

Summary Report

Inspection of
Environment, Safety, and Health Management
and Emergency Management
at the

Pantex Plant



November 2002

Office of Independent Oversight and Performance Assurance
Office of the Secretary of Energy

OVERSIGHT

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Abbreviations Used in This Report

AAAHC	Accreditation Association for Ambulatory Health Care
BWXT	BWXT Pantex, LLC
DOE	U.S. Department of Energy
EAL	Emergency Action Level
ERO	Emergency Response Organization
ES&H	Environment, Safety, and Health
ISM	Integrated Safety Management
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
OASO	Office of Amarillo Site Operations
PEHA	Plant Emergency Hazards Assessment
PSS	Plant Shift Superintendent

Introduction

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA) conducted an inspection of environment, safety, and health (ES&H) and emergency management programs at the National Nuclear Security Administration (NNSA) Pantex Plant in October and November 2002. The inspection was performed as a joint effort by the OA Office of Environment, Safety and Health Evaluations and the Office of Emergency Management Oversight.



Aerial View of the Pantex Plant

Background

The Pantex plant is located in the Texas Panhandle, approximately 17 miles northeast of Amarillo, Texas. The site encompasses approximately 9,000 acres of U.S. Department of Energy (DOE)-owned property, about 2,000 of which are used to conduct the programmatic operations.

The primary mission of the Pantex Plant is the assembly, disassembly, testing, and evaluation of nuclear weapons in support of the NNSA stockpile stewardship program. Pantex also performs research and development in conventional high explosives, and serves as an interim storage site for plutonium pits removed from dismantled weapons.

Pantex Plant activities involve various potential hazards that need to be effectively controlled.

These hazards include exposure to external radiation, radiological contamination, nuclear criticality, high explosives, beryllium, hazardous chemicals, and various physical hazards associated with facility operations (e.g., machine operations, high-voltage electrical equipment, pressurized systems, and noise). Significant quantities of radioactive materials and hazardous chemicals are present in various forms at the Pantex Plant.

The NNSA Office of the Deputy Administrator for Defense Programs is the lead program secretarial office for the Pantex Plant. As such, it has overall Headquarters responsibility for programmatic direction, funding of activities, ES&H, and emergency management at the site. At the site level, NNSA line management responsibility for Pantex operations, ES&H, and emergency management falls under the Director of the Office of Amarillo Site Operations (OASO). The Pantex Plant is managed and operated by BWXT Pantex, LLC (BWXT), under contract to DOE.

Throughout the evaluation of ES&H programs, OA reviews the role of NNSA organizations in providing direction to contractors and conducting line management oversight of the contractor activities. OA is placing more emphasis on the review of contractor self-assessments and NNSA line management oversight in ensuring effective ES&H and emergency management programs. In reviewing NNSA line management oversight, OA focused on the effectiveness of NNSA and OASO in managing the Pantex Plant contractor, including such management functions as setting expectations, providing implementation guidance, allocating resources, monitoring and assessing contractor performance, and monitoring/evaluating contractor self-assessments. Similarly, OA focuses on the effectiveness of the contractor self-assessment programs. DOE orders require that contractors establish self-assessment programs that review all aspects of ES&H and emergency management performance.

ES&H Review Scope and Overview

The purpose of the ES&H portion of this inspection was to assess the effectiveness of selected aspects of ES&H management as implemented by BWXT, under the direction of OASO. The ES&H portion of the inspection was organized to evaluate three related aspects of the integrated safety management (ISM) program: implementation of selected guiding principles of ISM by OASO and BWXT, OASO and BWXT feedback and continuous improvement systems, and implementation of the core functions of safety management for various work activities at the Pantex Plant.

The OA inspection team used a selective sampling approach to determine the effectiveness of OASO and BWXT in implementing DOE requirements. The approach involved examining selected institutional programs that support the ISM program, such as OASO and BWXT assessment programs. To determine the effectiveness of the institutional programs, the OA team examined implementation of requirements at selected Pantex Plant organizations and facilities. Specific activities reviewed by OA included selected aspects of nuclear explosives operations, nuclear facility operations, high explosives operations, maintenance, waste management, groundwater protection, and subcontractor activities. Selected engineered safety-related systems were also reviewed.

As discussed throughout this report, many aspects of the Pantex Plant ISM program are effective. Hazards analysis and controls for the highest hazard operations at the Pantex Plant (i.e., nuclear explosives operations) are particularly rigorous and effective. OASO and BWXT line management have made substantial progress in improving ISM at the Pantex Plant in recent years and have a number of ongoing initiatives. However, weaknesses were identified in certain aspects of ISM implementation, including responsibilities for safety of subcontracted activities, BWXT feedback and improvement programs, and certain aspects of hazard analysis and controls. Although OASO and BWXT have addressed some of the identified deficiencies and have plans to address others, continued senior management attention is needed to address subcontractor requirements and monitoring programs and to ensure that the management assessment and corrective action management processes are improved.

