

**Independent Oversight Targeted Review of the  
Safety Significant Blast Door and Personnel Door Interlock Systems  
and Review of Federal Assurance Capability at the Pantex Plant**



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**Office of Safety and Emergency Management Evaluations  
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## Acronyms

AM	Assistant Manager
ART	Assessment Review Team
B&W Pantex	Babcock & Wilcox Technical Services Pantex, LLC
BDI	Blast Door Interlock
CAM	Continuous Air Monitor
CAP	Corrective Action Plan
CART	Corrective Action Review Team
CAS	Condition Assessment Survey
CDNS	Chief of Defense Nuclear Safety
CFA	Causal Factor Analysis
CFR	Code of Federal Regulations
CGD	Commercial Grade Dedication
CM	Corrective Maintenance
CONOPS	Conduct of Operations
CRAD	Criteria, Review and Approach Document
CSE	Cognizant System Engineer
CY	Calendar Year
DIS	Door Interlock System
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DPOC	Division Point of Contact
DSA	Documented Safety Analysis
EFCOG	Energy Facility Contractors Group
EIRB	Executive Issues Review Board
ESD	Electrostatic Dissipative
ESH&Q	Environment, Safety, Health and Quality
ESTARS	Electronic Suspense Tracking and Routing System
FR	Facility Representative
FY	Fiscal Year
G&PA	Governance and Performance Assurance
HPI	Human Performance Improvement
HRO	High Reliability Organization
HSS	Office of Health, Safety and Security
IRT	Issues Review Team
ISI	In-Service Inspection
MC	Material Condition
M&O	Management and Operations
MSA	Management Self-Assessment
NMMP	Nuclear Maintenance Management Program
NNSA	National Nuclear Security Administration
NPO	NNSA Production Office
OFI	Opportunity for Improvement
ORPS	Occurrence Reporting and Processing System
PD	Process Document
PEP	Performance Evaluation Plan
PER	Problem Evaluation Request
PM	Preventive Maintenance
POD	Plan of the Day
PT	Production Technician

PXSO	Pantex Site Office
SAR	Safety Analysis Report
SC	Safety Class
S/CI	Suspect/Counterfeit Items
SME	Subject Matter Expert
SMP	Safety Management Program
SR	Surveillance Requirement
SS	Safety Significant
SSC	Structures, Systems, and Components
SSO	Safety System Oversight
TPD	Training Program Description
TSR	Technical Safety Requirement
WI	Work Instruction
WP	Work Package

# **Independent Oversight Targeted Review of the Safety Significant Blast Door and Personnel Door Interlock Systems and Review of Federal Assurance Capability at the Pantex Plant**

## **1.0 PURPOSE**

The U.S. Department of Energy (DOE) Office of Enforcement and Oversight (Independent Oversight), within the Office of Health, Safety and Security (HSS), conducted an independent review of the safety significant Blast Door Interlock (BDI) and personnel Door Interlock System (DIS) systems at the Pantex Plant. The Pantex Plant is operated by Babcock & Wilcox Technical Services Pantex, LLC (B&W Pantex) under contract to the National Nuclear Security Administration (NNSA) Production Office (NPO)<sup>1</sup>. Independent Oversight also reviewed the performance of DOE oversight, as appropriate, to provide input for its evaluation of the effectiveness of the Federal assurance capability. This is an assigned task for HSS in accordance with Commitment #16 of the DOE Implementation Plan to Improve Oversight of Nuclear Operations, which DOE developed in response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*. The Independent Oversight review was performed on site July 22-31, 2013.

## **2.0 SCOPE**

The targeted review of management of safety systems evaluated the effectiveness of processes for operating, maintaining, and overseeing the performance of selected safety systems at the Pantex Plant by specifically reviewing the safety significant BDI and personnel DIS systems. The review consisted of an evaluation of the procedures and processes used to demonstrate ongoing operability and reliability of the systems and specific evaluation of the implementation of those procedures and processes for a sample of components within those systems. The review focused on the implementation of the facility's safety basis as it relates to the selected safety systems; the review did not evaluate the adequacy of the documented safety analysis (DSA). The review also evaluated the effectiveness of DOE safety system oversight for the selected systems and the effectiveness of the Federal assurance capability.

Selected objectives and criteria from the following sections of HSS Criteria, Review and Approach Document (CRAD) 45-11, Revision 3, *Safety Systems Inspection Criteria, Approach, and Lines of Inquiry*, was used to define the scope of this targeted review:

- IV. Maintenance
- V. Surveillance and Testing
- VI. Operations
- VII. Cognizant System Engineer and Safety System Oversight
- VIII. Safety System Feedback and Improvement.

This review included the following activities:

- Observation of contractor and/or field office personnel during facility walkthroughs, safety system walkdowns, maintenance work package workability walkdowns, surveillance tests, and contractor assessments or observations of maintenance on the safety system.
- Detailed review of documentation associated with completed surveillance tests, assessments of safety system performance, and maintenance history for the selected safety systems.

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<sup>1</sup> Pantex Site Office (PXSO) became subsumed within NPO in June 2012.

This review also evaluated the effectiveness of both the contractor and field office programs in managing and maintaining safety system performance.

The review team also utilized the following criteria from HSS CRAD 45-21, Revision 1, *Feedback and Continuous Improvement Inspection Criteria and Approach – DOE Field Element*, to collect and analyze data on field office oversight activities for evaluation of the effectiveness of the Federal assurance capability:

- DOE Field Element Line Management Oversight Inspection Criteria 1-6.
- DOE Field Element Facility Representative Program Inspection Criteria.

