, and operator aids have effectively addressed the most important weaknesses identified by OA in 2002, a few procedure weaknesses have not been completely resolved. The most significant of these is the absence of direction or guidance that addresses how the on-scene incident commander (or any other decision-

maker, if necessary) is expected to determine appropriate protective actions for plant personnel in the immediate vicinity of an event scene. Although the current EPHA identifies release consequences relative to thresholds for early lethality and protective action criteria at specified distances, this information has not been carried over into response documents for use by decision-makers. Instead, the results of the performance tests and interviews conducted during this inspection indicated that all of the responders rely on the ERG to make protective action determinations. However, as discussed in further detail in Section E.2.3, on-scene commanders and other emergency response decision-makers do not have a consistent understanding of how to apply the protective action information in the ERG to the immediate event scene or whether they are expected to use that information to promptly evacuate affected downwind areas when the default plant-wide protective action for all events is to shelter in place.

Programmatic changes in the areas of personnel accountability and notifications to and communications with offsite authorities also have not been completely effective or have resulted in undesired consequences. The 2002 OA inspection identified that procedures did not direct the initiation of personnel accountability until after the EOC was activated. This condition remains largely unchanged. A newly issued work instruction indicates that it is the responsibility of the PSS to notify plant personnel via the plant-wide public address and paging systems to initiate personnel accountability. However, this expectation is inconsistent with other procedures and response documents and observations made during the OA limited-scope performance tests, during which accountability was initiated by the EOC executive team following their arrival in the EOC. In addition, the EM's operator aid and position guidelines do not identify any actions related to initiating accountability or following up to ensure that accountability has been completed and any discrepancies in accountability resolved. The new work instruction also does not clearly differentiate between actions required to perform accountability during drills and those required during actual emergencies.

Finally, a few weaknesses were observed in the process for approving written notification forms and controlling the information that is provided to offsite authorities. The notification and recall procedure requires that the notification form be approved by the EM or emergency oversight manager, if they are available, in the EOC before it is sent to the offsite agencies, but the emergency management team procedure assigns this responsibility to the BWXT EOC Coordinator. The drop-down menu for completing the signature blocks on the electronic version of the form identifies only the names of the PSSs and EOC Coordinators as options for review and release approval of the form. In addition, during one of the OA performance tests, the EM or emergency oversight manager did not approve a written notification form that was prepared to notify the offsite authorities of an upgrade in the emergency categorization/classification level. Additionally, the notification form is missing two items that, according to the DOE Order 151.1B emergency management guide, are expected to be included in the initial notification to DOE Headquarters.

More importantly, there are concerns with the process being used to provide updated event information to offsite authorities once the ERO is fully activated. No requirements have been established for the EM or emergency oversight manager to provide written updates to offsite authorities at periodic intervals or when there are significant changes in event status. Instead, follow-on communications are performed by the PXSO offsite liaison coordinator in the EOC who is responsible for establishing and maintaining an open telephone bridge line with designated offsite response centers. During the performance tests, the offsite liaisons were observed reading directly from the event log being displayed in the EOC and repeating briefing information being provided during periodic status briefings in the EOC verbatim to the offsite entities as the information was being presented. The information was not reviewed before being disseminated to ensure that it did not contain any sensitive or classified information or unconfirmed information that might be misinterpreted or acted upon prematurely by the recipients. This resulted in some inappropriate information being released to the offsite authorities during the performance tests. In addition, the practice of not providing periodic written updates on the status of events does not provide assurance that any of the information being reported, which may then be further disseminated by offsite recipients, is done so accurately and consistently.

Finding #2: BWXT has not implemented adequate mechanisms for monitoring and controlling information to ensure continuing effective communications with offsite authorities throughout an emergency, as required by DOE Order 151.1B.

The OA inspection team also noted that the PXSO and BWXT approach to issuing offsite protective action

recommendations and warning the public of plant emergencies is not based on results of the EPHA but rather is being driven by the desires of offsite authorities. As was identified during the 2002 OA inspection, the default protective action recommendation for any Pantex General Emergency is to shelter in place all residents within the 10-mile emergency planning zone surrounding the plant. While this approach is highly conservative and may reduce confusion regarding who is expected to take protective actions, it does not appropriately consider any potential risks to the public or to the site's credibility, and this practice could result in recommending protective actions that are not adequate to prevent long-term health effects to the public, particularly in areas in close proximity to the site. Furthermore, the procedures for notifying the public of a General Emergency at Pantex via the offsite warning sirens and tone alert radios are inconsistent. BWXT procedures dictate the use of these communications mechanisms to warn all residents within the emergency planning zone to shelter in place only if the General Emergency is caused by a radiological release (i.e., plutonium or tritium). These warning mechanisms are not used for a General Emergency involving chemicals or uranium, which is considered to be primarily a toxicological hazard. Although this practice has been agreed upon with the offsite authorities, the decision to prohibit the PSSs from activating these warning systems for events that the EPHA identifies as having offsite consequences does not provide those authorities and the public with the best possible information in a timely manner so that the potential for exposure to these hazards is minimized.

To summarize, BWXT has made significant progress in providing decision-makers with an appropriate set of plans, procedures, and operator aids that promote accurate, consistent, and timely categorization and classification of emergencies and initial notifications to emergency responders, plant workers, and the public. However, additional effort is needed to ensure that clear requirements and expectations have been established for the protection of plant personnel in the vicinity of an actual or potential hazardous material release and that protective action recommendations issued to offsite authorities are founded on the appropriate technical basis and thereby represent DOE's best interests. In addition, there are a few weaknesses in the process being used to provide continuing information to offsite authorities during emergencies that could readily result in the premature or inappropriate release of sensitive information. Although these concerns are important and warrant attention, the current set of BWXT policies, plans, procedures, and response resources provides a sound and technically defensible basis for responding to potential emergencies at the Pantex Plant, and the weaknesses do not materially detract from the overall effectiveness of this program element.

C.3 Conclusions

Corrective actions implemented since the previous OA inspection in November 2002 to address weaknesses in the EPHA and in various implementing procedures used to support emergency responder decision-making have improved the planning basis for the Pantex emergency management program in several key areas. BWXT has developed an EPHA that better reflects DOE expectations and requirements and that has improved content, rigor, and analytical quality. Furthermore, the effort to completely restructure the EALs and revise other response procedures has, with few exceptions, produced a set of flexible, accurate, and easily implemented response tools. However, the hazardous chemical screening process does not ensure that hazardous chemicals having the potential to affect the health of site workers and the public if they are released are appropriately assessed. Consequently, emergency responders may not have all of the necessary response procedures and tools to effectively respond to potential events. Additionally, the OA team identified a few continuing concerns related to formulating and implementing on-scene protective actions, the plant policy for recommending offsite protective action recommendations, communications with offsite authorities, and consistency among procedures. Nonetheless, revisions to the emergency plan, implementing procedures, and operator aids, and the extensive efforts taken to revamp the EALs, have produced the solid procedure foundation necessary for responding to and managing an emergency effectively.

C.4 Ratings

A rating of NEEDS IMPROVEMENT is assigned to the area of hazards survey and emergency planning hazards assessment.

A rating of EFFECTIVE PERFORMANCE is assigned to the area of program plans and procedures.

C.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Pantex Site Office

- Actively support BWXT in continuing to work with offsite authorities on best approaches to protective action recommendations and in employing new and existing offsite notification, warning, and alert systems to ensure consistency with DOE expectations.