Emergency Management Scope and Overview

OA evaluated progress since the August 2000 emergency management exercise evaluation in addressing key emergency response concerns. The inspection team also conducted tabletop performance tests with a sample of the site's key initial decision-makers to evaluate their ability to employ available tools and skills when responding to postulated emergency conditions.

The results of this review indicate that, overall, BWXT initial decision-makers are experienced and are adequately prepared to implement an effective response to the emergency events analyzed in the Pantex Plant emergency hazards assessment (PEHA). In addition, OASO and BWXT maintain effective interfaces with offsite agencies, and the significant level of sitewide drill activity provides the emergency response organization (ERO) with many opportunities to maintain proficiency. However, the OA team identified a number of significant programmatic and implementation concerns in the areas of PEHA methodology, categorization and classification processes, and training and qualification program rigor that limit the level of emergency preparedness. In addition, OASO and BWXT have not implemented effective continuous improvement processes that can systematically identify and address weaknesses in the Pantex emergency management program. During this inspection, BWXT promptly implemented compensatory actions in response to the discovery of significant discrepancies between the facility-specific hazardous material inventory and PEHA analytical assumptions for a storage magazine. Nonetheless, immediate line management attention is necessary to address critical weaknesses in the processes by which hazardous materials are inventoried, tracked, and reported to the BWXT emergency management department for use in the PEHA.

Organization of the Report

Section 2 of this volume provides an overall discussion of the results of the review of the Pantex Plant ES&H and emergency management programs, including positive aspects and weaknesses. Section 3 provides OA's conclusions regarding the overall

effectiveness of the OASO and BWXT implementation of the ES&H and emergency management programs. Section 4 presents the ratings assigned during this review. Appendix A provides supplemental information, including team composition. Appendix B identifies the specific findings that require corrective action and follow-up.

More detailed information on the inspection results is contained in two separate volumes of the report,

which were provided to OASO management and which are available to other DOE sites on request. Volume I provides more detailed information on the results of the review of the Pantex Plant ES&H programs. Volume II provides more detailed information on the results of the review of the Pantex Plant emergency management program.

2.1 Positive Attributes

ES&H Positive Attributes

Several positive attributes were identified in the Pantex Plant institutional ISM program. Many aspects of ISM implementation at the facility and activity level were also effective.

OASO senior management has established appropriate priorities and is focusing its limited resources on those priorities. Completion of the safety basis documentation necessary to meet the milestones in the Integrated Weapons Activity Plan is appropriately identified as a high-priority item. To support this goal, the OASO has created a number of safety basis review teams to support and monitor BWXT's efforts to complete authorization basis documents in accordance with established milestones. These teams implement the mechanism for reviewing and approving safety basis documents and are responsible for ensuring that accurate and complete information on the effectiveness of Pantex Plant safety systems is provided to the OASO Director so that informed decisions on the acceptability of residual risks can be made on a timely basis. OASO senior management has analyzed the impacts of this project on other line management oversight activities and has appropriately established priorities and allocated OASO ES&H personnel resources accordingly.

BWXT management has an effective system in place for establishing and implementing roles and responsibilities and assigning organizational and individual accountability for safety performance. A comprehensive policy directive formally assigns roles and responsibilities to each BWXT division. Roles and responsibilities established at the institutional level provide an effective framework for further flowdown and implementation for such functions as planning and work authorization for manufacturing activities. Accountability for safety performance is evident within divisions and is communicated effectively through division-level

documents that flow down to lower levels of the organization. BWXT senior management maintains a "Top 25" list of management expectations, including those related to safety, which have been assigned to specific division managers and incorporated into their individual performance expectations. Recently, BWXT initiated its "Goal Deployment" as a process for the flowdown of these "Top 25" performance objectives to all levels of the organization, where they will be tailored and incorporated into individual exempt employee performance expectations to strengthen accountability for safety performance throughout the organization. In addition, safety performance is a major component of individual performance appraisals.



