Volume I
Summary Report

Independent Oversight
Inspection of
Environment, Safety,
and Health Programs
at the

Pantex Plant

February 2005

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

OVERSIGHT

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Abbreviations Used in This Report

BWXT	BWXT Pantex, LLC
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
ES&H	Environment, Safety, and Health
ISM	Integrated Safety Management
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
OSHA	Occupational Safety and Health Administration
PXSO	Pantex Site Office
SS21	Seamless Safety for the 21st Century

1.0 Introduction

The U.S. Department of Energy (DOE) Office of Independent Oversight and Performance Assurance (OA) conducted an inspection of environment, safety, and health (ES&H) programs at the DOE Pantex Plant during January and February 2005. The inspection was performed by the OA Office of Environment, Safety and Health Evaluations. OA reports to the Director of the Office of Security and Safety Performance Assurance, who reports directly to the Secretary of Energy.

Aerial View of the Pantex Plant

Within the DOE, the National Nuclear Security Administration (NNSA) has line management responsibility for the Pantex Plant. NNSA provides programmatic direction and funding for most nuclear weapons stockpile management, research and development, facility infrastructure activities, and ES&H program implementation at the Pantex Plant. At the site level, the NNSA Pantex Site Office (PXSO) has line management responsibility for the Pantex Plant. Under contract to DOE, the Pantex Plant is managed and operated by BWXT Pantex, LLC (BXWT), which has operated the Pantex Plant since 2001.

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 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 purpose of this OA inspection was to assess the effectiveness of ES&H programs at the Pantex Plant as implemented by BWXT under the direction of PXSO. Using a selective sampling approach, the OA inspection evaluated:

- BWXT implementation of the core functions of integrated safety management (ISM) for selected activities, including nuclear weapons program and Applied Technology Division programmatic work activities, maintenance activities, and construction work performed by subcontractors. OA focused primarily on implementation of ISM at the facility and activity levels.

- NNSA, PXSO, and BWXT feedback and continuous improvement systems and selected aspects of management roles, responsibilities, and authorities.

- Essential safety system functionality of several safety systems that are designed to prevent and mitigate accidents at the Pantex Plant, including cranes and hoists, blast valves, and contaminated waste isolation valves in nuclear weapons cells and bays.

- PXSO and BWXT effectiveness in managing and implementing selected aspects of the ES&H program that OA has identified as

focus areas, including hoisting and rigging, safety systems oversight, the chronic beryllium disease prevention program, implementation of DOE Order 450.1, *Environmental Protection Program*, and selected aspects of safety in protective force training. OA selects focus areas—areas that warrant increased attention across the DOE complex—based on a review of operating events and inspection results.

Sections 2 and 3 provide a discussion of the key positive attributes and weaknesses identified during this review. Section 4 provides a summary assessment of the effectiveness of the major ISM elements reviewed on this inspection. Section 5 provides OA's conclusions regarding the overall effectiveness of NNSA, PXSO, and BWXT management of the ES&H programs. Section 6 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.

Volume II of this report provides four technical appendices (C through F) containing detailed results of the OA review. Appendix C provides the results of the review of the application of the core functions of ISM for Pantex Plant work activities. Appendix D presents the results of the review of NNSA, PXSO, and BWXT

High Explosives Fabrication Activities

feedback and continuous improvement processes and management systems. Appendix E presents the results of the review of essential safety system functionality, and Appendix F presents the results of the review of safety management of the selected focus areas. For each of these areas, OA identified opportunities for improvement for consideration by DOE and contractor management. The opportunities for improvement are listed at the end of each appendix so that they can be considered in context of the status of the areas reviewed.

2.0 Positive Attributes

Several positive attributes were identified in ES&H implementation at the Pantex Plant. Work associated with nuclear weapons and explosive materials is conducted in accordance with detailed procedures and controls, and there are noteworthy aspects of waste management.