BWXT Pantex

- Enhance the usefulness of procedures IOP-1156 and IOP-1158 for developing and maintaining the site emergency management hazards survey and EPHA, respectively, by incorporating additional specificity. Specific actions to consider include:
  - Ensure that changes to the hazardous material screening process are documented in the procedures, and coordinate changes with NA-43 to avoid potential rework that may result from a revision to DOE Order 151.1B.
  - Establish institutional mechanisms to ensure that the emergency management planner responsible for the EPHA is notified of changes in facility processes that may trigger additional hazards survey and/or EPHA activities due to the addition of new hazardous materials.
  - Develop and include administrative limits on hazardous material inventories in facility use agreements to ensure that bounding inventories analyzed in the EPHA are not exceeded.
  - Ensure that roles and identified staff positions responsible for developing, reviewing, approving, and maintaining the hazards survey and EPHA are clearly delineated in applicable procedures.
- Consider developing a list of specific chemicals and associated BWXT-specific screening quantities, and ensure that the enhancement to the work control process, when fully implemented, will automatically notify the emergency planner responsible for the EPHA when quantities of these chemical inventories approach or exceed these predetermined thresholds.
- In addition to authorization basis maximum allowable quantities, consider assessing maximum typical quantities of material at risk in the EPHA to increase the accuracy of emergency response decision-making tools such as the EALs.
- Consider developing a mechanism to more easily verify that sensitive chemicals, which are identified on the active chemical list by number and not by name, are present in quantities less than applicable screening thresholds.
- Consider developing a response document or tables derived from the EPHA scenario assumptions and resulting consequence analysis results (similar to the emergency assessment resource manual described in DOE Guide 151.1, Volume IV) that provides a simple cross-reference from the EALs to the EPHA for use in the EOC. For example, the response document or tables should provide a clear linkage between the specific event scenario descriptions, the rollup of the events into EAL statements, and the consequences of the events at various receptor locations.
- Consider incorporating hazard-specific information from the EPHA into the applicable EALs and EAL guides that could be used by decision-makers to formulate and validate protective actions and protective action recommendations.
- Continue to enhance the EALs and EAL guides to facilitate prompt and accurate decision-making. Specific actions to consider include:
  - Ensure that all of the EAL logic diagrams follow the same format wherever possible.
  - Ensure that the security EALs direct the user to determine whether an emergency warrants classification before an operational emergency is declared.

- Ensure that all of the EALs reflect the requirement to categorize and classify emergencies based on a recognized potential that a hazardous material may be released.

- Revise the wording in the EALs to specify observable indicators wherever possible. For example, eliminate such phrases as "eyewitness report of tritium release."

- Consider developing a discretionary EAL for an event involving a transportation vehicle on site other than the special nuclear material transport vehicle.

- Re-evaluate the use and importance of instrument indicators in EALs to determine whether the EALs can be further enhanced by transforming them into symptom-based EALs that make use of available instrument displays and setpoints.

- Consider deleting references to buildings listed on the EAL applicability matrix where analysis and controls are known to prohibit source terms capable of creating a classifiable emergency to improve the accuracy of event classifications.

- Consider tailoring the level of ERO response to the severity of an emergency. Specific actions to consider include:

  - Establish requirements or guidelines for what constitutes a "fully staffed" EOC by identifying the minimum positions that must be staffed before command and control is transferred from the PSS to the EM.

  - Establish mechanisms for recalling portions of the EOC staff for events in which a full EOC ERO recall is not necessary.

- Enhance the processes for providing emergency information to DOE Headquarters, offsite authorities, and the public to ensure the accuracy and appropriateness of information released. Specific actions to consider include:

  - Establish requirements and expectations for providing written, approved notifications to DOE Headquarters and offsite response centers on a periodic basis throughout an emergency and whenever there is a significant change in event status.

  - Develop a standard format for providing written notification updates to offsite authorities that encourages the formal dissemination of more information than that provided on PX-2247. Consult the DOE Emergency Management Guide when developing this form.

  - Require all information that will be transmitted over the bridge line with the offsite response centers be reviewed by a second party before it is provided by the PXSO Offsite Liaison Coordinators.

- Enhance the document control process to facilitate a consistent understanding of procedure requirements. Specific actions to consider include:

  - Perform a review of all emergency response implementing procedures, operator aids, and position guidelines to eliminate inconsistencies in requirements.

  - Consider deleting redundant requirements from multiple source documents to eliminate the potential for future conflicts as the procedures and response documents undergo periodic review.

  - Ensure that newly developed standard forms are clearly linked to a procedure at the time they are issued as resources or requirements.

  - Ensure that revisions to standard forms are sequentially numbered at the time a change is issued and establish a mechanism to ensure that the current version of a procedure is correctly linked to the current version of any associated forms in the event that a user cannot readily access the OPTIX document control system.

  - Establish a protocol that describes when new or revised procedures become effective relative to their review and approval by PXSO.

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APPENDIX D
TRAINING, DRILLS, AND EXERCISES

D.1 Introduction

Coupled with well-established program plans and procedures, a coordinated program of training, drills, and exercises is necessary to ensure that emergency response personnel and organizations fully understand those plans and procedures so that they can respond effectively to emergencies impacting a specific facility or the site as a whole. This response requires the ability to make time-urgent decisions and take action to minimize the consequences of the emergency and to protect the health and safety of responders, workers, and the public.

This evaluation included reviews of emergency response organization (ERO) training and qualification requirements and records, drill and exercise plans, post-drill critiques, and emergency response assessment reports. These reviews focused on the effectiveness of actions taken in response to the "needs improvement" rating assigned in the November 2002 Office of Independent Oversight and Performance Assurance (OA) inspection report to address not only the specific findings requiring corrective action but also other weaknesses identified in the body of the inspection report.

D.2 Status and Results

Training Program

Inadequate implementation of requirements related to training content, performance-based training principles, and timely completion of required training led to the conclusion in 2002 that the program did not ensure that ERO personnel were adequately trained and qualified in their assigned tasks. Although BWXT Pantex, LLC (BWXT) completed a number of corrective actions intended to address these weaknesses and prevent their recurrence, this 2005 inspection found that several weaknesses in the ERO training program have not been effectively corrected.

As part of the corrective actions from the November 2002 inspection, the BWXT emergency management department (EMD) developed and issued an annual training plan. Other than to document a few new requirements, the fiscal year (FY) 2005 training plan provides some additional information beyond that already contained in long-standing plant-wide training standards. Positive program additions promulgated through the training plan include requirements for ERO personnel to achieve a minimum passing score of 80 percent on all computer-based training evaluations or be subject to remedial training; a goal for all ERO members to complete their training requirements prior to January 31, 2005 (which was met by all incumbent ERO members); and a FY 2006 requirement to have all ERO personnel complete their required training no later than October 31, 2005, with the exception of specialized training, drills, and exercises.

The training required to be completed by each ERO member is appropriately based on their assigned ERO position and is clearly documented in the "Training Program and Qualification Package for Pantex Plant Emergency Response Organization." The majority of the courses are computer-based in keeping with the Pantex emergency plan, which states that classroom training will be held to a minimum. However, the latest revision of the training program and qualification document has added a new requirement that all ERO members must complete required reading once every 12 months. Current plans are for the required reading for each ERO position to consist of a review of the operator aid associated with that position. In addition, as part of the training curriculum, the training program and qualification document, the Pantex emergency plan, and the emergency management training program description (EPP-1010) state that all ERO members are required to participate in one drill or exercise per year to maintain their response qualifications.

The ERO training requirements are largely reflected in EPP-1010. Although this procedure has been revised twice since the November 2002 OA inspection, the version in effect at the time of this inspection did not specify adequate requirements to ensure that ERO members are sufficiently trained and qualified to perform their assigned response duties before being designated as a full-fledged ERO member. This version states that new ERO candidates must complete the "Introduction to the ERO" course before being issued an ERO responder card and pager and added to the ERO roster. Although the ERO responder card is stamped to indicate their in-training status, after

an individual has been assigned a responder card and pager, there are no limitations or restrictions on their capacity in responding to actual emergencies. Not only does this training course not provide sufficient instruction to ensure that new ERO members are capable of performing their assigned response duties, a review of training records indicated that this minimal requirement was not being met. At the time of this inspection, two individuals who were recently added to the ERO roster had completed only one computer-based course entitled "Emergency Management." Further, one of those two individuals was assigned as a WebEOC Operator but had not completed either the "WebEOC Overview" course or "WebEOC Initial" classroom lecture.

The site general manager requires BWXT division managers to assign employees to the ERO who are competent to staff ERO positions and available for a two-year minimum commitment. However, while a few responders, such as emergency medical technicians and physicians, are fundamentally trained to handle emergencies, ERO personnel cannot generally be expected to be fully capable of executing their designated response duties without additional training and practice. There are typically significant differences in the expected actions of most emergency responders than are encountered in their day-to-day jobs. This is in addition to the fact that the management structure, procedural requirements, and, in some cases, equipment used in responding to emergencies is fundamentally different from those used in day-to-day operations.

Furthermore, no mechanism has been established to notify incumbent ERO members of substantive changes in emergency response plans, procedures, or operator aids that may affect their area of responsibility. ERO members are typically expected to learn of and assimilate such changes when they participate in a drill or exercise. This practice does not ensure that responders are aware of current response requirements and expectations at the time they may be called upon to respond to an emergency. In addition, annual refresher training may not be an effective method to ensure that responders are informed of program and procedure changes on a periodic basis because some of the computer-based courses provide the student the option of bypassing the course material if they successfully answer an enabling question prior to the material being presented. Despite the current lack of an institutionalized process of informing ERO members of program changes, EMD recently conducted numerous briefing sessions for responders to familiarize them with all of the changes that have occurred since the ERO and parts of the EOC were restructured earlier this year.