High Explosives Fabrication Activities

OASO and BWXT safety initiatives are improving the safety of nuclear explosives operations, other nuclear operations, and high explosives activities. The SS21 initiative (a major ongoing effort to reengineer nuclear explosives operations to increase efficiency and enhance safety) has resulted in improved procedures, better tools, and a safer methodology for activities in weapons programs. Workers and supervisors have accepted the SS21 processes and view them as genuine improvements in safety. In addition, the high level of management priority and attention placed on procedure compliance has

resulted in a significant reduction in procedure violations. The increased management attention has also resulted in other enhancements in safety processes, such as a more coordinated approach to nuclear explosive movements between buildings, and improved methodologies for implementing procedures for the highest hazard nuclear activities, such as pit repackaging and disassembly, and inspection of nuclear weapons. BWXT has also rigorously implemented Occupational Safety and Health Administration (OSHA) process safety management regulations. In the absence of clear regulatory guidance for developing an authorization basis for non-nuclear facilities, BWXT has effectively used the process safety management principles to establish a safety basis for non-nuclear facilities, and has integrated process safety management requirements with ISM principles. The process safety management requirements are applied to all explosive manufacturing processes and have resulted in a more robust safety and health program for explosives operations, particularly in areas of employee participation, process hazards analysis, operating procedures, training, compliance audits, change management, and mechanical integrity.

The Pantex Plant radiation safety program is well documented and characterizes radiation hazards effectively. The program is well documented and has effective implementing manuals, which appropriately flowdown DOE requirements (with one exception related to high-radiation areas). For example, the Pantex Plant Radiation Safety Department Workplace Monitoring and Control Manual and the Operations Control Manual are comprehensive and provide a high level of detail regarding radiation safety practices to be followed in support of occupational and environmental radiation protection regulations and DOE orders. BWXT has implemented a rigorous program for characterizing radiation levels and contamination potential of the various nuclear components handled at Pantex and has assimilated a vast amount of radiological characterization data. Radiological information gathered as part of this program is used as a basis for establishing appropriate radiological controls and is included in training and various operator aids for all production technicians working near nuclear components. The radiation program and SS21 process have focused extensively on radiation dose reduction. In this area, the Pantex Plant has had significant success as evidenced by their ability to hold cumulative radiation doses near previous levels during a period where they essentially doubled their radioactive work activities (i.e., throughput of pit repackaging).

In coordination with OASO, BWXT has implemented several effective and aggressive environmental initiatives. The waste management program effectively characterizes the waste streams that will be generated at operational facilities in a manner that facilitates consideration of pollution prevention opportunities. It also ensures effective waste management because each waste stream is identified, and specific containers are provided for each type of waste. In addition, the weapons programs and high explosives operations have included waste management provisions into operating procedures. Overall, waste management is an integral part of the Pantex Plant mission and operations. OASO and BWXT have also been aggressive in addressing legacy environmental concerns. They have implemented two groundwater interim remediation actions, and significantly reduced legacy wastes. BWXT has also initiated actions to enhance the Pantex Plant environmental management system in anticipation of the new DOE order for environmental protection, which will establish a requirement for a systematic approach to environmental management.

The BWXT occupational medical program has achieved reaccreditation. The Pantex occupational medical program successfully upheld their ambulatory health care certification following a site visit by the Accreditation Association for Ambulatory Health Care (AAAHC) in May 2002. The accreditation program promotes feedback and quality improvement principles through the successful application of nationally recognized standards and criteria. Originally accredited in 1998, BWXT is the second DOE contractor medical program to renew their national certification. The AAAHC surveyor recognized the BWXT medical staff for excellence in record keeping, overall documentation of medical program delivery, and medical intervention activities. Several written procedures, patient handouts, clinical forms, and statistical documents were identified as innovative and particularly thorough and clear.

Emergency Management Positive Attributes

OASO and BWXT have established an appropriate framework for an effective Pantex emergency management program, and many elements have been adequately implemented. Positive attributes of the emergency management program are discussed below.



Nuclear Explosives Movement Activity

Initial decision-makers demonstrated generally effective performance during tabletop performance tests. With few exceptions, BWXT plant shift superintendents (PSSs) effectively executed the key activities of event categorization/classification, preparation and transmittal of initial and follow-up notifications, and implementation of predetermined protective actions. Initial on-scene security and fire shift commanders effectively established on-scene command in accordance with established protocols and appropriately isolated the affected facility while protecting security and fire department responders. Both groups of responders used job aids and procedures effectively.

OASO and BWXT have established and are maintaining effective interfaces with offsite agencies, and have implemented an effective public education program. Through the protocols established by an agreement in principle between NNSA and the State of Texas, OASO and BWXT have expended significant effort to work cooperatively with offsite agencies to improve the level of emergency preparedness throughout the region and to address the emergency management concerns of offsite agencies. Furthermore, through such mechanisms as an annual calendar provided to residents within the emergency planning zone and a dedicated segment of the telephone directory, the public is informed of emergency response plans, notification and warning systems, and protective actions.

The Pantex drill and exercise program provides numerous opportunities for BWXT and OASO emergency responders to maintain emergency response proficiency. BWXT uses site-

level drills, 14 of which were conducted in calendar year 2002, to integrate operational and emergency response at the division level. These, combined with the annual exercise, afford the necessary practice opportunities for a large ERO while providing frequent opportunities to identify response areas needing improvement. In addition, this level of activity provides confidence that the ERO can respond effectively to site events having a wide range of severity.