### **3.0 BACKGROUND**

The DOE Independent Oversight program is implemented by HSS's Office of Enforcement and Oversight, an independent office within DOE that has no line management or policy-making responsibilities or authorities. The Independent Oversight program is designed to enhance DOE safety and security programs by providing DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and requirements, and the effectiveness of DOE and contractor line management performance in safety, security, and other critical functions as directed by the Secretary of Energy. The Independent Oversight program is described in and governed by DOE Order 227.1B, *Independent Oversight Program*, and a comprehensive set of internal protocols, operating practices, inspectors' guides, and process guides. The program is implemented by two subordinate offices: the Office of Security and Cyber Evaluations, and the Office of Safety and Emergency Management Evaluations.

The Office of Safety and Emergency Management Evaluations evaluates safety policies and programs throughout DOE with a particular emphasis on evaluating worker and public protection from the nuclear hazards that exist at many DOE sites. This office accomplishes its mission through two primary mechanisms: (1) a network of staff site leads who are assigned to monitor activities at DOE sites with nuclear facilities or activities and coordinate office appraisal activities at those sites; and (2) a program of targeted reviews that evaluate selected functional or topical areas at multiple sites across the DOE complex. Appraisal activities are selected, prioritized, and planned based on such factors as risk to workers and the public, facility operational status, and performance history.

"Safety Class or Safety Significant Structures, Systems and Components" was identified as an Independent Oversight targeted review area for 2013 in an HSS memorandum from the Chief Health, Safety and Security Officer to DOE senior line management dated November 6, 2012. The memo also stated that the areas would be further defined in associated Independent Oversight review plans. In addition, the HSS memo stated that the performance of DOE oversight would be evaluated during the targeted reviews to provide input to the overall evaluation of DOE's Federal assurance capability.

Independent Oversight selected the BDI and personnel DIS as the safety class (SC)/safety significant (SS) systems to be evaluated during this review; both are SC systems. The Pantex Plant has a series of interconnected buildings containing blast and personnel doors that are configured as inner and outer doors and facilitate the movement of personnel and equipment in and out of areas of the facility. The DSA credits the doors as protective barriers for credible accident scenarios. Each set of doors (inner/outer) are interlocked to prevent both doors from being opened at the same time. The BDI/DIS contains pneumatic and/or electromagnet locks and a series of relays to prevent the opposite door from unlocking and being opened while its interlocked door is opened.

Although the review focused primarily on the BDI/DIS, Independent Oversight considered additional systems during field observations as necessary to obtain a clearer perspective for evaluating implementation of some of the CRADs.

#### **4.0 METHODOLOGY**

Independent Oversight completed the targeted review through detailed document reviews and an onsite review of contractor safety system engineering, operations, maintenance, and feedback and improvement activities; system material condition; and field office oversight of the selected SC systems.

The targeted review process was divided into several stages, including onsite and offsite planning, onsite data gathering activities, report writing, validation, and review. Planning included discussions with responsible site personnel, determination of the details of safety systems to be reviewed, scheduling of the review, collection of applicable site procedures and documents, and document reviews. After the onsite data collection period, a draft independent review report identifying overall perspectives, deficiencies, and opportunities for improvement (OFIs) was prepared and made available to line management for review and feedback. Finally, the results of the review were briefed to key managers, consistent with site needs.

When all the selected DOE sites have been reviewed, Independent Oversight will prepare a report summarizing the conclusions of the assessment regarding the overall status of safety system management throughout the DOE complex, common issues, and lessons learned. Independent Oversight will also prepare a report summarizing the effectiveness of the Federal assurance capability throughout the DOE complex in response to the DNFSB.

#### **5.0 RESULTS**

##### **5.1 B&W Pantex Maintenance**

The overall objective of a sound nuclear maintenance program is to ensure that maintenance activities are properly planned, scheduled, and performed to ensure that safety systems can reliably perform their intended safety functions when required.

##### **Nuclear Maintenance Management Plan and Program**

Maintenance of SC and SS structures, systems and components (SSCs) is addressed in the B&W Pantex DOE-approved nuclear maintenance management program (NMMP), *Nuclear Maintenance Management Program (PLAN-IMP-409292)*, as required by DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*. The NMMP was developed using the DOE Guide 433.1-1A, *Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1B*, and was approved in a letter from the Pantex Site Office (PXSO) dated December 2, 2011. Independent Oversight reviewed the document for compliance with DOE O 433.1B and determined that it adequately describes the program in sufficient detail, includes a Contract Requirements Document matrix that outlines every requirement and the procedure(s) that implement those requirements, and ensures effective processes are in place for safety systems to maintain their integrity, operability and reliability.

DOE Order 433.1B recognizes maintenance as a safety management program (SMP) in accordance with 10 CFR 830.204. The introduction to Chapter 17 of the Pantex site-wide safety analysis report (SAR), AB-SAR-314353, revision 219, states, "Information on the elements of the safety management policies

and programs are briefly discussed in 17.4.” Section 17.4, *Safety Management Policies and Programs*, does not list maintenance as an SMP. Maintenance is discussed in Chapter 10 of the Pantex site-wide SAR, but it is not identified or described as an SMP. Technical Safety Requirements (TSR) Section 5.6.1.3, *KEY ELEMENTS of Safety Management Programs*, refers to the DSA as the document that discusses SMPs. In addition, the PXS0-approved NMMP does not identify the maintenance program as an SMP. (See **OFI-B&W Pantex-Maint-1**.)

The maintenance program is further supported by a series of process procedures as shown below. The framework of these process procedures acceptably defines a maintenance management program at the working level.