Finding #3: The BWXT emergency management training and qualification program does not ensure that ERO personnel are proficient to perform their assigned response duties during an emergency, as required by DOE Order 151.1B and the Emergency Management Department FY05 Annual Training Plan.

During the onsite period of this inspection, the inspection team was provided with an updated revision of EPP-1010 and a revised draft of the calendar year 2005 annual training plan (now referred to as the FY 2005 emergency management training program plan). These documents have been revised in an attempt to clarify the ERO training and qualification requirements. However, some of the procedure changes appear to be contradictory. Within the "Qualification" section, EPP-1010 implies that new ERO members will not be issued an ERO card and pager, and added to the ERO roster, until after they have completed all of their required computer-based training and participated in a drill or exercise. However, another item in this section states that new ERO responder cards will be stamped with "In Training" until the new member has participated in a drill or exercise, which does not preclude the individual from filling an ERO position in response to an actual emergency. The draft training program plan contains similar, albeit not identical, qualification requirements. In neither case do the changes indicate whether new ERO members are required to complete the applicable position-specific required reading before being assigned to the ERO. Both documents have been further annotated to specify that the decision to use an "In Training" ERO member to fill a position during an actual emergency will be made by the EM (or the Pantex Site Office – PXSO – site manager in the case of PXSO personnel), but neither document provides any indication of the conditions under which this decision might be made.

Drill and Exercise Program

With regard to drills and exercises, the November 2002 inspection determined that the BWXT drill and exercise evaluation and critique processes were not being used effectively to identify and correct emergency management programmatic and performance weaknesses. This conclusion was based on a lack of

acceptance criteria for determining satisfactory performance in drills and exercises; repeated use of generic and broad exercise objectives and performance criteria that did not promote critical evaluation of key specific response actions; weaknesses in identifying deficient drill and exercise performance; and inadequate follow-up of drill findings to ensure the implementation of corrective actions. This 2005 inspection found that there has been improvement in planning and evaluating drills to identify and characterize program and performance weaknesses and, as described in Appendix F of this report, significant improvement in capturing, tracking, and monitoring the information obtained from drills and exercises to ensure the effective implementation of corrective actions. However, the incomplete definition and inconsistent implementation of new requirements has limited the degree of improvement in the drill program. Furthermore, the majority of the corrective actions associated with the drill and exercise program that were identified in response to the 2002 inspection were applied only to the drill program and were not carried over into the exercise program to achieve similar improvements in the planning and conduct of annual site exercises.

The BWXT work instruction for planning, conducting, and documenting drills now requires that the plans for all emergency response drills not only identify specific objectives and evaluation criteria, but also include drill pass/fail criteria. The work instruction also requires that drill plans include objectives developed from corrective actions associated with previous drills and exercises, if applicable, and post-drill critiques to specifically address progress toward closure of previous drill findings. The drill planning and post-drill critique forms, which are required to be used to develop and document all emergency response drills, include sections requiring the drill director to review lessons learned from previous drills and exercises and identify corrective actions from previous drills that were validated during the current drill. A review of numerous plans and critiques from drills conducted in fiscal years 2004 and 2005 revealed that most of the plans and critiques appropriately include these required elements and that follow-up is being performed on the results from previous drills. As a result, drills are now being used more effectively to objectively evaluate and improve response performance.

Despite an overall improvement trend, numerous instances were identified wherein application of the new requirements was inconsistent. For example, the majority of drills conducted are division-level and plant-wide accountability drills. For about half of those drills, the drill plan identifies two critical criteria that must be met for the drill to have a satisfactory rating and that are associated with actions taken by the operations center to initiate accountability procedures. More appropriately, for the other half of the drills, the critical criteria require demonstrating the ability to account for employees, subcontractors, and visitors. In addition, a few division drill coordinators believe that a drill must be rated as needing improvement if 100 percent of employees cannot be accounted for within 15 minutes, while others have rated drills as satisfactory if 85 percent of employees are accounted for in that time frame. Further, no requirements or guidance have been established that specify when or whether any elements of a drill that lead to an "unsatisfactory" or "needs improvement" rating must be re-tested to ensure that corrective actions have been implemented and determined to be effective.

EMD has established a drill/exercise objective master template from which the objectives for drills and exercises are selected. A review of documentation for the 2004 and 2005 sitewide exercises indicated that the performance evaluation criteria being used to determine whether the exercise objectives are successfully demonstrated during an exercise are not being tailored to facilitate effective evaluation of response performance. This concern was also identified in the November 2002 inspection. This lack of tailoring, combined with weaknesses in assimilating and managing post-exercise critique and evaluation information, is significantly reducing the effectiveness of the exercises as a critical component of EMD's feedback and improvement program. Examples of weaknesses in the exercise evaluation and assessment process include:

- No guidance or direction has been developed to aid evaluators in determining whether an objective was successfully met or not met. This is particularly problematic since some objectives have a large number of evaluation criteria associated with them.

- Evaluation criteria that are not applicable to the given scenario are not removed from the forms provided to evaluators for recording their observations. This puts the burden on individual evaluators to determine which criteria they should be evaluating in their assigned evaluation areas based on information contained in other parts of the exercise package.

- Many criteria lack objective evidence for determining whether they are successfully being demonstrated (e.g., "minimum required staffing is available," "EOC facility and equipment are operational in a timely manner").

- A few criteria are not technically accurate. For example, the objective for determining the event classification does not address categorization, yet the 2004 exercise involved an operational emergency that the plant shift superintendent was not expected to further classify. Criteria for determining the timeliness of offsite and Department of Energy Headquarters notifications are specified as 15 minutes regardless of whether an operational emergency has been further classified.

- Many of the criteria on the evaluation forms submitted to EMD are not marked to identify whether each criterion was accomplished, not accomplished, or not applicable. Further, some of the 2004 exercise objectives were not identified by the evaluators as having been met or not met based on their observations.

- There is no evidence to determine how or whether differences in evaluator observations are being resolved when, for example, one evaluator identifies a criterion as having been met and another identifies it as not met, but neither provides any additional information.

- It appears that not all comments from evaluators are being fully considered or correctly assessed to determine whether and what corrective actions may be appropriate. For example, there is no evidence that substantive comments from Defense Nuclear Facilities Safety Board staff and the Federal Emergency Management Agency Region VI Pantex Site Coordinator regarding inadequate fire department response actions and an exercise control issue during the 2004 exercise were ever addressed or resolved.

- Appropriate follow-up or corrective actions for two of the items identified in the assessment report for the 2004 exercise are not evident. An "improvement item" addressed the fact that the identity of the hazardous chemical involved in the exercise had to be provided to the responders 90 minutes after the initial event occurred, but the associated corrective actions did not address the underlying cause that the plant shift superintendent did not recognize the importance of the two terrorist threat telephone calls that were received. An observation item identifies that security personnel who responded to the scene did not have the appropriate protective equipment to enter an identified chemical environment and were not trained on its use. There are no recommendations or corrective actions identified for this observation and no discussion as to whether the responders should have had or been trained in the use of such equipment.

Finding #4: The BWXT exercise planning and evaluation process does not ensure that program and performance weaknesses are systematically identified and evaluated for corrective action, as required by DOE Order 151.1B and the Pantex emergency plan.

D.3 Conclusions

While BWXT implemented a number of corrective actions to address the training, drill, and exercise weaknesses identified during the November 2002 OA inspection, these corrective actions have not been effective in addressing all of the identified concerns. BWXT has continued to revise and improve its training program through changes to the governing emergency preparedness procedure and annual training plan. Additionally, the training required for each ERO position has been documented in the training program and qualification package, and the training program has established minimum standards for completing the accompanying computer-based training. New drill planning and critique requirements have improved the use of drills as an effective mechanism for improving the BWXT emergency management program and response capabilities. In addition, the use of drills and exercises as a feedback mechanism has improved due to better tracking of weaknesses, deficiencies, and improvement items identified during these activities and follow-up to ensure that corrective actions have been implemented and deemed effective. However, ERO personnel continue to be placed on the roster without receiving instruction on the practical aspects of their position or demonstrating that they are capable of performing their assigned functions. Additionally, BWXT has not established an effective process to

notify, train, and evaluate, when appropriate, ERO members when substantive changes are made to emergency response plans, procedures, or operator aids. Furthermore, the utility of the annual exercises in evaluating response performance and fostering improvement is unnecessarily limited by weaknesses in the exercise planning and assessment processes.