2.2 Program Weaknesses

ES&H Program Weaknesses

Although the framework for the Pantex Plant ISM program is sound, weaknesses were identified in certain aspects of requirements implementation for some types of work activities. In addition, certain aspects of OASO and BWXT feedback and improvement systems need additional improvement.

ES&H requirements established in the DOE/BWXT contract have not been fully conveyed to or implemented by BWXT subcontractors. While safety performance indicators demonstrate improvements in the safety performance of BWXT employees over the past two years, the indicators for subcontractor employees have not shown significant improvement. In accordance with the DOE/BWXT contract, BWXT is responsible for compliance with the contractual ES&H requirements, regardless of whether the work is performed by BWXT employees or by BWXT subcontractors. However, the ES&H provisions in contracts awarded by BWXT have not always been sufficiently specific to communicate expectations. Some DOE ES&H requirements are not clearly imposed through subcontracts to BWXT or consistently included in safe work permits or other ES&H documents. Areas where DOE ES&H requirements were not addressed include exposure limits, medical programs, and operating procedures. In some cases, subcontractors and BWXT employees could be working in the same facilities, performing similar work activities, and encountering the same hazards, but be subject to different requirements, providing different levels of protection. In addition, training requirements were not documented or implemented in some cases. Further, BWXT monitoring of subcontractors has not always been effective in ensuring that ES&H requirements are incorporated in procedures and implemented by subcontractors. The roles and responsibilities for the

safety engineers who are responsible for monitoring subcontractors are not well defined, and the engineers were not aware of the requirement to assure compliance with the ES&H requirements specified in the contract. OASO has not focused on subcontractor performance, and the BWXT contractual performance metric, approved by OASO, for reducing injury and illness rates at the Pantex Plant accounts for BWXT employees only and does not include subcontractor employees. Similar weaknesses in this area were identified through previous BWXT self-assessments but were not addressed fully and effectively.

BWXT management assessment and issue management processes and their implementation do not ensure that deficiencies in ES&H programs are identified, documented, evaluated, and resolved and that recurrence controls are implemented in a consistently appropriate and timely fashion. BWXT has implemented many mechanisms to provide feedback and improvement in safety performance at the Pantex Plant. However, there are continuing process and implementation weaknesses in the BWXT management assessment and issue management processes that have hindered the effectiveness of these mechanisms in driving consistent, continuous improvement, especially in reporting and managing the evaluation and resolution of safety deficiencies. Management assessment programs are not always scheduled and performed as required, and assessment results are not always entered into deficiency tracking systems. ES&H incidents and deficiencies were not properly documented and investigated in some cases; adverse trends and repetitive incidents were not always analyzed; the extent of condition and causes were not always assessed; recurrence controls were not always properly established; and implementation of actions was not always timely and effective. Further, corrective actions for significant, systemic issues have not always been effectively coordinated, with established milestones, clear acceptance criteria, and timely monitoring to verify completion and effectiveness of the corrective action.

Pantex Plant line management has not ensured that all potential high-radiation areas are properly identified, designated, and controlled, in accordance with site and DOE requirements. The controls for nuclear explosives and pit repackaging procedures were not sufficiently defined or implemented to ensure that DOE-defined high-radiation areas (i.e., areas where the dose could exceed 100 millirem in one hour at 30 centimeters) are properly



Nuclear Explosives Operations Activities

identified and controlled. Nuclear explosives operations and pit repackaging efforts routinely expose sources of radiation with dose rates greater than 100 millirem per hour at 30 centimeters. Because of the potential for a higher dose, DOE requires that areas with high-radiation fields be designated as high-radiation areas and that more rigorous controls be implemented. Although unlikely to occur with current practices, there are currently no positive procedural restrictions (e.g., time limits/logging) or other controls that would ensure that the radiation source is not exposed long enough for an individual to receive a dose of 100 millirem in a one-hour period.

Emergency Management Program Weaknesses

The OA team identified several key weaknesses in the PEHA that are particularly significant because the PEHA is the foundation of the emergency management program. Concerns arising from inadequate definition or inconsistent implementation in several other important program elements were noted as well. Specific weaknesses are discussed below.