- PD 02.06.04.01, *Process for Maintenance Management* – This process document (PD) describes the process that defines the Pantex Plant maintenance management program.
- PD 02.06.04.02, *Process for Maintenance of Facilities, Systems and Equipment* – This PD documents an overview of the process for maintaining facility SSCs and equipment at the Pantex Plant.
- WI 02.06.04.01.01, *Manage the Maintenance Program* – This work instruction (WI) establishes guidelines for managing the Pantex Plant maintenance management program.
- WI 02.06.04.02.03, *Planning and Approving Maintenance Work Orders* – This WI provides guidance and criteria for designing, planning, and approving work packages (WPs).
- WI 02.06.04.02.04, *Execute Maintenance Work and Provide Feedback* – This WI provides guidance for processing maintenance work orders, including pre-job and post-job reviews, and for conducting feedback for continuous improvement.
- WI 02.06.04.02.06, *Conduct Maintenance Compliant with Technical Safety Requirement Controls* – This WI provides guidance for Maintenance Division personnel when conducting maintenance to ensure compliance with TSR administrative controls.
- WI .02.06.04.02.07, *Establish Preventive Maintenance for Facility and Infrastructure Structures, Systems and Components, and Equipment* – This WI provides guidance and criteria for establishing preventive maintenance (PM) (including predictive maintenance) for facility SSCs and equipment.

### **Corrective, Preventive and Predictive Maintenance**

Independent Oversight reviewed the maintenance process for corrective, preventive, and predictive maintenance and found that B&W Pantex is adequately following and effectively implementing the appropriate corrective maintenance (CM) and PM procedures through the WP process. This process has the necessary controls to ensure the continued reliability of SC/SS systems such as the BDI/DIS, consistent with the system’s safety classification. PMs are performed on SC and SS equipment. A subpart of these PMs include the BDI system. BDI PMs include monthly functional checks, and annual structural hardware functional tests. Certain PMs adequately address the TSR surveillance requirements (SRs), such as the monthly functional tests for the Bay BDIs to implement TSR SR 4.1.4.1. PMs are closely tracked and are consistent with vendor recommendations. Overall, PMs were adequately conducted for the BDI/DIS on an annual basis in addition to functional tests that are performed to meet TSR SR/ISI requirements. (A few exceptions are noted below.)

The BDI/DIS components were appropriately determined by B&W Pantex engineering not to require predictive maintenance based on known system reliability. Independent Oversight further reviewed predictive maintenance implementation with other systems and equipment (e.g., fire protection and radiation protection systems) under the NNMP and found it to be adequate.

B&W Pantex metrics include indicators for maintenance backlog. CM backlog is measured in terms of man-hours. For the months of April, May, and June 2013, the total CM backlog averaged 9,432 man-hours. The backlog for safety systems was only eleven percent of the CM backlog total for the same period. The specific work associated with SC/SS CM backlog is not having an adverse effect on the reliability of safety systems which is evidenced by no current temporary modifications or extended LCO actions existing at the time of the review. Based on the amount and nature of the safety system CM backlog at the time of this review, Independent Oversight concludes that Pantex is applying an acceptable amount of priority on CM for safety systems. In contrast, because B&W Pantex places more stringent requirements on approving extensions to PM performance past their required performance dates, PM backlog is managed at or near zero. The NPO Assistant Manager for Nuclear Safety and Engineering has recently challenged B&W Pantex management to develop an improved set of maintenance performance indicators to more closely track maintenance performance and Independent Oversight agrees that improvement is needed in this area.

### **Periodic Inspections**

Equipment/system condition assessments are performed by B&W Pantex condition assessment survey (CAS) inspectors in accordance with WI 02.06.04.01.03, *Condition Assessment Survey Inspections of Facility Structures, Systems and Components*. These surveys are conducted for each facility on a rotating five-year frequency and are used for planning and management of facility maintenance and capital improvements. The survey results are reviewed and prioritized by the Condition Assessment Board and placed on a list of deferred maintenance items, which do not include CM or PM items. Currently, SC/SS equipment deferred upgrades constitute approximately three percent of the total deferred maintenance. After reviewing a sample of these CAS inspection reports, Independent Oversight determined that the CAS inspection process is effective in identifying needed SC/SS SSC improvements; however, the process is less effective in getting any of those upgrades approved and implemented.

On balance, given the large number of BDI/DIS door openings (approximately 60,000 per year for BDI equipment doors and 300,000 per year for personnel DIS doors) and the relatively low incidence of door failures (about ten to twelve per year for all BDI/DIS doors), the BDI/DIS are very reliable and are maintained in a condition that ensures integrity, operability, and reliability of the system. Equipment reliability and system health are further discussed under the cognizant system engineering program. (See Section 5.4 of this report.)

### **Maintenance Configuration Control and Conduct of Maintenance**

Independent Oversight reviewed several completed CM WPs for the BDI system and found that they implemented the planned activities effectively. In each case, the work was performed according to the work procedures in the WP and the defined post-maintenance testing was adequate to re-establish operability of the SC/SS SSCs involved in the activities and was adequately documented in the WP. Overall, Independent Oversight determined that for reviewed maintenance activities, including work control, post-maintenance testing, material procurement and handling, and control and calibration of test equipment, are formally controlled to ensure that changes are not inadvertently introduced, the system(s) fulfill requirements, and that system performance is not compromised.

As further detail, the reviewed work packages demonstrated that prior to issuing a WP, B&W Pantex used a process procedure WI 02.06.04.02.03, *Planning and Approving Maintenance Work Orders*, to ensure that there were reviews by several organizations including systems engineering and operations. This ensures that the system's design configuration was not changed and continued operability of the system remains unchanged upon completion of the maintenance and PMT. Maintenance planning was supported by use of an Oracle software application. As maintenance was planned and scheduled, any required training was verified by the supervisor prior to job assignment. Independent Oversight observed training verification during maintenance stand-up meetings, where the supervisor handed out training status sheets to several craft persons whose training was not up to date. Independent Oversight also found that several CM packages observed during the planning process identified the proper vendor information and the individuals who had to review the package, including the system engineer for SC and SS maintenance.

Maintenance craft workers are hired by B&W Pantex as journeymen and provided access and task-specific training. Training on maintenance procedures and programs is also provided. As an example, the maintenance craft are required to take a classroom course on the BDI/DIS. A sample of maintenance staff training records was found to be complete and up to date. It was also noted during field observations that the maintenance craft workers in most cases demonstrated proficiency with performing maintenance tasks.