D.4 Rating

A rating of NEEDS IMPROVEMENT is assigned to the area of training, drills, and exercises.

D.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible National Nuclear Security Administration and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

BWXT Pantex

- Enhance the ERO training and qualification program to provide greater confidence in responder proficiency. Specific actions to consider include:
  - Require new ERO candidates to attend an orientation at their designated emergency response duty station before being issued an ERO pager and added to the ERO roster.
  - Require new ERO candidates and incumbent ERO members assigned to new positions to review their position-specific procedures and operator aids with an EMD staff member or a qualified ERO sub-team leader before being issued an ERO pager and added to the ERO roster in their designated position.
  - Clarify what requirements must be met in order for an ERO member to be "fully qualified."
- Continue to refine the drill program to foster program and performance improvement. Specific actions to consider include:
  - Enforce use of the latest version of PX-4902 that requires the recording of drill results according to each drill objective and exercise evaluation criterion.
  - Establish formal expectations for the repeated testing of any drill objectives or critical criteria that are rated as unsatisfactory.
  - Clarify the term "critical criteria" and their role in the drill evaluation process.
- Enhance the emergency response exercise program by tailoring exercise plans and assessment reports to the scenario. Specific actions to consider include:
  - Develop criteria and guidance for determining whether an exercise objective was successfully demonstrated.
  - Establish formal expectations for the repeated testing of any objectives that are not met during exercises.
  - Compare the drill/exercise objective master template and supporting evaluation criteria to the draft DOE Emergency Management Guide Volume VI to ensure that objectives and criteria have been developed for all response actions that should be tested on a periodic basis in exercises.
  - Reduce the number of evaluation criteria associated with some objectives by establishing new objectives or re-distributing the criteria among the existing objectives to facilitate the identification of performance trends, better target the specific response actions being tested, and improve post-exercise information management.
  - Remove evaluation criteria that are not applicable to the given exercise scenario from the evaluation forms provided to evaluators.
  - Incorporate observable indicators of successful response performance into evaluation criteria wherever possible. Ensure that the indicators are consistent with procedural requirements.

- Document how all evaluator, controller, and observer comments were considered and addressed.

- Include a rationale for how/why each finding was categorized as a deficiency, weakness, improvement item, or observation in the post-exercise assessment report.

- Expand post-exercise assessment reports to include specific information on response performance relative to each exercise objective to promote the identification of performance trends.

APPENDIX E
EMERGENCY RESPONSE

E.1 Introduction

The ultimate objective of emergency planning and preparedness is to prepare emergency responders so that they can apply their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public. Critical elements of the initial response include formulating protective actions, categorizing and classifying the emergency, and notifying onsite personnel and offsite authorities. Concurrent response actions include reentry and rescue, provision of medical care, and ongoing assessment of event consequences using additional data and/or field monitoring results.

The information provided in this section is based on observations of two sets of emergency management limited-scope performance tests (LSPTs) conducted by the Office of Independent Oversight and Performance Assurance (OA). The first set of LSPTs involved individuals comprising the operations center normal day shift. Two decision-making teams were evaluated, each team consisting of three BWXT Pantex, LLC (BWXT) plant shift superintendents (PSSs): a duty PSS, who provides operations center leadership, and two equally qualified supporting PSSs. The second set of performance tests involved two emergency operations center (EOC) emergency management teams, each consisting of an executive team that provides strategic management of the event and an environment, safety, and health (ES&H) team that performs consequence assessment functions. The executive team was composed of a BWXT emergency manager (EM), a Pantex Site Office (PXSO) emergency oversight manager, and selected EOC support staff. The ES&H team was composed of a plume modeler, WebEOC operator, and subject matter experts in the areas of radiological safety, industrial hygiene, and explosives safety. Interviews that focused entirely on practices for determining protective actions for responders and site workers in the immediate area of the event scene were also conducted with four BWXT fire department personnel who may serve as the initial on-scene commander (OSC).

Two operational emergency scenarios were developed for the LSPTs: 1) an event occurring at a facility that produces a significant fire that consumes a structure containing small amounts of radioactive material and that subsequently threatens and results in the release of a hazardous chemical, and 2) a transportation event involving a release of a hazardous chemical that threatens nearby occupied buildings and has offsite consequences. The LSPT scenarios, which were developed by OA in conjunction with BWXT trusted agents, were presented to the participants by several trusted agents to ensure scenario validity and delivery of accurate event cues. The trusted agents also played the roles of several positions not staffed, such as the OSC.

E.2 Status And Results

In the event of a non-security-related emergency, initial direction and control of the Pantex Plant emergency response organization (ERO) is provided from the operations center by a duty PSS supported by a minimum of one additional PSS, while initial on-scene command and control is provided by an OSC from the BWXT fire department. As the interim emergency manager, the duty PSS is responsible for emergency classification, initial protective actions and protective action recommendations, recall of the ERO, and notification of onsite personnel and offsite authorities until relieved by the EM and the emergency oversight manager. ERO members in the operations center or the EOC support the OSC in formulating subsequent protective actions as event information becomes known and consequence assessment results become available.

During the November 2002 OA inspection, BWXT initial decision-makers demonstrated generally effective response during LSPTs. Except for some performance concerns that were attributed primarily to weaknesses in emergency action levels (EALs) and other procedures, PSSs executed their emergency responsibilities effectively. Furthermore, BWXT had improved on-scene command and control to ensure the safety of response personnel and the availability of appropriate response equipment at the event scene. This 2005 inspection found that the BWXT initial decision-makers have maintained their ability to effectively respond to postulated events, but that weaknesses exist in formulating protective actions drawn from the Department of Transportation

Emergency Response Guidebook (ERG), executing assigned consequence assessment functions, and ensuring that information regarding the adequacy of protective actions is understood by on-scene personnel.

E.2.1 Plant Shift Superintendents

The PSSs appropriately performed their emergency response duties using effective teamwork and well-conceived operator aids and other administrative tools. The primary operator aid used in PSS emergency response is organized by grouped activities that are conducive to rapid distribution of the many tasks among the three PSSs. Tasks within the groups comprehensively address the initial emergency response duties in that they include communication of initial protective actions to site personnel, ERO recall, offsite notifications, hazard identification, and event categorization and classification. Electronic displays and various guidance and reference documents enabled the PSSs to determine meteorological conditions, hazardous material inventories for affected buildings, and categorization and classification through the use of EALs and the ERG. This resulted in a timely and, in nearly all cases, accurate execution of initial emergency response duties performed from the operations center.

In nearly all cases, the PSSs accurately categorized and classified the postulated emergency events, and without exception immediately implemented the site's default protective actions of sheltering onsite personnel and issuing the default protective action recommendation, as required by the situation. The PSSs quickly determined the event location and the type and quantity of hazardous materials involved by soliciting on-scene reports or by reviewing hazardous chemical inventory records, and then applied the appropriate EALs, EAL guides, and the ERG for the known conditions. The PSSs used this information to make classification determinations based on standard classification definitions, which demonstrated a good understanding of the concepts used in determining and communicating event severity. However, in one case, the PSS inappropriately upgraded an operational emergency that did not require further classification to a Site Area Emergency based on the presence of hydrogen inside a postulated burning building. In this instance, the PSS reviewed a chemical inventory of the building's contents and judged hydrogen to be the most hazardous material involved. Then, as required by the applicable EAL, the PSS referred to the ERG to determine the extent of any necessary protective actions. In this case, the PSS applied the default public safety precautionary isolation distance of 100 meters (which is used in the ERG for any gas) to the generic classification definitions to determine that the event could have consequences beyond the facility boundary. Although a sound approach was utilized, the determination that hydrogen was a hazardous material for classification purposes was inappropriate because hydrogen poses an explosive threat, not a toxicological threat, and the ERG precautionary distance of 100 meters used by the PSS is not based on blast effects.

The PSSs effectively used the ERG and a computer mapping program to generate a circular area of consequence centered on the hazardous material release point for the purpose of formulating associated protective actions. Initial PSS orders for site protective actions were timely, and the PSSs effectively used the event announcement scripts to clearly communicate release locations and current meteorological conditions and to direct sheltered personnel to close doors and windows and shutdown ventilation systems. PSSs typically kept site workers sheltered until more information became known and the OSC became involved. However, a few subsequent protective actions provided by the PSS were not consistently adequate to support the OSC in keeping initial scene responders and site workers safe.