The PEHA does not adequately define or bound the range of events for which emergency plans must be developed. As a result of weaknesses in the site processes for identifying and tracking hazardous material inventories, the PEHA does not reflect actual quantities of materials that may be involved in a postulated event. In two instances, walkdowns of facilities chosen at random revealed the presence of significant quantities of hazardous materials that were either substantially understated in or missing from the PEHA analyses. The PEHA also does not

accurately assess the consequences of the full spectrum of postulated events because (1) some low-probability, high-consequence events were either removed from consideration due to application of an arbitrary frequency cutoff or are absent altogether, and (2) weaknesses in analytical methodologies and assumptions limit the validity of results from event analyses. Furthermore, predetermined protective actions are not explicitly based on the associated event consequences, so protective actions for site workers and protective action recommendations for offsite authorities and the public within the emergency planning zone may not be appropriate. Additionally, the methodology for identifying and classifying events at levels below that of a General Emergency is faulty due to improper consideration of several key classification concepts. Finally, the rigor of the PEHA is diminished by lapses in the quality and completeness of documentation.

Emergency action levels (EALs) and emergency plan implementing procedures do not adequately support prompt and accurate decision-making. BWXT has not developed a complete set of EALs (which are critical for timely and accurate categorization/classification and protective action formulation) that can be easily implemented in a time-urgent, high-stress environment. The EAL set does not include some EALs for operational emergencies not requiring classification; some existing EALs reference indicators that are unclear or cannot actually be observed; and Emergency Management Department (EMD) protocols consider the EALs as guidance documents, thus permitting reduced rigor in their usage. As a result, event classifications may not be consistent, and the appropriate set of protective actions may not be communicated to affected populations. The potential for inconsistencies was demonstrated during PSS tabletop performance tests, when the same scenario and identical event conditions produced an Alert classification (and “stay clear of area” protective action) by one PSS and a General Emergency (and an emergency-planning-zone-wide shelter-in-place) by another PSS. Finally, BWXT has not developed a procedure to direct the overall categorization/classification process or to facilitate decision-making under unanticipated circumstances, such as multiple events or event initiators that affect multiple facilities. Most of these weaknesses were originally identified by OA during the August 2000 exercise evaluation.

The Pantex continuous improvement processes, as applied to the emergency management area, are not consistently effective in identifying weaknesses, developing and tracking corrective actions, and verifying effectiveness. BWXT self-assessments, sitewide drills, and exercises have identified few weaknesses or improvement items over the past several years, and those that were identified were seldom captured in a tracking system or had corrective actions formally developed and tracked to completion and verification. BWXT has permitted corrective actions to remain formally unresolved for extended periods of time, and in several cases, corrective actions for both internally- and OA-identified weaknesses have not been effective. Furthermore, although OASO and the Albuquerque Operations Office Transportation and Emergency Operations Division have conducted several specific oversight activities, the long-term absence of a dedicated emergency management program manager has significantly hindered OASO’s ability to effectively monitor the status of the Pantex emergency management program and provide the necessary guidance and feedback.

The Pantex training and qualification process does not ensure that emergency responders are prepared to assume their duties when they are added to the ERO roster, and the ERO refresher program is not comprehensive or consistently implemented. In order to fill vacancies left by personnel reassignments and turnover, OASO and BWXT emergency responders are routinely added to the ERO roster before they complete assigned initial training and qualification activities and without having to demonstrate their ability to adequately perform the associated duties if they were recalled for an actual event. The OA inspection team noted that at the time of the inspection, approximately 25 percent of the 279 personnel listed on the ERO roster either had not completed all of the initial qualification requirements for their position or had not satisfied their annual drill/exercise participation requirement. In addition, the content of the initial emergency response training courses is not geared to individual roles and responsibilities, and except for participation in an annual drill or exercise, formal annual refresher training has not been established for all ERO positions.

3.0

Conclusions

ES&H Program

Within the current operational alignment, OASO roles, responsibilities, and authorities are clearly assigned, understood, and implemented. OASO line management is overseeing site operations effectively and using contract mechanisms effectively to achieve accountability for ES&H performance. OASO has determined that they are understaffed in some ES&H areas and have scaled back some operational awareness activities while OASO ES&H staff focus on the high-priority authorization basis efforts. However, OASO appropriately uses and prioritizes existing resources to implement ES&H responsibilities.

NNSA and OASO are implementing the NNSA reengineering initiative, which is designed to increase the responsibility at the site offices. NNSA also plans to increase its reliance on the operating contractor's self-assessment program to evaluate ES&H performance. As a result, some of the current OASO line management oversight processes will be reevaluated and possibly modified or eliminated. OASO ES&H staffing levels need to be periodically reevaluated as the NNSA reengineering effort evolves.

BWXT senior management are actively involved in ES&H and are implementing important safety functions. With few exceptions, roles and responsibilities for ES&H are defined and understood. A strong working relationship with environmental regulators has been established, and the regulators understand that current management is committed to proactively addressing legacy problems.