A high level of safety in nuclear explosive operations is ensured through rigorous controls and effective adherence to nuclear explosive operating procedures. Nuclear weapons program procedures contained a high level of detail and clearly defined scopes of work for nuclear explosive activities, and were generally very effective in providing task-specific controls at the procedure step where the control was needed. Production technicians demonstrated a high degree of knowledge of all observed nuclear explosive operations and performed their operations safely in accordance with the applicable nuclear explosive operating procedures. Activities were accomplished and verified through effective implementation of the procedure reader/worker/verifier system in accordance with the plant standards and the DOE order for safety of nuclear explosive operations.

Pantex Facilities Used for Explosive Operations

Training and qualification programs for nuclear and high explosives workers are extensive, well documented, and tailored to the workers' assigned responsibilities. High explosives equipment operators, scientists, and technicians are experienced, sufficiently trained, and current in their qualifications. Many operators have over twenty years of experience in their assigned work activities. A comprehensive training program for weapons program production technicians is in place to ensure initial and continuing qualification to perform weapons-related work. In addition, the on-the-job training programs for production technicians and within several Applied Technology departments are extensive and rigorous. Training lesson plans adequately address all aspects of the work activity, and competency is measured through examinations and proficiency tests. Numerous on-the-job training programs have been developed and conducted for many work activities.

PXSO and BWXT action to implement an environmental management system has several noteworthy aspects. The noteworthy aspects include: involvement and support by senior PXSO and BWXT management, a structured process for identifying risk-ranked objectives and targets that involves line managers, use of BWXT managers from line and support organizations for such functions as awareness training and environmental management system communication, and seeking certification of the Pantex environmental management system by the Texas Commission on Environmental Quality under the Clean Texas program. In addition, Pantex has a proactive award-winning pollution prevention program that is being expanded by use of an Affirmative Procurement Program Advocate.

Waste management operations effectively integrate waste stream management into weapons production, maintenance, and subcontractor functions using a noteworthy process for analyzing waste streams and implementing controls. The Process Information Flow is used to define and analyze waste streams within operating facilities so that specific controls can then be determined and implemented prior to waste generation. These controls include using the material evaluation form to characterize individual waste streams, and providing centrally located waste containers that

Nuclear Operations Facility

are properly labeled and tracked. In addition, specific controls for waste management have been imbedded within nuclear explosive operating procedures.

Many aspects of programs for ensuring essential system functionality are well defined and implemented. The newly developed safety analysis reports, in most instances, adequately define the safety function of safety systems and identify the controls. The technical safety requirement integrated implementing plan provides for detailed evaluation of controls to ensure that they are appropriate. A backfit process is being established to evaluate the need for upgrading older safety systems to current requirements. Configuration management within nuclear facilities continues to mature and is functioning well to control important plant records. BWXT has recently established a new systems engineering department and has established an appropriate manual guiding their activities. Technical specification surveillances and preventive maintenance procedures are well written and generally appropriate to ensure safety system functionality.

PXSO and BWXT management have implemented or initiated a number of safety enhancements. The Seamless Safety for the 21st Century (SS21) effort—a major, long-term effort to reengineer nuclear weapons processes to enhance quality and safety—continues to be effective in improving processes, procedures, and tools and is having a positive impact on safety. PXSO and BWXT have supported the behavior-based safety program, which has contributed to injury and illness rates that are lower than DOE averages and are showing improving trends. PXSO and BWXT have devoted significant attention and resources to various DOE-wide initiatives, such as implementation of the environmental management system and the chronic beryllium disease prevention program, and are implementing these programs effectively. Improvements in processes, issues management tools, and requirements have been made in response to previous OA inspection findings, including establishment of a new issues management system and flowdown of safety requirements to subcontractors. BWXT is currently implementing a program to upgrade the process hazards analysis to provide useful information, and recently hired a program director, reporting to the General Manager, to coordinate ISM across the site. A comprehensive Pantex Glove Callout Manual was developed to identify the appropriate type and material of gloves for a wide variety of chemicals. Further, PXSO and BWXT managers recognize the need for continued improvements in a number of areas, such as assessments, issues management, and subcontractor safety, and have taken or initiated a number of appropriate actions. For example, a board has been established to enhance subcontractor safety, and safety professionals have been added to the construction safety staff in an effort to correct recognized weaknesses in subcontractor safety programs.