Independent Oversight reviewed the field performance of maintenance activities. B&W Pantex has implemented a maintenance Plan of the Day (POD) meeting to highlight safety, security, and quality information in order to increase situational awareness of maintenance staff in the field. The maintenance POD is developed daily and is sent to all maintenance managers to brief employees on the POD topics of the day. Independent Oversight observed the maintenance PODs and found them to be informative.

Independent Oversight observed the implementation of several CM WPs, including two repairs of the BDI system, replacement of camera lenses used in one of the bays, and repair of a leaking air connection in another bay. The pre-job briefs for each job were thorough, covered the expected hazards and associated controls, and provided an opportunity for worker input and questions. Workers executed the detailed tasks in the WP both proficiently and effectively. For one troubleshoot-and-repair CM work package observed by Independent Oversight, one of the assigned electricians, who had worked on the BDI system extensively, went directly to the component that he suspected and made an adjustment, and the BDI function was restored. Each of the observed maintenance activities was thoroughly conducted in accordance with B&W Pantex procedures.

Independent Oversight observed the performance of a monthly BDI functional test and found that the test was performed as prescribed in the PM work instruction. A simulation of the annual inspection of one of the cell personnel doors (TP-MN-04311) was also observed; the PM WIs were followed correctly, and the carpenters were very knowledgeable of the door operation and equipment. One additional PM was observed by Independent Oversight involving a functional test of the continuous air monitors (CAMs) and associated equipment within the Radiation Alarm Monitoring System for one of the facility bays (TP-MN-02300). During this functional test, various radioactive sources had to be handled and placed near the CAM to measure the alarm response. The PM was conducted effectively, even though one of the electronic technicians stated that he was relatively new at performing the test.

One of the BDI PMs that was observed contained WI steps marked with "SR" in the margin, incorrectly indicating that the step satisfied a TSR SR. This observation of incorrectly marked steps was also identified in a recent NPO letter to B&W Pantex dated July 11, 2013. (See **OFI-B&W Pantex-Maint-2.**)

Pre-job briefings for PM activities performed on swing shift are covered generically and very broadly during the swing shift maintenance POD at the start of that shift. This POD covers organizational

announcements, general safety topics of interest, and lessons learned. The group is reminded of the proper personal protective equipment and any specific lockout/tagouts that may be needed during the shift. The specifics of the hazards, the associated controls, human performance tools that may be helpful, and how the work is to be conducted are not covered on a task level for each PM activity. The swing shift supervisor stated to Independent Oversight that individual pre-job briefs were not performed for swing shift PM activities. Nevertheless, in the maintenance packages for the PMs observed by Independent Oversight, the pre-job brief section of the Work Performance Record (Form PX-3170) was signed off by the supervisor and the workers indicating their concurrence with the pre-job brief. (See **OFI-B&W Pantex-Maint-3.**)

### **Procurement and Suspect/Counterfeit Items**

Spare parts for maintenance of SC and SS SSCs are procured through B&W Pantex procedure WI 02.03.05.01.16, *Acquisition and Control of Maintenance Materials*. The B&W Pantex procurement process contains requirements to ensure that SC parts that are procured as Acquisition Level 1 are procured from a qualified vendor whose program has been audited and found to be acceptable. SC parts for the BDI/DIS are procured as Acquisition Level 4 (commercial grade). The commercial grade dedication (CGD) process does not require the identification of critical characteristics to ensure that the method of dedication is appropriate. Without identification of critical characteristics and alignment of those characteristics to associated tests and/or certifications, the systems are at increased risk of not meeting the DSA intended functions. Based on NPO concerns, B&W Pantex had already included this issue in their quality improvement plan and expects to revise the CGD process by the end of the calendar year 2013. At the request of Independent Oversight, the system engineer reviewed a sample of completed CM activities on the BDI/DIS, identified the critical characteristics for each component replaced, and compared the critical characteristics to the typical post-maintenance functional test. The conclusion was that the functional test met all of the critical characteristics for the BDI components that were replaced. Independent Oversight also reviewed a sample of completed CM WPs in which SC/SS SSCs were replaced and found no other procurement issues. No further review of SC SSC Acquisition Level 1 procurements were evaluated as part of this targeted review.

Independent Oversight toured the warehouse where SC BDI/DIS parts are stored. The storage location is in a caged area with little access control, and the parts are stored on metal shelving. There are no apparent inventory controls, and some parts were not properly labeled with procurement information to ensure that the part was acceptably procured for the BDI/DIS. Storage of SC parts lacks sufficient control to ensure that parts are not damaged and are properly marked while in storage. (See **OFI-B&W Pantex-Maint-4.**)

B&W Pantex has an extensive set of procedures and processes designed to prevent, detect and eliminate suspect/counterfeit items (S/CI) from use in the plant. PD 02.03.06.04, *Process for Suspect and Counterfeit Items Prevention*, establishes the B&W Pantex process for preventing the introduction and use of S/CI through engineering involvement, design, procurement, inspection, identification, evaluation, reporting, control, and disposition. WI 02.03.06.04.01, *Prevent Suspect and Counterfeit Items*, defines the roles, responsibilities, and process for preventing introduction of S/CI into the plant. WI 03.03.06.04.02, *Inspect, Identify, Report, Evaluate, and Control Suspect/Counterfeit Items*, establishes the process for inspecting and identifying S/CI inadvertently installed in the plant and requirements for evaluation of suspect items. This instruction also contains training requirements for personnel who manage or perform S/CI inspection and evaluation activities. Finally, WI 03.03.06.04.03, *Control and Disposal of Suspect and Counterfeit Items*, defines the required steps for disposing of S/CI. A review of the Occurrence Reporting and Processing System (ORPS) reporting criteria 4.C revealed that of the 16 ORPS reports involving S/CI, none of the items were related to SC/SS SSCs. Adequate processes and procedures are in place to prevent the use of S/CI in critical components.