Since the transition to BWXT in 2000, there have been significant improvements in ES&H programs, and BWXT has implemented a number of key initiatives to improve ES&H at the Pantex Plant. Safety professionals have been better integrated into work activities. BWXT has made progress in developing and approving authorization basis documents for nuclear facilities and operations. Significant management priority and attention has been given to improving hazard controls for nuclear explosives and other nuclear



Craft Activities

operations and associated maintenance activities. Preventive maintenance procedures have improved significantly in response to OASO observations.

These initiatives have contributed to improvements in ES&H programs, particularly in the areas of greatest potential hazards (i.e., nuclear explosives operations), and the improvements are evident in the performance indicators. There have been significant reductions in workplace injuries and illnesses among BWXT employees. Performance indicators for nuclear explosives operations procedures and procedural adherence, and observations during this inspection, indicate a marked improvement. The positive trend in recordable and lost time case rates is partly attributable to the implementation of the behavior-based safety program. The doses for pit repackaging have been reduced significantly, as evidenced by a twofold increase in the total pit repackaging throughput without a corresponding increase in worker dose.

Enhancements are needed in some aspects of BWXT feedback and improvement systems. BWXT has established and implemented processes for feedback and continuous improvement. Some of these processes, such as the BWXT independent assessment process, are working well,

and senior management actively seeks and utilizes performance information for improvement. Several new processes to facilitate improvement have been established, including the behavior-based safety program. However, some required management assessments are not being performed, and the implementation of issues management processes needs further improvement. Improvements in BWXT feedback and improvement processes are particularly important in light of the NNSA reengineering effort and the associated increased reliance on contractor self-assessments.

Also, BWXT processes do not ensure that applicable ES&H requirements are clearly communicated to subcontractors in contracts or other ES&H documents. Hazard controls for subcontracted work were different than those for work performed by BWXT employees. OASO and BWXT monitoring of subcontractors has not been sufficient to ensure that ES&H objectives are met in some areas, such as training. The injury and illness rates for subcontractor employees have remained relatively constant over the past few years, while BWXT injury and illness rates have improved considerably. OASO and BWXT management involvement will be needed to determine an appropriate set of corrective actions for tailoring and conveying requirements to subcontractors and ensuring effective implementation of those requirements.

Nuclear explosives operations, sealed insert operations, high explosives operations, maintenance, waste management, subcontracted work, and groundwater protection activities observed by the OA team were implemented safely and in accordance with ES&H requirements, with few exceptions. Processes for defining the scope of work for these activities are

defined and effectively implemented. Except for some aspects of subcontracted work, the processes for identifying and analyzing hazards are well established and documented. Most hazards associated with observed work were adequately identified, analyzed, and/or documented. In most respects, the authorization basis for nuclear operations provides appropriate analysis for the hazards and engineered systems that were evaluated (i.e., confinement and fire protection).

Although most aspects of ISM at the Pantex Plant are effective and the institutional processes are well designed, a few aspects of implementation need additional improvement. For example, sufficient procedural controls designed to ensure that high-radiation areas are properly identified and controlled for nuclear explosives and sealed insert operations were not in place. Also, some hazards associated with high explosives operations were not sufficiently analyzed and/or documented.

Overall, many aspects of the Pantex Plant ISM program are effective. Hazards analysis and controls for the highest hazard operations at the Pantex Plant (i.e., nuclear explosives operations) are particularly rigorous and effective. OASO and BWXT line management have substantially improved ISM at the Pantex Plant in recent years and continue to make improvements. The OASO Manager has effectively prioritized resources and is ensuring that an effective oversight program is implemented. OA observations indicate that work is being conducted safely, with few deficiencies.

However, weaknesses were identified in certain aspects of ISM implementation, including processes for ensuring subcontractor flowdown and implementation of requirements, BWXT management assessment and corrective action processes, and controls for high-radiation areas. Although OASO and BWXT have addressed some of the identified deficiencies and have plans to address others, continued senior management attention is needed to address subcontractor requirements and monitoring programs and to ensure that BWXT management assessment and issues management processes improve.

Emergency Management Program

The Pantex emergency management program has notable strengths in many programmatic elements. From an emergency preparedness perspective, BWXT has devoted considerable resources to an active drill and exercise program that regularly exercises emergency responder roles and responsibilities. BWXT



Groundwater Monitoring Station at Pantex

has been effective in preparing the PSSs, who are the site's key initial decision-makers, in their role as the interim emergency operations center incident commander; their effectiveness can be attributed to a combination of experience and the practice gained from drill participation. OASO and BWXT have been particularly effective in establishing and maintaining effective interfaces with offsite authorities, thereby benefiting the level of response preparedness throughout the region, and in implementing a public education program that significantly strengthens the ability of Pantex and local agencies to provide protective actions to the public in the unlikely event of an emergency at Pantex that has offsite consequences.