In part, the LSPT scenarios were designed to test the ability of the PSSs to recognize the need to relocate unprotected responders and workers sheltered in buildings that were located inside an isolation zone. The PSSs used a number of terms, including hot zone, exclusion area, and isolation zone, to communicate these areas of consequence, but based on BWXT emergency management training content, the intent is that personnel are allowed to enter these areas only if they don appropriate personal protective equipment. Furthermore, the ERG establishes a circular isolation zone to protect persons who are relatively close (even though upwind) to the release point from immediately dangerous exposures. However, the PSSs did not demonstrate a consistent understanding of the isolation zone concept. PSSs did not inquire about the proximity of security personnel to the event scene or attempt to relocate personnel at incident command posts and staging areas when they were inside the isolation zone because most PSSs considered it safe to be in the isolation zone without protection as long as responders remained upwind and because they deferred to the OSC's responsibility for making these on-scene decisions. Additionally, absent any written direction or

guidance on required actions within the isolation zone or how to determine whether a building is suitable for personnel sheltering, the PSS teams reacted differently to the OSC's handling of sheltered employees. After realizing that sheltered workers were inside the scene isolation zone, some duty PSSs kept workers sheltered and other duty PSSs relocated workers. Weaknesses in application of the ERG to protective action decision-making are discussed further in Section E.2.3.

To summarize, during LSPTs, BWXT PSSs demonstrated timely and mostly accurate initial decision-making in initially warning and protecting site employees, recalling the ERO, categorizing and classifying the event, and notifying offsite authorities. The PSSs used teamwork and the appropriate checklists, EALs, EAL guides, the ERG, and other available documents and visual displays to efficiently and effectively execute the many tasks required of operations center personnel in an emergency event. However, PSSs did not typically provide to the OSCs the initial event consequences that the PSSs had determined to support the OSC in protecting responders and site workers. Furthermore, for the same postulated conditions, PSSs differed in their judgment regarding the appropriateness of evacuation or sheltering for workers in buildings located in the isolation zone. Nonetheless, the PSSs performed well overall, and the response weaknesses that were observed are largely mitigated by the knowledge and experience of OSCs in using the ERG and understanding protective action concepts.

E.2.2 EOC Executive Teams

The EOC executive teams provided appropriate overall strategic guidance to the ERO and adequately supported the OSCs. The security, on-scene command, operations center, and consequence assessment functions were well-coordinated and, with some exceptions in the consequence assessment area, appropriately integrated into the response. Personnel accountability was quickly initiated when appropriate, hazards and consequences were pursued, buses were staged for possible evacuation, reentry plans were made, offsite authorities were kept informed of event conditions, next of kin notification procedures were implemented and, in most cases, press releases were appropriately and rapidly reviewed and approved.

The EOC executive teams, similar to the PSS teams, generally made accurate classifications. However, in one case, an EM inappropriately upgraded an operational emergency not requiring further classification to a Site Area Emergency classification based on a misunderstanding of the materials at risk and the basis for the OSC's initial 1000-foot standoff distance. In this instance, although an ES&H team member briefed the EM that the burning structure contained no significant hazards, the EM independently determined that the building's inventory of vacuum cleaners that are used in radiologically contaminated areas represented a "large" quantity of burning, low-level radioactive materials. After comparing the ERG-recommended evacuation distance of 1000 feet to the facility boundary distance, the EM declared a Site Area Emergency because the recommended evacuation distance was between the facility and site boundary. Although the approach was sound, the EM's characterization of the source term was not consistent with the event conditions.

The EOC executive teams demonstrated appropriate and generally safe fundamental concepts in formulating protective actions. They kept response personnel, field monitoring teams, and evacuating personnel upwind and used information from ES&H team briefings and dispersion plume plots to determine areas where evacuations should be considered and plan field monitoring activities. When rescuers needed to enter hazardous atmospheres, the EOC executive teams ensured that appropriate personal protective equipment was being used at the scene. When planning worker evacuations, the EOC executive teams investigated safe exits and considered having rescuers take personal protective equipment to personnel before relocating them.

The OA team observed a few performance weaknesses. For example, the EOC executive teams did not always make full and consistent use of available maps, the ERG, or consequence analyses generated by the ES&H team to ensure that on-scene responders and workers near the event scene were adequately protected. In one scenario, although five bottles of chlorine were engulfed in a fire, and would therefore warrant an isolation zone of 800 feet based on the ERG, one ES&H team informed the EOC executive team that the responders were safe because they were 100 feet upwind of the event. However, the 100-foot isolation zone was previously established by the OSC based on only one bottle of chlorine releasing. If the 800-foot isolation zone had been overlaid on a site map, the impact of its release on nearby occupied buildings and on-scene responder locations would have been evident. Despite the potential severity of the chlorine

release, only one of the EOC executive teams implemented an evacuation for one of the impacted buildings. During a different scenario involving a cylinder of anhydrous ammonia, both EOC executive teams concluded that an evacuation of a more distant building was necessary. In this case, the evacuation determination was made because the plume plot indicated that an emergency response planning guideline (ERPG)-1 concentration, which is considerably less of a hazard than that presented during the chlorine release scenario and one not requiring short-term protective actions, could exist in the vicinity of a normally occupied building.

Furthermore, the EOC executive teams did not ensure that the OSC understood the basis for EOC recommendations regarding protective actions. For example, during the postulated chlorine release, one EOC executive team recommended that the OSC evacuate personnel from a building near the event scene. When their conclusion was proposed to the OSC, and the OSC disagreed (as a planned part of the scenario), the matter was dropped without any further discussion of the results of the consequence assessment plume plots or on the relative merits of relocating personnel instead of keeping them sheltered. Weaknesses in consequence assessment decision-making are discussed in more detail in Section E.2.3. Finally, EMs and emergency oversight managers did not review and approve information provided to offsite authorities to ensure that it was accurate and appropriate for distribution. In one instance this resulted in the premature identification of fatalities, and in another instance, based on usage of WebEOC, it could have resulted in the reporting of an explosion that did not actually occur. This concern is considered to be largely attributable to a weakness in the supporting emergency response procedures, and is discussed in more detail in Section C.2.2.

To summarize, the EOC executive teams provided effective overall management of postulated events by directing or integrating the emergency management team, the operations center, and the on-scene command. The briefings and deliberations among the EM, EOC, EOC cadre of directors, PSS, and the ES&H team were frequent, informative, and formalized, as they were well-controlled by the EM and made use of many available tools, such as a visual display system and EOC speaker system, to enable all EOC support personnel to also stay informed. The teams demonstrated fundamentally sound concepts in establishing a safe approach to managing the event, and team members were sensitive to employee and responder safety and the need for personnel accountability. However, the EOC executive teams did not fully utilize available tools for confirming the adequacy of the OSC's protective actions in the vicinity of the event scene. This is largely attributable to the practice of typically deferring to the OSC's judgment in such matters and some misconceptions regarding ERG usage. Finally, although adequate control of press releases was demonstrated, neither EOC executive team appropriately reviewed or controlled information reported to offsite authorities to ensure accuracy and appropriateness.

E.2.3 Consequence Assessment and Follow-On Protective Action Formulation

Following EOC activation, the ES&H team's primary function, as part of the emergency management team, is to perform consequence assessment functions. During the LSPTs, the ES&H teams quickly developed initial chemical dispersion plots, using the ALOHA modeling program, that were appropriately based on conservative assumptions. Subsequent dispersion plots were later refined as source term information became available. The results of the dispersion analyses were discussed in the EOC for use in formulating protective actions and planning field monitoring activities. Furthermore, with few exceptions, the ES&H teams provided appropriate guidance to the EM and periodically briefed the EOC executive team on their assessments.

The ES&H teams' effectiveness was, however, diminished by a number of performance weaknesses of varying significance. Although ERPG concepts were generally understood by the ES&H team, one of the ES&H team briefings for the EOC executive team was inappropriately based on radiological deposition rather than the protective action guideline of committed effective dose equivalent that should be used to formulate protective actions and protective action recommendations. Additionally, there were weaknesses in modeler proficiency in using the Hotspot dispersion program for radiological events. For example, when preparing a predictive analysis of burning radioactive material, the program output was not in protective action guideline units because the modeler did not make the appropriate selection; consequently, the modeler had to resort to hand calculations for unit conversions. This resulted in unnecessary delays and made the process more vulnerable to errors.