3.0 Weaknesses

Although some aspects of ISM at the Pantex Plant are effective, there is insufficient rigor in the analysis of hazards and implementation of controls for certain processes and hazards, and weaknesses exist in feedback and improvement processes and in certain aspects of safety systems.

Processes for performing activity-level hazards analysis, conducting exposure assessments, and ensuring that hazard controls are established and communicated to workers are not sufficiently effective to ensure that workers are protected against the full range of potential hazards. With the exception of nuclear explosive and explosive hazards, BWXT management has not assured that hazards are analyzed and documented and that controls are specified for work activities prior to authorization of the work. In addition, BWXT has not implemented a comprehensive exposure assessment program that uses recognized exposure assessment methodologies. Elements of the BWXT programs for implementing the requirements of the Occupational Safety and Health Administration (OSHA) process safety management standard have not been effectively executed with respect to legacy process hazards analysis, operating procedures, process safety information, management of change, and audits. BWXT has not ensured that all hazard controls are specified in safe work plans, activity hazards analyses, or safety plans in sufficient detail to ensure worker safety.

Pantex Excavation Strike

Some ES&H requirements are not being effectively implemented. The BWXT Radiation Safety Department and Manufacturing and Engineering Divisions have not ensured that weapons program radiological work is performed in accordance with all institutional radiation protection requirements, including entry control authorization, and that all procedures being used in lieu of radiation work permits provide required information on radiological conditions. BWXT workers and supervisors are not meeting institutional procedure compliance expectations for some ES&H requirements and procedures that are not specified in nuclear explosive operations procedures. Hoisting and rigging equipment (other than that covered by technical safety requirements) is not being properly maintained and inspected prior to use, resulting in the potential for deficient equipment to be used and increasing the risk of personnel injury.

BWXT has not ensured that subcontractors performing construction work fully and effectively implement applicable ES&H requirements. BWXT has not ensured that subcontractors have sufficiently identified or analyzed hazards such that appropriate controls could be established. In addition, BWXT has not ensured that its subcontractors comply with DOE hoisting and rigging requirements. Numerous safety deficiencies were observed at construction sites, and controls were not always effective. For example, subcontractors disconnected lightning protection for a building that contained explosives and that requires a high degree of protection against electrical surges.

Inadequate analyses and insufficient formality in processes controlling engineering calculations and issues tracking reduces the confidence in safety system reliability. Although the safety-class components reviewed were in most aspects adequately designed, deficiencies exist in some safety analyses, including inadequate identification of the safety function of a safety-class drain line and an inadequate

analytical basis for some important controls, such as the leak rate and closure time for the blast valves. Furthermore, BWXT has not established appropriate processes for controlling engineering calculations, which contributed to weaknesses (lack of rigor and quality) and analytical errors in several calculations and an engineering evaluation. In addition, although improvements have been made in some areas of configuration management, weaknesses exist in the unreviewed safety question procedure and in the issues tracking process, particularly in the areas of processing new information that may impact the safety basis and in implementing the issues reporting system to formally identify and track engineering issues. Finally, BWXT has not established an effective process for tracking and trending safety system performance.

Isolation Door at the Pantex Plant

BWXT feedback and improvement programs are not fully effective in identifying, correcting, and preventing ISM-related deficiencies and events. BWXT has made progress in feedback and improvement programs since the 2002 OA inspection and has established and implemented the basic processes of feedback and improvement. However, the processes continue to have some weaknesses, and implementation of the processes is not sufficiently effective. Current plant standards have not been revised to reflect management expectations and the assurance processes that are being used in the field. Training and implementation planning for new processes and tools have not been sufficiently rigorous to ensure consistent, effective implementation. In some cases, line management has not demonstrated sufficient ownership and discipline in the development, maintenance, and adherence to implementing plant standards and new processes. Assessments are not sufficiently comprehensive or rigorous to effectively evaluate safety processes and performance, including the implementation of ISM. Many safety issues are not being documented using the approved issues management tool, and evaluations are not consistently thorough in identifying the extent of condition and causes of deficiencies and in establishing effective corrective actions and recurrence controls. Some injuries and exposures are not being sufficiently evaluated for causes and appropriate follow-up actions. Lessons learned are not sufficiently reviewed for applicability to Pantex or rigorously applied to processes and activities through definitive, tailored preventive actions.