There are significant positive aspects to several other areas as well. The PEHA contains derived threshold planning quantities and protective action criteria for explosives (as a hazardous material), which are critical in defining the complete range of hazards to site workers. In the continuous improvement area, OASO has clearly established the responsibilities and requirements for NNSA line management oversight of the Pantex emergency management program. BWXT has established a framework for an effective self-assessment program and is in the process of implementing such additional improvements in assessment extent and rigor as the adoption of programmatic evaluation criteria contained in the DOE Order 151.1A emergency management guide. Furthermore, BWXT has implemented several meaningful improvements since the August 2000 OA exercise evaluation, including an electronic process for developing and transmitting the initial and follow-up event notification forms and an approach for initial on-scene decision-making that better integrates security and fire department functions while ensuring a clear chain of command.

The OA inspection team also identified several notable programmatic weaknesses, the most significant of which relates to the PEHA. The PEHA contains several fundamental deficiencies, including assumptions regarding hazardous material quantities (potentially available for release) that are inconsistent with actual facility inventories; a spectrum of potential initiating events that does not include several low-probability, high-consequence events; and errors in applying the event classification process. Additionally, predetermined protective actions have not been appropriately determined for site workers and the public. The collective impact is that the technical basis for initial response procedures and job aids does not ensure

that initial decision-makers have all of the guidance and direction necessary to appropriately protect site workers and the public from potentially-significant events. In addition, without a suitable PEHA basis, hazard reduction activities might not be appropriately considered or prioritized.



Isolation Door at the Pantex Plant

The overall effectiveness of the Pantex emergency management program is also hindered by notable weaknesses in the areas of plans and procedures; training, drills, and exercises; and continuous improvement. The existing EAL set does not adequately support timely and accurate event categorization and classification, as demonstrated during tabletop performance tests. The observed weaknesses in EAL implementation result primarily from ambiguous indicators in some EALs; the fact that several events requiring categorization are absent from the EAL set; and the inappropriate designation of EALs as guidance documents, rather than procedures. Together, these weaknesses allow differences in individual judgment and knowledge to unduly influence the categorization/classification process, particularly in high-stress situations when decision-making can be problematic. The ERO training program does not require that ERO candidates complete their training and demonstrate position-specific competence before they join the ERO, a practice that is inconsistent with BWXT sitewide and Departmental expectations for a performance-based ERO training and qualification program. Finally, there are numerous weaknesses in the OASO and BWXT assessment and corrective action/issues management processes that hamper consistent identification and satisfactory resolution of emergency management

issues. These weaknesses range from a lack of rigor in the scope of the self-assessment program to a process that does not promote the identification, capture, and tracking of weaknesses and items for improvement identified during drills and exercises. In addition, the extended absence of a dedicated OASO emergency management program manager is a considerable impediment to OASO's ability to effectively monitor the Pantex program and identify areas needing improvement. OASO management is aggressively attempting to fill the position; however, continued difficulty in this area represents a substantial challenge to management's ability to provide sufficient NNSA line management oversight.

Immediate BWXT line management attention is necessary to ensure that hazardous material inventories are accurately identified and included in PEHA analyses and, where inconsistencies are identified, to implement appropriate compensatory measures so that initial

decision-makers can adequately protect site workers and the public during an event at the affected facility. It should be noted that during this inspection, BWXT promptly implemented compensatory actions in response to OA concerns regarding significant discrepancies between the facility-specific hazardous material inventory and PEHA analytical assumptions for a storage magazine. Furthermore, in the short term, rigorous processes must be established and implemented to ensure that changes in hazardous material inventories, whether resulting from changes in process or material movement, do not produce unanalyzed event sequences or consequences. OASO and BWXT line management attention is also needed to implement rigorous assessment and corrective action mechanisms that will facilitate meaningful, long-term improvements in the Pantex emergency management program, as well as in the broader area of integrated safety management, as discussed above.

4.0 Ratings

The ratings reflect the current status of the reviewed elements of the Pantex Plant ISM and emergency management programs:

Safety Management System Ratings

Guiding Principle #2 – Clear Roles and Responsibilities	EFFECTIVE PERFORMANCE
Guiding Principle #5 – Identification of Standards and Requirements	EFFECTIVE PERFORMANCE

Feedback and Improvement

Core Function #5 – Feedback and Continuous Improvement	NEEDS IMPROVEMENT
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Pantex Plant Implementation of Core Functions for Selected Work Activities

Core Function #1 – Define the Scope of Work	EFFECTIVE PERFORMANCE
Core Function #2 – Analyze the Hazards	EFFECTIVE PERFORMANCE
Core Function #3 – Develop and Implement Hazard Controls	EFFECTIVE PERFORMANCE
Core Function #4 – Perform Work Within Controls	EFFECTIVE PERFORMANCE