Furthermore, although the National Atmospheric Release Advisory Capability (NARAC) is one of the listed modeling programs for initial and ongoing consequence assessment (and for which DOE requires the capability to access), one team never attempted to use it, and when it became apparent that NARAC was not accessible through normal means due to NARAC mainframe maintenance, the other ES&H team was unable to access NARAC through available alternative methods. Additionally, contrary to procedural guidance contained in the emergency management team procedure, the ES&H teams did not perform EAL reviews, become involved in discussions of classification upgrades, or use the ERG to ensure consistent and appropriate application by the OSC. Notably, one of the ES&H teams did not ensure that the OSC understood why protective actions for scene responders needed to be upgraded. For example, in one scenario, the ES&H team leader contacted the OSC directly to recommend increasing the radius of the area under protective actions from 1000 feet to 571 yards to reflect the results of their predictive consequence assessment. When the OSC declined to extend the area, the ES&H team made no attempt to explain the basis for their recommendation.

It should be noted that BWXT had previously recognized that the consequence assessment function is not well supported by the ES&H team concept, and BWXT has established a milestone of October 2005 for implementing a consequence assessment approach that uses a smaller, dedicated team with skills and experience more closely aligned to performing initial and ongoing consequence assessment duties.

Finding #5: During limited-scope performance tests, the ES&H teams did not ensure that consequence assessment information was understood by decision-makers formulating protective actions and did not perform their assigned EAL and classification verification reviews, as required by DOE Order 151.1B and site procedure EPP-6001, *Emergency Management Team.*

Pantex response protocols assign the OSC the responsibility for responder and worker protective actions in the immediate vicinity of an emergency event. Consequently, after observing during the LSPTs that PSSs and ERO personnel in the EOC typically defer to the OSC's judgment regarding protective action decision-making, the OA inspection team interviewed four fire department officers who may serve as the OSC to evaluate their initial response to postulated emergency events. Most of the OSCs who were interviewed effectively used the ERG to establish initial standoff distances, establish appropriate isolation zones, and identify downwind protective action areas. However, one OSC did not demonstrate effective use of the ERG as a consequence assessment tool for determining adequate protective actions. Observed weaknesses include basing his determinations of scene standoff distance on judgment and recall rather than initially referring to the ERG; formulating protective actions for radiological hazards using the toxic inhalation hazard tables; not differentiating required actions within an isolation zone from those within the downwind protection area; and being unable to differentiate a small spill from a large spill for use of the toxic inhalation hazard tables.

The observed weaknesses and inconsistencies in protective action decision-making by PSSs, ERO members assigned to the EOC, and one of the OSCs, particularly whether they are expected to use the isolation zone concept in deciding to promptly evacuate affected areas when the default plant-wide protective action is to shelter in place, can be attributed to several factors. These include the philosophy used to construct the EALs; the Pantex emergency responders' widespread use of the ERG, with its inherent limitations in applicability and understandability; and as discussed in Section C.2.2, the absence of a procedure or response checklist that addresses how the OSC is expected to determine appropriate protective actions in the immediate vicinity of an event.

Finding #6: During limited-scope performance tests, Pantex emergency response personnel did not demonstrate consistent understanding and application of methods used to formulate protective actions, as required by DOE Order 151.1B.

In summary, the ES&H teams produced appropriate predictive analyses of toxic chemical and radiological material dispersions using the applicable modeling programs and conservative assumptions, and used the results to plan field monitoring activities and inform the EOC executive team of the results. However, some proficiency weaknesses were noted in the use of the radiological dispersion programs and alternative access to the NARAC modeling program when normal NARAC access is unavailable. ES&H

teams also did not perform some duties, such as EAL and classification upgrade reviews, as required by emergency procedures. Of most significance, the ES&H teams did not effectively communicate consequence assessment analyses to the OSC for use in formulating protective actions at the event scenes, and ERO emergency management decision-makers do not share a consistent understanding of the process for determining the adequacy of protective actions for on-scene responders and nearby site workers.

E.3 Conclusions

During LSPTs, the PSSs effectively performed nearly all of their initial response duties to protect employees and the public, categorize and classify events, recall emergency response personnel, and notify offsite authorities. EOC executive teams provided the appropriate strategic management of the event by coordinating and integrating the various emergency response teams and taking over further classification and offsite notification duties, and the ES&H teams provided appropriate predictive consequence analyses for use in planning field monitoring activities and informing the EOC executive team of recommended protective actions. In most cases, OSCs, who were separately interviewed, assumed responsibility for protecting on-scene responders and nearby employees after the initial phase of the event, and demonstrated an appropriate knowledge of protective action principles using the ERG. However, selected weaknesses were observed in the use of the ERG by the PSSs, emergency management teams, and one OSC in developing event classifications and follow-on protective actions and in communicating the consequence assessments from the EOC emergency management team to the OSC for use in formulating protective actions. In a few cases, these weaknesses resulted in incorrect classifications, left on-scene responders potentially unprotected in the isolation zone for hazardous materials, or created inconsistencies in decision-making regarding the most effective protective actions for employees. Nonetheless, overall, PSSs and the EOC executive teams, combined with OSC knowledge and experience in applying ERG protection principles, demonstrated their ability to effectively protect site workers and the public and effectively manage a significant event at the Pantex Plant. Additionally, the ES&H teams, responsible for consequence assessments, were not equally proficient in use of radiological dispersion models, were unable to access the NARAC dispersion modeling program using alternate methods, and did not perform verification reviews of EALs and classification upgrade decisions as described in procedures.

E.4 Ratings

A rating of EFFECTIVE PERFORMANCE is assigned to the area of PSS emergency response decision-making.

A rating of EFFECTIVE PERFORMANCE is assigned to the EOC Executive Team emergency response decision-making.

A rating of NEEDS IMPROVEMENT is assigned to consequence assessment and follow-on protective action formulation.

E.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible National Nuclear Security Administration and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

BWXT Pantex

- Strengthen the communication and consistent understanding of near-scene protective actions among all responders. Specific actions to consider include:
  - Provide a method, such as a fax machine at the scene, to enable the transmission of consequence assessment information developed at other response venues to the OSC to facilitate a common understanding of the area impacted by a potential or actual hazardous material release.
  - Provide expanded maps in the EOC that are more conducive to overlaying templates of isolation zones for use in clearly indicating to the EOC responders the impacts of decisions

on deployed personnel, including the protective force, command posts, staging areas, and employees sheltered.

– Integrate use of the ERG into the ES&H team consequence assessment functions so ES&H team members are aware of the basis for safe distances and areas under protective actions established by on-scene responders. This will enable a comparative analysis of ERG instructions against ES&H team conclusions and provide a means for ES&H teams to validate appropriate implementation of the ERG.

- Develop expectations and guidance for applying the information in the ERG in the formulation of protective actions. Specific actions to consider include:

  – Establish requirements that specify how OSCs are expected to formulate and issue near-scene protective actions and, as appropriate, apply the principles embodied in the ERG to establish isolation zones and shelter or evacuate downwind impact areas.

  – Ensure that the terms isolation zone, buffer zone, cordon area, evacuation zone, exclusion area, and hot/warm/cold zones and any restrictions on occupancy or required personal protective equipment are clearly defined in procedures and training.

  – Ensure mastery in formulating and issuing near-scene protective actions by establishing specific drill and exercise evaluation criteria for these actions.

  – Clarify responsibilities and authorities among the PSSs, OSC, EM, and ES&H team for formulating and issuing near-scene protective actions so that differing recommendations are promptly and accurately resolved. Ensure that these responsibilities and requirements are fully and accurately reflected in required training.

- Strengthen the role of the ES&H team in support of event classification and protective action decision-making. Specific actions to consider include:

  – Through training, drills, and exercises, emphasize the role of the ES&H team in reviewing EALs to validate classification decisions made by the EM or to provide alternative recommendations.

  – Reinforce the responsibility of ES&H teams to ensure, through interactions with the OSC and ultimately the EM, that protective actions being implemented are consistent with the results of their consequence assessment analyses.

  – Establish more proficient modeler abilities through additional hands-on training using the Hotspot dispersion modeling program and alternative methods of accessing the NARAC program.

- Continue to enhance the processes for managing and disseminating information within the EOC to ensure that all responders have a common understanding of event status. Specific actions to consider include:

  – Require the OSC communicator or EOC communicator, or consider assigning a third individual with sole responsibility, to print out, review, and highlight key pieces of information from the WebEOC at periodic intervals for use by the EM and emergency oversight manager.