Weaknesses in PXSO line management oversight processes hinder PXSO's effectiveness in driving improvement in safety management at Pantex. While some improvements have been made, a number of PXSO oversight processes and procedures are not yet developed, and others are not yet mature and effective. PXSO has not ensured that corrective actions are tracked to closure and validated to be effective and that operational awareness data is analyzed for trends. PXSO does not have an adequate technical basis for reporting Facility Representative performance indicators or for assumptions used in analyzing Facility Representative coverage. PXSO does not have a documented program plan/procedure for implementing employee concerns program requirements. PXSO has not established and implemented a lessons-learned program as required by NNSA and PXSO Functions, Responsibilities, and Authorities Manuals.

4.0 Summary Assessment

The following paragraphs provide a summary assessment of the PXSO and BWXT activities that were evaluated by OA on this inspection. Additional details relevant to the evaluated organizations are included in the technical appendices in Volume II of this report.

Nuclear Explosives Program. In general, nuclear explosive operations are planned and performed safely in accordance with the core functions of ISM. The SS21 initiative continues to improve the quality of nuclear explosive operations using improvements in tooling, procedures, and the process. Work governed by nuclear explosive operating procedures was effectively defined, analyzed, and controlled and was performed within specified controls, with rigorous and effective procedure compliance. However, activity-level hazards analyses for hazards other than nuclear explosive or conventional explosive hazards are not always systematically reviewed and are not well documented. In addition, most activity-level hazards are not identified in procedures as required, and production technicians have no other documentation of the hazards unique to the activity. Some institutional radiation protection requirements, including use of radiation work permits, specification of radiological conditions, and entry control authorizations, are not adequately defined and followed. While compliance with nuclear explosive operating procedure requirements was rigorous, some ES&H requirements contained in general use procedures or other documents were not properly followed. Increased management attention is warranted in these areas to ensure that safety management is integrated into the weapons program processes for all hazards related to worker safety.

Applied Technology. Work scopes are well defined in the Applied Technology Division, primarily in such work control documents as operating procedures and developmental instructions. Explosive hazards associated with high explosives in the Applied Technology Division are well understood, documented, controlled, and communicated to workers at all levels. Training and qualification programs are robust and tailored to the workers' assigned responsibilities, and work is generally performed safely, as evidenced by the continually improving safety metrics within the division. At the facility level, process safety management requirements have been implemented within programs, but in a number of areas, process safety management standard requirements have not been effectively executed. At the work activity level, current work control processes (e.g., procedures and job safety hazards analyses) are not sufficiently rigorous for hazards other than energetic or explosive hazards (i.e., chemical, physical, biological, or ergonomic hazards) in identifying, analyzing, documenting, and communicating hazards to the workforce. In addition, elements of the BWXT exposure assessment program do not meet some of the requirements defined in DOE Order 440.1A.

Maintenance. For maintenance activities, the Pantex Plant has appropriate plant standards that define the work control process. The standards, procedures, and manuals for processing work requests provide a comprehensive set of instructions that, if rigorously implemented, can produce well-planned work packages that include appropriate instructions, precautions, and procedures. Most maintenance work is completed safely as evidenced by the reported low accident and injury rates. However, the BWXT work planning and control process as implemented is not sufficiently rigorous to ensure that all pertinent hazards are adequately identified and analyzed, and that appropriate controls are identified and implemented prior to conducting the work. Managers have not established high standards for work planning, and planners are not devoting sufficient attention to the details of the job being planned. Craft supervisors and workers, in the desire to get work done, are accepting poor quality work packages and are relying on their own professional skill and expertise to prevent accidents and injuries. In some cases, particularly in hoisting and rigging operations, operators are not ensuring that requirements are being met prior to conducting work. In other cases, workers are simply not aware of some pertinent hazards and consequently

are not equipped to evaluate the work, and do not recognize the need to obtain additional expertise to ensure that appropriate controls are applied.