Emergency Planning

Hazards Survey and Hazards Assessment	SIGNIFICANT WEAKNESS
Program Plans and Procedures	NEEDS IMPROVEMENT
Offsite Interfaces	EFFECTIVE PERFORMANCE

Emergency Preparedness

Training, Drill, and Exercise Program	NEEDS IMPROVEMENT
Emergency Public Information	EFFECTIVE PERFORMANCE

Emergency Response

BWXT Emergency Response Decision-Making	EFFECTIVE PERFORMANCE
OASO Emergency Response	EFFECTIVE PERFORMANCE

Readiness Assurance

NNSA Assessments and Performance Monitoring	NEEDS IMPROVEMENT
Contractor Assessments and Issues Management	NEEDS IMPROVEMENT

APPENDIX A

SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Scoping Visit	August 27 - 29, 2002
Onsite Inspection Visit	October 28 - November 7, 2002
Report Validation and Closeout	November 19 - 21, 2002

A.2 Review Team Composition

A.2.1 Management

Glenn S. Podonsky, Director, Office of Independent Oversight and Performance Assurance
Michael A. Kilpatrick, Deputy Director, Office of Independent Oversight and Performance Assurance
Patricia Worthington, Director, Office of Environment, Safety and Health Evaluations
Thomas Staker, Deputy Director, Office of Environment, Safety and Health Evaluations
Charles B. Lewis, Director, Office of Emergency Management Oversight
Kathy McCarty, Deputy Director, Office of Emergency Management Oversight

A.2.2 Quality Review Board

Michael A. Kilpatrick	Patricia Worthington
Charles B. Lewis	Dean C. Hickman
Robert M. Nelson	Douglas P. Trout

A.2.3 Review Team

Thomas Staker, Deputy Director, Office of Environment, Safety and Health Evaluations (Team Leader)

Safety Management Systems

Ali Ghovanlou (Topic Lead)
Al Gibson
Bernie Kokenge
Bob Compton (Feedback and Improvement)

ES&H Technical Team

Robert Freeman (Topic Lead)
Victor Crawford
Mark Good
Bo Kim (Oakland Operations Office)
Jim Lockridge
Thomas Naymick
Don Prevatte
Edward Stafford
Mario Vigliani
Thomas Watson

Emergency Management

Steven Simonson (Topic Lead)
Jeff Robertson
J.R. Dillenback
Steve Kirchhoff
Tom Mazour
Tom Rogers
David Schultz

A.2.4 Administrative Support

Lee Roginski
Tom Davis

APPENDIX B

SITE-SPECIFIC FINDINGS

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

ES&H FINDING STATEMENTS
1. BWXT has not established sufficient measures to ensure that ES&H requirements in its contract with DOE are appropriately tailored and communicated to subcontractors and fully and effectively implemented by subcontractors.
2. BWXT management assessment and issue management processes and their implementation do not ensure that deficiencies in ES&H and emergency management programs are identified, documented, evaluated, and resolved and that recurrence controls are implemented in a consistently appropriate and timely fashion.
3. NNSA and BWXT have not ensured that all potential high-radiation areas are properly identified, designated, and controlled, in accordance with site and DOE requirements.
EMERGENCY MANAGEMENT FINDING STATEMENTS
1. BWXT has not implemented mechanisms that appropriately identify, track, and assess all hazardous materials so that current inventories, changes in inventories, and changes in processes are adequately evaluated to support emergency planning and response, as required by DOE Order 151.1A, <i>Comprehensive Emergency Management System</i> .
2. BWXT has not accurately assessed an appropriate spectrum of emergency events and conditions or determined barrier failure indicators and predetermined protective actions based on event consequences, to provide the necessary technical basis for effective emergency response decision-making tools, as required by DOE Order 151.1A.
3. The BWXT emergency action levels, other implementing procedures, and current protocols for procedure use do not ensure that accurate emergency classifications and protective actions are communicated in a timely manner to site workers and offsite jurisdictions, as required by DOE Order 151.1A.
4. The Pantex emergency management training program does not ensure that ERO personnel have been trained and qualified in their assigned tasks, as required by the Pantex emergency plan and plant training standards.
5. The BWXT drill and exercise evaluation process does not ensure that program and performance weaknesses are identified and corrected, as required by the Pantex emergency plan, the plant standard on drills, and the exercise program implementing procedure.
6. OASO has not established a program for conducting assessments of the Pantex emergency management program, as required by DOE Order 151.1A, and has not been effective in identifying program weaknesses.
7. BWXT emergency management self-assessments are not sufficiently rigorous to consistently identify programmatic weaknesses, and program elements are not assessed annually, as required by DOE Order 151.1A.

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