In summary, the B&W Pantex maintenance program is effective in maintaining the BDI/DIS in a condition that ensures the systems will be available to perform intended safety functions and the system is periodically inspected in accordance with maintenance requirements. However, management attention is needed to improve the pre-job briefing process for PM activities and the formality of SC/SS parts procurement, storage and control.

## **5.2 B&W Pantex Surveillance and Testing**

This area reviewed the surveillance and testing program and activities to evaluate whether they are properly performed in accordance with the TSR surveillance and specific administrative controls.

### **TSR Requirements in Surveillance Procedures**

The relevant TSR for the BDI/DIS is TSR Section 3.1, *Interlock Systems*, which requires functional testing of the interlock systems, visual checks of reserve tank discharge valve position, visual inspection of the floor gasket assemblies, and visual inspection of the latching air cylinder assembly, depending on the type of door. Independent Oversight verified the BDI surveillances and tests adequately demonstrate that the door interlock systems are capable of accomplishing their safety functions as required by TSR Section 3.1. The requirements are generally defined as the interlock prevention of opening a second paired door with one already open, and continuing to meet their applicable system requirements and performance criteria.

The combination of shift and monthly/annual tests procedures adequately include the requirements in the TSR Section 3.1 to ensure the continued reliability of the safety function of the of the interlock system and demonstrate that the system is capable of meeting system requirements and performance criteria. The successful accomplishment of this interlock function ensures that at least one associated blast door is closed and will mitigate the release of material from a bay or cell or prevent damage to a bay from an external event.

### **System Parameters Confirmed by Surveillance Procedures**

Independent Oversight reviewed the B&W Pantex BDI/DIS surveillance and test procedures and found they adequately contain and confirm the key operating parameter (i.e., to prevent both doors from opening at the same time) and its major BDI/DIS components remain within TSR and operating limits. Shiftly interlock checks and monthly/annual functional tests (which test all SSCs of the BDI/DIS) also ensure the systems will meet the DSA and TSR requirements.

### **Surveillance and Testing Performance**

B&W Pantex has adequately defined its surveillance and testing process in three procedures that direct the implementation of SR/ISI performance. First, PD 02.01.06.03, *Technical Safety Requirements Surveillance Requirements and In-service Inspections*, adequately describes the process for ensuring that SR/ISIs are properly implemented and performed. This PD requires SR/ISIs to be scheduled using the site-wide computerized maintenance management system and has requirements for tracking and trending SR/ISI performance and deficiencies. Independent Oversight reviewed the status of SR/ISIs and all TSR requirements were up to date as of July 2013. Second, Work Instruction (WI) 02.01.06.03.01, *Maintain Technical Safety Surveillance/In-Service Inspection Programs*, adequately establishes the procedure for performing TSR SR/ISIs of Pantex Plant nuclear facility SC/SS SSCs and implements the requirements of PD 02.01.06.03 *Technical Safety Requirements Surveillance Requirements and In-service Inspections*. Third, WI 02.06.03.03.02, *Authorize Work in/on Facility and Facility Systems and Components for Operations, Maintenance, and Subcontractor Activities*, contains a requirement related to the scheduling

and performance of SR/ISI. The procedure requires the Manager of Nuclear Facility Operations approval of any extension of the performance of a SR/ISI into the grace period. This requirement helps to ensure that potentially late TSR surveillances and inspections should receive supervisory attention. Independent Oversight reviewed the surveillance and testing procedures for the BDI/DIS and found them to contain the necessary safety basis testing specifications and acceptance criteria for these components. Of the 59 functional surveillances completed in the 18 months preceding this on-site review, a sample of 25 completed SR test packages were reviewed. These were functional tests of bay and cell doors completed over an 18-month period pursuant to TSR 3/4.1. Independent Oversight found that the test packages were complete and executed in accordance with instructions TP-MN-03146 or TP-MN-05503 depending on the specific door tested. Independent Oversight observed the performance of several shiftly and annual functional tests of the BDI/DIS during the onsite review. The test procedures were performed correctly. The acceptance criteria of making sure that only one interlocked door opens at a time and the closed door remains latched was successfully met and was the basis for continued system operability in accordance with the TSR. The results of the tests were correctly documented and retained.

It was noted that the shiftly functional test are performed by Pantex Plant operators called Production Technicians (PTs) and the monthly/annual BDI/DIS SRs are performed under PM WPs by maintenance craft. During the observations of the performance of these tests the PTs and maintenance craft demonstrated adequate proficiency with performing this work.

### **Instrumentation, Measurement and Test Equipment**

Since there is no instrumentation associated with the BDI/DIS that requires calibration and no measurement and test equipment was used for associated TSR surveillances and tests, this aspect of the inspection criteria was not reviewed.

In summary, surveillance and testing activities for the selected BDI/DIS were properly performed in accordance with TSR SRs. Surveillance and testing of the system demonstrates that the system is capable of accomplishing its safety functions and continues to meet applicable system requirements and performance criteria.

### **5.3 B&W Pantex Operations**

This area reviewed Pantex Plant operations to determine if these activities are conducted in a manner that ensures the safety systems are available to perform their intended functions when required.

#### **Accurate Operations Procedures**

Independent Oversight reviewed the set of operating procedures for the BDI/DIS and found these procedures are technically accurate to achieve required system performance for normal operating conditions. In the case of the BDI/DIS, there are no abnormal or emergency conditions requiring a procedure for the system. However, an adequate procedure was in place to address severe weather conditions that would restrict door access in certain bays/cells. Operations procedure F7-5001, *Facility Procedure*, adequately addresses normal operating and severe weather conditions.