  – Expand the use of the WebEOC information management options to establish a separate log of the actions assigned and unresolved items identified by the EM and emergency oversight manager that can be readily distinguished from the event chronology to ensure effective tracking and completion of those items.

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APPENDIX F
READINESS ASSURANCE

F.1 Introduction

Emergency management program administration includes elements of readiness assurance as well as performance of some planning and response functions. Readiness assurance activities ensure that emergency management program plans, procedures, and resources of the Pantex Site Office (PXSO) and BWXT Pantex, LLC (BWXT) will facilitate an effective response to an emergency at the site. Site readiness assurance activities include implementation by both PXSO and BWXT of a coordinated schedule of program evaluations, appraisals, and assessments and the effective use of issues management systems to foster program improvement. Key elements of the readiness assurance program include the active involvement of National Nuclear Security Administration (NNSA) line organizations in monitoring program effectiveness; implementing self-assessment programs; and ensuring that timely corrective actions for identified weaknesses are developed, implemented, and appropriately closed. NNSA field elements also have direct responsibility for performing some emergency response activities, including oversight of the site's emergency response and activities related to the release of emergency public information to site workers and the public.

As a follow-up to the November 2002 inspection conducted by the Office of Independent Oversight and Performance Assurance (OA), this inspection examined the processes by which PXSO provides guidance and direction to and maintains operational awareness of the Pantex emergency management program. The inspection included a review of PXSO emergency management program assessment processes and selected aspects of the PXSO training and qualification program for emergency response organization staff. Additionally, the inspection included reviews of the BWXT emergency management self-assessment and issues management processes and the status of actions taken to address findings identified in the previous OA inspection.

F.2 Status and Results

F.2.1 NNSA Line Program Management

The November 2002 OA inspection determined that the Office of Amarillo Site Operations (now PXSO), supported by the Albuquerque Operations Office Transportation and Emergency Operations Division, had conducted a variety of activities to monitor the performance of the Pantex emergency management program. The Office of Amarillo Site Operations was actively engaged in providing oversight and guidance in defining program requirements. However, performance monitoring activities had not been conducted that would identify significant programmatic weaknesses, and there was no established program for conducting a thorough assessment of the emergency management program over a three-year period, as required by DOE Order 151.1A. This 2005 inspection revealed that PXSO has continued to provide oversight and monitoring for the Pantex emergency preparedness program through both informal and formal activities, and has effectively utilized the performance enhancement program to provide direction to BWXT, but PXSO has not yet conducted formal, documented assessments of the BWXT emergency management program functional elements.

Following the 2002 OA inspection, PXSO filled the position of emergency preparedness program manager and assigned responsibilities for line management oversight of the BWXT emergency preparedness program and coordination of the PXSO emergency response organization, and then closed the finding related to conduct of assessments. The program manager's routine oversight activities include reviewing and approving site emergency preparedness documents, observing drills and exercises, and meeting regularly with the manager of the BWXT emergency management department (EMD). In response to findings from the OA inspection, BWXT corrective actions involved preparing and revising a significant number of planning and preparedness documents. Consequently, PXSO oversight activities during 2003 and 2004 focused on reviewing and commenting on these documents. For example, the PXSO emergency

preparedness manager coordinated reviews of the hazards survey and emergency preparedness hazards assessment (EPHA) that were performed by the PXSO authorization basis group and the NNSA Office of Emergency Management Implementation (NA-43).

PXSO has utilized the performance evaluation plan as an effective tool to foster improvement in the emergency preparedness program, and the PXSO program manager is responsible for negotiating performance measures and monitoring contractor performance for the emergency preparedness section of the performance evaluation plan. Fiscal year 2004 performance measures, all of which were accomplished, were closely tied to the completion of corrective actions stemming from the previous OA inspection. These corrective actions included completing the hazards survey and revising the EPHA and emergency action levels (EALs). Fiscal year 2005 performance measures are also appropriately focused on continued improvements in BWXT's program, and include a goal to develop programmatic metrics for assessing program health in succeeding years. Progress in achieving the performance measures is routinely monitored, discussed periodically with the BWXT EMD manager and responsible line managers, and formally evaluated at the end of the year.

PXSO assessment activities are governed by an appropriate set of site office procedures that establish the roles, responsibilities, and processes for performing assessments. The assessment procedure includes instructions for preparing a line oversight plan and schedule, encourages the use of performance-based assessments, establishes assignments for tracking corrective actions, and provides formats for key assessment documents. The line oversight plan, based on the NNSA policy regarding line oversight and contractor assurance, provides additional details on expected assessment activities and includes the schedule for emergency management oversight activities. The oversight approach includes either observing an oversight activity conducted by BWXT (shadowing) or evaluating activities for each of the program elements during the fiscal year. According to this plan, evaluation activities may include observations, which are informally documented, or formally documented assessments.

The PXSO emergency management line oversight schedules for 2004 and 2005 included shadowing or evaluation activities for each of the emergency management functional areas. The program manager has closely monitored the BWXT self-assessment program through review of the self-assessment plans and reports and participation in post-assessment corrective action meetings. During 2004, PXSO and BWXT personnel conducted a joint management assessment of the EAL process. As noted above, PXSO oversight activities have also included formal review, comment, and approval for emergency preparedness documents and procedures, observation of drills and exercises, and formal review of BWXT corrective actions from the previous OA inspection. However, as previously identified in the 2002 OA inspection, PXSO has not established a program to conduct formal, documented assessments to address the BWXT program elements over a three-year cycle.

Finding #7: PXSO has not implemented a program for conducting formal, documented assessments of the Pantex emergency management program, as required by DOE Order 151.1B and PXSO Procedure 110.2.1, *PXSO Assessment Program*.

PXSO oversight activities have also included extensive follow-up reviews to verify closure of corrective actions resulting from the 2002 OA inspection. These activities were well supported by NA-43 through the performance of two verification assist visits. Reviewers from NA-43 examined the evidence packages associated with the corrective actions, and concluded that most actions, including those related to the hazards survey, EPHA, and EALs, were completed. The reports of the reviews indicate that the appraisals were generally thorough and detailed. For example, in one instance the reviewer requested that additional information be provided to support closure of the action associated with development of a plan for the integrated hazardous material control system. In another instance, the reviewer indicated that a corrective action was not implemented due to insufficient data to verify effectiveness. Following the assist visits, PXSO closed the corrective actions (though some conditions were placed on the closure of three of the actions), and PXSO continued to monitor BWXT corrective action implementation. Based on the conditional closures, PXSO requested that BWXT conduct a self-assessment of the corrective actions in the fall of 2004. PXSO also identified problems with the implementation of the integrated hazardous material control system in late 2004, and took appropriate actions to ensure that BWXT addressed the problems and moved implementation of the system forward.

Finally, in February 2005 PXSO completed an effectiveness review of the completed corrective actions; this review consisted primarily of interviews and document reviews.

While the overall verification and validation efforts by PXSO and NNSA were significant, in a few cases, weaknesses in the corrective action implementation were not identified. For example, the review of the corrective actions for training weaknesses did not identify that emergency response organization personnel were not required to demonstrate proficiency prior to assignment to the roster, as specified in the corrective action plan. The verification and validation reviews were based primarily on interviews and document reviews, and did not include a significant number of performance-based observations. Consequently, the effectiveness of some actions was not validated. For example, as noted in Appendix C, the site's hazards screening procedure appropriately addresses the analysis of hazardous chemicals that are expected to exceed a protective action criterion beyond 30 meters. But the fact that this screening process was not utilized was not identified in the verification and validation reviews.

To summarize, PXSO is regularly engaged in oversight of the BWXT emergency management program, and has received significant support from NA-43 in executing its line oversight responsibilities. Both PXSO and NA-43 were actively involved in the review of BWXT emergency preparedness documents, such as the hazards survey and EPHA, and follow-on reviews of closed corrective action packages stemming from the 2002 OA inspection. PXSO also effectively utilized the performance evaluation plan to encourage and track emergency preparedness program improvements. However, notwithstanding the line oversight and informal assessment activities being performed by PXSO, the corrective action tracking system item related to the previous OA finding was prematurely closed in that PXSO has not conducted formal, documented assessments of the BWXT emergency management program. Furthermore, reviews of past corrective actions were not fully effective in identifying weaknesses in implementation.