Construction. For construction activities, BWXT has recently taken actions to improve the safety of work activities. BWXT has significantly improved the flowdown of requirements into subcontracts, strengthened the qualifications and training of project subcontract technical representatives, and increased safety monitoring and assessment of subcontractor safety. However, additional improvements are needed in the rigor of identification and analysis of hazards, as evidenced by a number of hazards that were not properly identified and others that were identified but not adequately analyzed. Improvements are also needed to ensure that hazard controls are specified in safety documents in sufficient detail to ensure worker safety. Several controls that were required in subcontracts were not effectively conveyed to workers and thus were not implemented. In general, the level of compliance with contractual ES&H requirements needs improvement. Appropriate requirements have been imposed, but expectations for compliance have not been effectively conveyed.

Safety Systems Functionality. The components reviewed are generally robust, simple, and appropriately designed to perform their safety function. Many aspects of configuration management are well defined and implemented, including document and records control. Important improvements have been made in the procurement of safety-class components. Surveillances and tests were appropriate; in most cases, the procedures were well written, and all surveillances and tests were performed on time. The preventive maintenance program is robust, and adequate and timely corrective maintenance is being performed. The material condition of the systems reviewed was good. BWXT has established an effective program for training technicians to perform hoisting and rigging supporting nuclear operations that includes hands-on operations training and a performance test. Technicians demonstrated their ability to effectively operate cranes and rigging equipment. Although the components evaluated are relatively simple, some analyses supporting the safety analysis report have not been adequately performed or documented. For example, the safety function of the drain line to the isolation valve was not defined in the safety analysis report, and blast valve controls were not adequately supported by testing or analysis. Furthermore, concerns were identified with the quality and rigor of some engineering calculations and evaluations, and BWXT has not established appropriate processes for controlling engineering calculations and evaluations to ensure that they meet the quality standards of 10 CFR 830. Weaknesses were also identified in two areas of the configuration management program: the unreviewed safety question program, which ensures that the safety analysis report is maintained, and the site issues reporting process, which ensures that engineering and other issues are appropriately tracked and resolved. Furthermore, concerns were identified with two technical safety requirement surveillances that did not adequately test controls, the rigor in documentation of some safety system maintenance work, and operation procedures that did not provide adequate direction for performing a second verification of a rigging procedure. Although none of the weaknesses that were identified raised significant concerns as to whether the reviewed safety-class systems would adequately perform their intended safety functions, the identified weaknesses did result in some uncertainty in the systems' functionality for some events. Furthermore, the weaknesses indicated the need to improve the rigor and quality of some analyses and the rigor with which technical safety requirement controls are ensured to be implemented.

Implementation of DOE Order 450.1, *Environmental Protection Program.* PXSO and BWXT have established a comprehensive and effective set of actions to implement an environmental management system. Several aspects of the implementation actions are noteworthy, including senior PXSO and BWXT management involvement and support for the environmental management system, involvement of BWXT managers from line and support organizations, coordination of training and communication organizations, and structured processes for identifying risk-ranked objectives and targets. Pantex continues to have a proactive pollution prevention program. A few work instructions and processes need to be issued or updated to further enhance the current system.

Hoisting and Rigging. BWXT generally has established appropriate standards and requirements for hoisting and rigging operations, and nuclear operations-related hoisting and rigging activities are performed in accordance with the requirements. However, workers do not appropriately implement all standards and requirements for rigging activities that are not governed by technical safety requirements. Personnel are not verifying that inspection labels are current, equipment inventories are not being maintained, and shop supervisors are not enforcing site requirements. Further, site standards are not sufficiently detailed to describe

exactly how the DOE Hoisting and Rigging Manual is implemented at the site. BWXT has applied OSHA hoisting and rigging requirements to subcontractors and has required the use of lift plans to ensure compliance with these requirements. However, BWXT has not imposed the more conservative DOE hoisting and rigging requirements, which are included in the BWXT prime contract, on its subcontractors.