#### **Operations Personnel Training**

At the Pantex Plant, nuclear operations are conducted under the direction of the Manager of Nuclear Facility Operations. Facility managers, called Facility Representatives<sup>2</sup>, report to the Manager of Nuclear

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<sup>2</sup> B&W Pantex uses the term “Facility Representatives” refers to B&W Pantex employees who are assigned to

Operations and are assigned to each building within the Pantex Plant facility. PTs perform certain functions for the operations organization (e.g., daily shift checks of bays and cells) but report to Production Section managers, who are outside the nuclear operations part of the Manufacturing Division.

Training for PTs is implemented using the site-wide training process (Plateau). The PTs receive core qualification using a systematic approach to training consistent with DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*. The qualification process includes SC/SS systems training and testing/evaluation to demonstrate the knowledge, skills, and abilities needed to perform assigned duties and was found adequate by Independent Oversight. The PTs who were interviewed and observed by Independent Oversight exhibited adequate knowledge of the BDI/DIS operation and purpose.

B&W Pantex Facility Representatives are responsible for day-to-day nuclear operations. The training and qualification program for these positions was found to include appropriate DSA and TSR topics, including the requirements for the BDI/DIS. Independent Oversight interviewed B&W Pantex Facility Representatives (4) and observed their routine activities, including an operational turnover and bays/cells activities. They were found to be knowledgeable of the safety basis documents and the specific TSR requirements of the BDI/DIS. They are also trained on proper system response. The only failure mode related to the BDI/DIS is the failure of the system to prevent opening of an interlocked door with one door already open. In this case the BDI/DIS for the associated interlocked door set is declared inoperable and the associated LCO is entered. The TSR directed action in this case is to administratively control access to the affected bay or cell so that at least one door remains closed. There are no other failure modes or required actions involved in credible accident scenarios in which the system is required to function. This is covered in the TSR training and B&W Facility Representative qualifications process. All B&W Pantex Facility Representatives had completed the required training and qualification, which included DSA and TSR topical areas.

### **Operational Configuration Control**

During facility walkdowns with B&W Pantex engineers and operations staff, Independent Oversight reviewed selected portions of the BDI/DIS for adherence to proper configuration as identified on plant drawings and procedures. No discrepancies were identified during the walkdowns by Independent Oversight for the BDI/DIS SSCs reviewed. The facility walkdowns found the systems were properly aligned and controlled in accordance with the Manufacturing Division CONOPS manual (MNL-352156) Section 8, *Control of Equipment and System Status*.

Independent Oversight found that facility log entries were appropriate, adequately detailed, and consistent with B&W Pantex directives except as noted below. The required B&W Pantex Facility Representative logbook reviews in multiple buildings were often not performed at least once a month as specified in the Manufacturing Division CONOPS Manual (MNL-352156). In one instance, no B&W Pantex Facility Representative logbook review had occurred since the current log book was initiated in January 2013. In addition, interviews and reviews of the log keeping requirements indicated that B&W Pantex Facility Representatives receive no guidance on the scope of the log review. One B&W Pantex Facility Representative stated that he reviewed the current page of the log, and another stated that he may go back two or three pages but does not go back to the last documented B&W Pantex Facility Representative review. According to B&W Pantex management, the frequency of B&W Pantex Facility Representative

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buildings. The term “Facility Representatives” is also used by DOE to refer to Federal employees assigned to monitor activities in nuclear facilities. To distinguish these two uses, the B&W Pantex Facility Representatives will be referred to as “B&W Pantex Facility Representatives” for the purposes of this report.

reviews is a known issue, but previous actions to correct the problem have not been effective or lasting. (See **OFI-B&W Pantex-Ops-1.**)

### **Conduct of Operations**

During Independent Oversight's field observation of operator activities, PTs were observed executing an operational procedure using a form of communication called "Reader-Worker-Checker." In this process the reader, with the procedure in hand, reads the step to be executed. The worker in turn says "understand" and executes the step, and the third person (the checker) says "check" after the worker has completed the step. This process does not reflect proper three-way communication in that the worker does not repeat back to the reader the procedure step instruction. Without repeat-backs, the reader does not know what was understood by the worker. During an observation of the PTs, the checker said "check" almost reflexively after the worker said "understand." The objective should be to use communication as an effective tool to reduce the likelihood of committing an error during procedure execution, and implementing worker repeat-back would improve the effectiveness of the communication. (See **OFI-B&W Pantex-Ops-2.**)

Independent Oversight further reviewed the Conduction of Operations (CONOPS) matrix submitted in accordance with DOE Order 422.1, *Conduct of Operations*, for the Pantex Plant that PXSO approved in a letter dated March 24, 2011, and the associated CONOPS manuals, one covering the overall Pantex Plant (MNL-00040) and one governing CONOPS specifically for the Manufacturing Division (MNL-352156). Throughout the manuals, the term "guidance" or "guidelines" is used instead of "requirements." Some plant management and staff stated that the information in the manuals contained guidance, and others considered that compliance with the manual was required. However, all agreed that compliance with DOE Order 422.1 and the contractor documents that implement those requirements is management's expectation. (See **OFI-B&W Pantex-Ops-3.**)

The B&W Pantex CONOPS matrices (MNL-00040 and MNL352156) sections covering specific requirement 2.m, *Control of Interrelated Process*, refer to implementing documents that do not specifically address the control of interrelated processes. This specific requirement of DOE Order 422.1 was the only item that substantively changed from the previous Order (DOE Order 5480.19). Specific requirement 2.m under DOE Order 422.1 defines responsibilities for the control of interrelated processes, including those of the nuclear facility operators and the personnel who operate/control the interrelated processes. The intent of this requirement is to establish responsibilities for both the nuclear facility operators and the personnel operating/controlling interrelated processes to ensure that impacts to the nuclear facility are minimized. This includes defining interrelated processes for each nuclear facility, personnel responsibilities and knowledge, and lines of communication between nuclear operators and interrelated process personnel. The intent of these lines of communication is that they flow between groups within the organization so that not only do nuclear facility operations personnel communicate concerns about performance of interrelated processes to those operating/controlling those processes, but that those operating interrelated processes communicate any process problems to the affected nuclear facilities in a timely manner so that actions can be taken to prevent adverse effects on facility safety.