F.2.2 BWXT Feedback and Improvement

The November 2002 OA inspection determined that the BWXT self-assessment program for emergency management included all of the essential elements of an effective program, and the program was being supplemented by Quality Assurance Division independent assessments. Program enhancements had also been identified and were being implemented outside of any formal assessment program. However, the emergency management self-assessment program did not meet either BWXT requirements or DOE/NNSA expectations in terms of frequency, scope, or rigor; weaknesses identified by external and internal assessments had not been consistently identified and corrected; and the use of different tracking systems based on the source of the identified issue hindered the identification of performance trends and recurring problems. This 2005 inspection revealed that improvements have been made in the implementation of the BWXT self-assessment and issues management programs supporting the EMD.

Since the previous OA inspection, BWXT has improved its ability to track issues and corrective actions. Implementation of a sitewide electronic status tracking and routing system (ESTARS) has provided EMD with an excellent tool for planning and conducting assessments and tracking corrective actions to closure. Issues identified for follow-up in the assessment and exercise programs are entered into the problem evaluation request (PER) system and subsequently into ESTARS. The closure process incorporates quality assurance verification of closure documentation. BWXT EMD staff have effectively utilized this system to track its corrective actions to closure. Weekly status reports provide easy visual identification of actions that are overdue, upcoming for completion, and awaiting verification; and review of the consolidated findings reports for fiscal years 2004 and 2005 indicates that corrective actions are being appropriately tracked and closed in a timely fashion.

Annually, BWXT prepares an emergency readiness assurance plan (ERAP) that provides an excellent, detailed summary of the Pantex program, status, and plans, and fully addresses the areas specified for inclusion by the DOE Order 151.1B companion emergency management guide. The ERAP provides consolidated information for both the BWXT and PXSO programs. The plan provides key line managers with sufficiently comprehensive information to develop an overall understanding of program status and needs, including planned and completed drills and exercises, status of assessments, major outstanding findings, and projected resource requirements.

The Pantex readiness assurance program plan includes a self-assessment element that annually reviews each of the emergency management functional

elements, as well as additional related topics and national asset programs. Roles and responsibilities for the program are defined in the Pantex emergency management plan. Sitewide procedures govern the overall conduct of assessments, which are implemented through a detailed internal operating procedure. The internal operating procedure contains appropriate guidance for the conduct and follow-up of assessments, including:

- Use of evaluation criteria from the DOE Emergency Management Guide
- Preparation of an assessment plan
- Formal documentation of results
- Entry of findings in the PER system
- Closure requirements for corrective actions.

EMD personnel have conducted the self-assessments as scheduled, and the OA review of the assessment program indicates that it has shown steady improvement in rigor, completeness, and application of lessons learned since its implementation. For example, an improved level of expectations and thoroughness is evidenced by an increase in the number of weaknesses and opportunities for improvement that are identified in more recent reports. Similarly, an internal decision to include weaknesses and opportunities for improvement in the corrective action system has resulted in a significant increase in the number of improvement actions being tracked to closure. Finally, the incorporation of a follow-on corrective action planning meeting for the assessments has resulted in improvements in the development of corrective actions that adequately address the issues identified in the findings. One area of weakness is that while the emergency management program self-assessments have focused appropriately on ensuring that the procedural foundation for the emergency management program meets requirements, this focus on procedure content, rather than on observations of performance or review of output documents, has partially limited assessment effectiveness. For example, a self-assessment of protective actions evaluated as satisfactory the ability to implement effective shelter-in-place actions based on the existence of direction contained in a high-level response procedure rather than verifying that facilities have procedures and processes in place and can perform the required protective actions.

BWXT feedback and improvement efforts were also directed toward the implementation of corrective actions following the 2002 OA inspection. The corrective actions intended to address the findings from that inspection were completed in a timely manner and, as noted in Appendix C, resulted in significant improvements in the hazards survey, EPHA, and EALs. As discussed above, BWXT has implemented a comprehensive self-assessment process that has shown steady improvement over the past year and a half. Similarly, improvements are evident in the execution of training and drills, and in the plans and procedures that support timely, accurate response to an emergency. However, not all the actions have been effective in addressing the previous findings. The enhancement to the work control process intended to address concerns regarding maintenance of the EPHA is not yet implemented. While the training program is improved, the actions necessary to ensure that the ability of ERO personnel to perform their position responsibilities is demonstrated prior to being placed on the roster have not been implemented. Additionally, improvements in the drill program have not been carried over into the exercise program.

To summarize, since the previous OA inspection, BWXT has improved both the self-assessment and issues management processes that support EMD. Self-assessments of each of the emergency management functions are being conducted annually in accordance with site and departmental procedures, and the assessment and issues management processes have been improved through continued application of lessons learned. The implementation of the sitewide PER/ESTARS has provided EMD with an effective tool for supporting self-assessments and tracking the issues resulting from both the self-assessments and the drill and exercise program. The status of and projected initiatives for the emergency preparedness program are accurately captured in a comprehensive ERAP. Following the previous OA inspection, BWXT identified and implemented a significant number of corrective actions to address the inspection findings, and conducted two self-assessments to verify completion of the actions. PXSO and NNSA also completed two verification reviews and an effectiveness review. Nevertheless, a few of the corrective actions have been ineffective in addressing the underlying issues identified in the findings and signal a need for increased attention to the process by which corrective actions are examined for closure.

F.3 Conclusions

Following the November 2002 OA inspection, both PXSO and BWXT implemented actions that have led to improvements in the site's emergency management program. PXSO assigned an individual with direct responsibility for oversight and monitoring of the program, and effectively applied contract performance measures to guide and manage programmatic upgrades. PXSO also has engaged in both informal and formal oversight activities of the site program, and was significantly supported by NA-43 in the review of the Pantex hazards survey and EPHA and verification reviews of corrective action closure packages. BWXT has implemented a formal self-assessment program that addresses the applicable programmatic elements using the evaluation criteria of the DOE Emergency Management Guide, and the EMD has applied lessons learned from the self-assessment process to identify and execute improvements to the program. Additionally, EMD has successfully utilized the sitewide issues management system to ensure that identified weaknesses and opportunities for improvement are addressed in a timely manner and tracked to closure. Finally, program status and plans are effectively communicated through the ERAP. Although feedback and improvement activities at the site could be further improved by stressing the use of performance-based observations of procedural implementation to identify program weaknesses, overall, the site's efforts to address previously identified weaknesses and sustain improvement momentum are notable.

F.4 Ratings

A rating of EFFECTIVE PERFORMANCE is assigned to the area of NNSA line program management.

A rating of EFFECTIVE PERFORMANCE is assigned to the area of BWXT feedback and improvement.

F.5 Opportunities for Improvement

This OA inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Pantex Site Office

- Strengthen the formal assessment program through the development of a resource-loaded assessment plan. Specific attributes to consider in development and use of the plan include:
  - Identify the assessments needed to address each of the emergency management program functional areas, and devise a schedule that facilitates conducting and documenting the assessments over a three-year cycle.
  - Identify the resources needed to complete the assessment plan, and for activities that require outside expertise, identify how that expertise will be obtained.
  - Integrate the PXSO functional assessment schedule with the BWXT self-assessments, evaluated exercises, and external assessments.
  - Balance assessments of documents with assessments of field implementation of the documents.
  - Review the training and experience of personnel conducting self-assessments to ensure that they have the appropriate background to enable them to identify the expected standards of performance in the areas being evaluated.
  - Include the updated assessment plan in the ERAP.

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- Enhance the ability of the self-assessment program to identify and correct weaknesses in the emergency management program. Specific actions to consider include:
  - Revamp the assessment schedule to balance assessments that primarily focus on document reviews with performance-based assessments

that evaluate field implementation of those documents.

- Conduct targeted and in-depth assessments of critical portions of a functional area rather than broader and shallower assessments of the entire functional area.

- Identify the resources needed to complete the scheduled assessments, and periodically use independent personnel, either internal or external to the department, to plan and conduct the self-assessment.

- Review the training and experience of personnel conducting self-assessments to ensure that they have the appropriate background to enable them to identify the expected standards of performance in the areas being evaluated.

• To further improve the site's corrective action processes, consider implementing the following actions:

- Ensure that corrective action plans incorporate activities for verifying completion of the corrective action and validating effectiveness of the corrective action.

- Improve the effectiveness of corrective actions by conducting specific training on the changes, especially procedure changes, for emergency response personnel.

- When appropriate, verify the effectiveness of corrective actions for specific findings as they are completed, rather than waiting until the entire corrective action plan is completed.

- Incorporate performance-based assessments as part of the process for verifying the effectiveness of corrective actions.

- When validation activities identify continuing weaknesses, conduct formal appraisals of the need to either re-open the finding or open a new finding associated with the original finding.