Safety Systems Oversight of Engineered Safety Systems. PXSO and BWXT have established most elements of effective safety system oversight programs. Engineers who were interviewed were technically competent and in most respects were very knowledgeable of their assigned systems. PXSO assessments performed to date have been detailed and have identified weaknesses and areas for improvement in contractor programs and activities related to safety systems. Weaknesses were identified in PXSO's issues tracking system and in their plans for conducting independent system or component functionality assessments. The BWXT system engineer program has weaknesses in tracking and trending safety system performance and processing engineering deficiencies via BWXT protocols.

Chronic Beryllium Disease Prevention Program. The Pantex Plant has an effective program and is in compliance with 10 CFR 850. The site standard adequately documents the roles, responsibilities, and authorities necessary to provide a comprehensive program that protects and monitors workers potentially exposed to beryllium. The 2001 beryllium initiative to clean all areas of the plant that may have contamination above the housekeeping standard has reduced the number of workers that could be exposed to residual beryllium contamination. A voluntary beryllium medical surveillance program is effectively publicized and aggressively supports beryllium associated workers during the identification, testing, and follow-up phases of the program. Additional attention is needed to evaluate the need for controls when handling beryllium components that have detectable surface contamination below regulatory requirements and for scheduling regular program self-assessments to ensure the quality and effectiveness of all program activities.

Safety in Protective Force Training. PXSO is actively involved in the ES&H aspects of security protective force training. In the areas of live-fire range instruction and range instruction documentation, protective force training was effectively managed by BWXT. Risk assessment reports that are required by DOE Order 440.1A were somewhat generic and lengthy for effective use by instructors and students.

BWXT Feedback and Improvement. BWXT has made a number of improvements in feedback and improvement processes and performance since the 2002 OA ES&H inspection, including establishing the basic processes of feedback and improvement. Safety issues are being identified and resolved, adverse trends and systemic deficiencies have been identified, and preventive actions are being identified and implemented. BWXT has developed annual contractor assurance system plans that define the elements of assessment and issues management processes and identify planned assessment activities. However, the development of more rigorous processes is incomplete, and line management has not consistently or rigorously implemented feedback and improvement processes. As a result, the BWXT assurance system is not fully effective in identifying, correcting, and preventing ISM-related deficiencies and events. There is an overall lack of discipline in the development, maintenance, and adherence to plant standards that is impeding the effectiveness of the contractor's assurance system.

PXSO Oversight. PXSO is making progress on developing processes and procedures to implement DOE and NNSA expectations for line management oversight. However, a number of processes and procedures are not yet developed, and others are not yet mature and effective. PXSO, through assessments, Facility Representatives, and contract evaluation, is providing feedback to the contractor in a number of areas, which is contributing to improvements in various aspects of safety management. The primary focus of PXSO assessments, Facility Representatives, and operational awareness activities is on the highest priority hazards at Pantex (i.e., nuclear and explosives safety) and on the environmental program, and the results of this OA inspection indicate that PXSO has contributed to the generally effective Pantex Plant programs in these areas. However, PXSO has not been sufficiently effective in identifying and correcting weaknesses in BWXT processes for analyzing and controlling other hazards (e.g., chemical hazards). Management attention is needed to ensure that timely improvements are made in a number of areas, including issues management, trending of operational awareness data, tracking and validation of corrective actions, application of lessons learned, the employee concerns program, Facility Representative coverage, and Facility Representative performance indicator reporting.