The B&W Pantex Manufacturing CONOPS manual (MNL-352156) does not address interrelated processes. The Pantex Plant site-wide manual (MNL-00040) Section 13.3.1, *Operator Responsibilities*, states that Department Managers/Facility Representatives "establish written guidance in Internal Procedures... specifying personnel responsibilities related to unique processes." Although MNL-00040 does discuss *unique processes* and operator knowledge, training and communication, it does not identify training/qualification or communications requirements for personnel operating/controlling the interrelated processes. Additionally, MNL-00040 does not discuss CONOPS requirements for the control of interrelated processes or identify responsibilities for operations personnel regarding interrelated

processes. Independent Oversight interviewed the B&W Pantex CONOPS Program Manager who stated that B&W Pantex management made the assumption that, just like the other sections of the Order, no substantive changes were made for this requirement when it changed from DOE O 5480.19 to DOE O 422.1. The PXSO-approved CONOPS matrix and the accompanying manuals do not fully address the elements of specific requirement 2.m. (See **OFI-B&W Pantex-Ops-4.**)

In summary, observed operations were conducted in a manner that ensures the availability of safety systems to perform the intended safety functions when required. Reviewed procedures are technically accurate and complete, and operator training for the BDI/DIS is sufficient to meet DOE Order 426.2. PTs and B&W Pantex Facility Representatives are knowledgeable and their training was up-to-date. PTs exhibit an acceptable level of competence in their knowledge of the facility and the BDI/DIS, and B&W Pantex Facility Representatives exhibit a high level of competence in their knowledge of the safety systems. Adequate systems are in place to maintain safety system equipment and system status. Operation of the BDI/DIS is rigorous and meets the assumptions of the safety basis for safe operation. However, management attention is needed to ensure that operator logs are periodically reviewed, that proper three-way communication is employed during operational procedure execution to reduce the potential for human error, and that interrelated processes are better addressed.

#### **5.4 B&W Pantex Cognizant System Engineer Program**

B&W Pantex has established an effective cognizant system engineer (CSE) program as defined in DOE Order 420.1C, *Facility Safety*, to ensure the continued operational readiness of the BDI/DIS to meet their safety functional requirements and performance criteria. B&W Pantex procedure MNL-00054, *System Engineering and Configuration Management Program*, establishes roles and responsibilities and describes the CSE program and its implementing processes and procedures.

CSEs are trained and qualified in accordance with the B&W Pantex Training Implementation Matrix, which defines the site's qualification process elements as required by DOE Order 426.2. Specific training requirements for System Engineering (0627) and other specialties are further defined in a Training Program Description (TPD) in Plateau, the software program used to track training. New CSEs and their supervisors agree on the TPD and qualification card requirements, and CSEs are expected to qualify after a minimum of two years. Full qualification includes formal training courses as defined in the TPD, required reading, and on-the-job training/mentoring with another qualified CSE. This process does not include interim qualification or periodic requalification but does include continuing training, which is documented in the site's training database, Plateau. Independent Oversight reviewed the qualification cards and training records for the primary and backup CSEs for the BDI/DIS to verify compliance with requirements. CSEs meet the requirements and are technically competent, but the qualification cards do not explicitly identify which assigned safety systems they are qualified for; supervisors handle these safety system assignments administratively. Although not required by DOE Order 420.1C, CSE qualification could include system-specific qualifications for full qualification and provide for documentation of qualification on additional systems after full qualification. (See **OFI-B&W Pantex-CSE-1.**)

Some of the CSE responsibilities listed in MNL-00054 (e.g., perform unreviewed safety question evaluations) are no longer applicable or consistent with the qualification card. (See **OFI-B&W Pantex-CSE-2.**) Additionally, the qualification card includes several tasks that are not specified in DOE Order 420.1C (e.g., performing calculations to support engineering design and failure modes and effects analysis), and the current elements of the training program may not ensure that a candidate can perform these tasks independently upon full CSE qualification. (See **OFI-B&W Pantex-CSE-3.**) Several of the tasks listed as CSE responsibilities are infrequently performed (less than once every five years), and some of the tasks have never been performed by most of the CSEs. This increases the risk of human error

during these infrequent tasks, which can affect nuclear safety, since no process is in place to reduce the likelihood of human error (e.g., a technical pre-job brief). (See **OFI-B&W Pantex-CSE-4.**) Overall, however, B&W Pantex has adequately defined CSE qualification and training requirements and is assigning appropriately qualified and experienced CSEs to each vital safety system.

MNL-00054 provides comprehensive guidance for a broad range of system engineering responsibilities. In addition to this baseline procedure, more than a dozen WIs, desk aids, and forms are used to implement the various system engineering program elements. Independent Oversight reviewed these supporting documents, as well as selected samples of CSE system walkdowns, system health reports, assessment reports, and other CSE activities. For example, CSEs conduct material condition (MC) walkdowns in accordance with WI 02.03.12.02.04, *Perform Material Condition Walkdown*, and Deskaid 0090, *Material Condition Walkdown (MCW)*, and document these periodic MC assessments on Form PX-5064, *Material Condition Walkdown Checklist*. These documents are generally adequate, but there are some minor inconsistencies in the program. MNL-00054 does not contain any requirements for documentation of some CSE activities, such as system notebooks and logs; some are more detailed than others, and management's expectations for CSE activities are not clear. (See **OFI-B&W Pantex-CSE-5.**) Also, although MC walkdowns are clearly defined, similar SSC walkdowns are not clearly described or flowed down into CSE responsibilities. (See **OFI-B&W Pantex-CSE-6.**)