5.0 Conclusions

Overall, PXSO and BWXT have effectively applied ISM principles and core functions to nuclear explosive and explosive hazards. These hazards have received extensive management attention and are subject to rigorous controls and clear expectations for procedural compliance. As a result, few deficiencies were identified in these areas. Management has also devoted significant attention to reducing worker injuries (e.g., behavior-based safety programs) and has had considerable success, as evidenced by the reported low and decreasing injury and illness rates. PXSO and BWXT have appropriately addressed the complex issues associated with implementing an environmental management system and a chronic beryllium disease prevention program, and have implemented or initiated appropriate actions to meet applicable requirements.

In a number of areas, PXSO and BWXT recognize that current systems have weaknesses that need to be addressed, and actions are ongoing or being initiated. A number of efforts are ongoing to enhance the reliability of essential safety systems and safety system oversight. Effective actions have been taken to improve the flowdown of most requirements to subcontractors, and actions are ongoing to further enhance subcontractor safety. Management has recognized that continuing weaknesses exist in assessments and issues management and has instituted new tools and taken other actions to improve line management implementation of assessment processes. While progress has been made, considerable work remains in these areas.

However, management has not sufficiently focused on other aspects of ISM, such as activity-level hazards analyses, and some aspects of industrial hygiene, radiation protection, hoisting and rigging, and worker and subcontractor safety in activities other than nuclear weapons and explosive operations (including maintenance, construction, and certain laboratory, support, and non-nuclear/explosive programmatic activities). Implementation of the core functions of ISM was less effective in these areas.

Some of the areas that particularly warrant increased BWXT management attention include:

- Worker safety for hazards other than nuclear explosive and explosive hazards
- Ensuring compliance with general safety programs and full and effective implementation of existing processes
- Ensuring that subcontractors understand and effectively implement ES&H requirements
- Enhancing and effectively implementing hoisting and rigging requirements for activities not governed by technical safety requirements
- Increasing the rigor and attention to detail on safety system design calculations and configuration management
- Enhancing BWXT feedback and improvement processes, particularly in issues management, in the rigor and quality of assessments, and in the disciplined and effective implementation of the BWXT contractor assurance system.

PXSO line management oversight also needs to focus on BWXT efforts in the above areas, and address weaknesses in PXSO line management oversight in the areas of issues management, trending of operational awareness data, tracking and validation of corrective actions, application of lessons learned, the employee concerns program, Facility Representative coverage, and Facility Representative performance indicator reporting.

6.0 Ratings

The ratings reflect the current status of the reviewed elements of the Pantex Plant ISM program.

Implementation of Core Functions for Selected Work Activities (See Appendix C, Section C.4, for a more detailed breakdown of the Core Function ratings.)

Core Functions #1-4 Implementation – Nuclear Explosive Operations .... EFFECTIVE PERFORMANCE
Core Functions #1-4 Implementation – Applied Technology ..... NEEDS IMPROVEMENT
Core Functions #1-4 Implementation – Maintenance ..... SIGNIFICANT WEAKNESS
Core Functions #1-4 Implementation – Construction ..... NEEDS IMPROVEMENT

Feedback and Improvement

Core Function #5 – Feedback and Continuous Improvement ..... NEEDS IMPROVEMENT

Safety System Functionality

Engineering Design ..... NEEDS IMPROVEMENT
Configuration Management and Quality Assurance ..... NEEDS IMPROVEMENT
Surveillance and Testing ..... EFFECTIVE PERFORMANCE
Maintenance ..... EFFECTIVE PERFORMANCE
Operations ..... EFFECTIVE PERFORMANCE

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APPENDIX A
SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Planning Visit	January 10-14, 2005
Onsite Inspection	January 24-February 4, 2005
Report Validation and Closeout	February 15-17, 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
Patricia Worthington, Director, Office of Environment, Safety and Health Evaluations
Thomas Staker, Deputy Director, Office of Environment, Safety and Health Evaluations

A.2.2 Quality Review Board

Michael Kilpatrick	Patricia Worthington
Dean Hickman	Robert Nelson

A.2.3 Review Team

Thomas Staker, Team Leader

Phil Aiken	Vic Crawford	Brad Davy	Marvin Mielke
Bill Miller	Jim O'Brien	Bob Compton	Al Gibson
Joe Lischinsky	Jim Lockridge	Joe Panchison	Don Prevatte
Ed Stafford	Mario Vigliani		

A.2.4 Administrative Support

Lee Roginski
Tom Davis

A.3 Ratings

The Office of Independent Oversight and Performance Assurance uses a three-level rating system to provide line management with a tool for determining where resources might be applied toward improving environment, safety, and health. It is not intended to provide a relative rating between specific facilities or programs at different sites because of the many differences in missions, hazards, and facility life cycles, and the fact that these reviews use a sampling technique to evaluate management systems and programs. The three ratings and the associated management responses are:

- Effective performance, which indicates that management should address any identified weakness
- Needs improvement, which indicates a need for significantly increased management attention
- Significant weakness, which indicates a need for immediate management attention, focus, and action.

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APPENDIX B
SITE-SPECIFIC FINDINGS

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

FINDING STATEMENTS
1. With the exception of nuclear explosive and conventional explosive hazards, BWXT line management and support organizations have not ensured that hazards are analyzed and documented and that controls are specified for work activities prior to authorization of the work.
2. BWXT has not implemented a comprehensive exposure assessment program that utilizes recognized exposure assessment methodologies, as required by DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*.
3. The BWXT Radiation Safety Department and Manufacturing and Engineering Divisions have not ensured that weapons program radiological work is performed in accordance with all institutional radiation protection requirements, including entry control authorizations, and that all procedures being used in lieu of RWPs provide the required information on radiological conditions.
4. BWXT workers and supervisors are not meeting institutional procedure compliance expectations for some ES&H requirements contained in general use procedures, policies, and postings.
5. Although BWXT has implemented programs to meet the OSHA PSM standard, five elements of the PSM standard have not been effectively executed (i.e., legacy PHAs, operating procedures, process safety information, management of change, and audits).
6. BWXT has not ensured that subcontractors have sufficiently identified or analyzed hazards such that appropriate controls could be established.
7. BWXT has not ensured that hazard controls are specified in SWPs, AHAs, or safety plans in sufficient detail to ensure worker safety for construction activities performed by subcontractors.
8. PXSO has not ensured that all corrective actions are tracked to closure and validated to be effective (as required by PXSO procedures), that operational awareness data is analyzed for trends, and that deficiencies in construction, maintenance, and worker safety aspects of production/operations are adequately identified and corrected.
9. PXSO does not have an adequate technical basis for reporting FR performance indicators, or for assumptions in analyzing FR coverage.
10. PXSO does not have a documented program plan/procedure for implementing the employee concerns program requirements.
11. PXSO has not established and implemented a lessons-learned program as required by NNSA and PXSO Functions, Responsibilities, and Authorities Manuals.

Table B-1. Site-Specific Findings Requiring Corrective Action (continued)

FINDING STATEMENTS
12. BWXT has not implemented a fully effective assessment and oversight program that rigorously and proactively evaluates safety management systems and performance.
13. BWXT has not fully or effectively implemented issues management processes that ensure that safety deficiencies are appropriately documented, rigorously categorized, and evaluated in a timely manner, with root causes and extent of condition accurately identified, and appropriate recurrence controls identified.
14. BWXT has not implemented fully effective processes that consistently and rigorously identify adverse trends and lessons learned from completed work activities and external events resulting in the identification and application of appropriate preventive actions.
15. NNSA and BWXT have not adequately analyzed and documented the design of some important aspects of the safety-class systems during the development and review of the 10 CFR 830 compliant SAR.
16. BWXT has not established appropriate processes for ensuring that engineering calculations and analyses meet the quality standards of 10 CFR 830.
17. The BWXT USQ standard and attendant documents do not adequately define roles, responsibilities, and processes for addressing identified SAR discrepancies.
18. Hoisting and rigging equipment (other than that covered by TSRs) is not being properly maintained and inspected prior to use, resulting in the potential for deficient equipment to be used and increasing the risk of personnel injury.
19. BWXT has not ensured that its subcontractors comply with DOE hoisting and rigging requirements.