In reviewing several selected samples of system health reports, Independent Oversight noted that while the Systems Engineering Department has developed system performance metrics, the system health process does not evaluate the overall health of the system and is not used to drive equipment reliability. The monthly nuclear safety metrics, which represent their version of a system health report, do not objectively evaluate system health and do not include all information related to system health, such as the status of critical spares and obsolescence of SC/SS SSCs. The system health reports focus on failures and do not discuss defects or actions to address defects unless they affect nuclear safety. (See **OFI-B&W Pantex-CSE-7.**)

MNL-00054 also documents the site's protocols for satisfying the CSE program requirements described in DOE Order 420.1C; i.e., CSE program coverage for vital safety systems, configuration management, and CSE support for operations and maintenance. As discussed previously, the various supporting WIs and desk aids adequately address all of the system engineering program elements. Most important are the CSE's daily and routine activities to provide technical support for operations and maintenance and to continually assess the operability, reliability, and material condition of assigned vital safety systems. Independent Oversight reviewed these activities and concluded that the CSE program is effective in ensuring that safety systems can reliably perform as intended.

The management self-assessments (MSAs) for TSR controls, which are scheduled in the annual CAS assessment schedule and performed by the control owner of the specific TSR control every three to five years, are noteworthy. These MSAs include a review of the safety basis (System Engineering also reviews of the supporting calculations), TSR implementation, configuration management, system and equipment verification, operations, maintenance, training, surveillance and testing, and past assessments. In discussions with System Engineering staff and some other control owners, Independent Oversight determined that the MSAs are useful in identifying and resolving issues. Thus, in addition to the periodic MC walkdowns and other routine activities performed by CSEs, the TSR/CAS MSAs provide very detailed and comprehensive safety system assessments to help ensure reliable performance of vital safety systems.

In summary, the CSE program is well-established and is undergoing training and qualification improvements that are expected to have a positive effect on system performance and reliability. The system engineers who were interviewed are appropriately experienced and qualified. However,

management attention is needed to clarify CSE roles, responsibilities, and infrequently-performed tasks, and to improve the rigor and formality of the system health monitoring process.

## **5.5 B&W Pantex Safety System Feedback and Improvement**

A critical aspect of ensuring vital safety system functionality, operability and reliability is a feedback and improvement process incorporating monitoring and trend analysis for system operability; analysis of incidents and off-normal conditions; development, implementation, and evaluation of corrective actions; and dissemination and review of lessons learned. Independent Oversight evaluated the establishment and implementation of feedback and improvement programs and processes that affect nuclear SS systems at the Pantex Plant. Independent Oversight reviewed program and process documents, interviewed responsible managers and staff, and evaluated samples of process outputs, such as assessment and trend reports, performance indicator reports, incident and event analysis reports, lessons-learned publications, and issues management documentation.

B&W Pantex has established a suite of feedback and improvement programs and implementing documents supporting the management of Pantex Plant safety systems. Feedback and improvement processes are described in the quality assurance, contractor assurance system, and integrated safety management system program plans (descriptions). B&W Pantex has issued numerous process descriptions, implementing WIs, desk instructions, and guides for performing assessment activities, issues management, event reporting and analysis, safety basis development and revision, lessons-learned screening and use, and development of performance indicators. In addition, various guidance and links to outside information sources are available on the program owner's home page on the Pantex Plant intranet.

### **Assessment Program**

B&W Pantex has established a robust assessment program that includes management and independent assessments, workplace surveillances, and various safety-related inspections. Annual integrated assessment schedules are developed and maintained using a formal risk-based selection process based on activities for which the organizations are responsible. Management self-assessments are performed for all TSRs on a periodic basis to verify implementation, proper control of maintenance, and overall effectiveness of each control. Independent Oversight reviewed risk models for the 2013 assessments of the Maintenance, Manufacturing, and Engineering organizations. Activities generally appeared to be appropriate, although some key feedback and improvement activities, such as management assessment, lessons learned, event reporting, and issues management, were not included in some of the models. Most of the selected management assessments were mandatory assessments required by DOE or other regulatory directives. The integrated assessment schedules for 2011 through 2013 reflect a variety of management assessments, including nuclear safety-related reviews by the various responsible organizations. B&W Pantex is partnering with NPO in integrating assessment schedules, including NPO shadowing of B&W Pantex assessments and joint assessments. Assessment schedules are reviewed by NPO. Management assessment team leaders are required to take classroom training presented by Governance and Performance Assurance (G&PA) Department personnel, with annual refresher training. Independent Oversight reviewed the course materials for the classroom training and considered the content appropriate for team leaders.

Independent Oversight reviewed the reports for 16 formal management and nine independent assessments conducted in fiscal years (FYs) 2011, 2012, and 2013 that affect Pantex Plant safety systems and processes. Formal plans and CRADs are developed for management and independent assessments. Assessment reports are documented in consistent formats, typically with attached checklists of criteria and compliance results. Most of the assessments reviewed were substantive, well documented evaluations of safety processes and performance, and any identified issues were clearly defined.

Responsible managers review and approve management assessments and ensure that issues are entered into the appropriate issues management processing system. Many assessment activities have identified issues, driving process and performance improvement. Independent assessments include effectiveness reviews for corrective actions for significant issues. These reviews are also thorough and have identified weaknesses in corrective action effectiveness.

The G&PA Department provides oversight, mentoring, and feedback for management assessments. An Assessment Review Team (ART) conducts formal quality reviews of a sampling of management self-assessment reports and provides feedback to assessors and responsible managers. The ART documents non-compliances with the assessment process, including incorrectly categorized assessment issues, in the Electronic Suspense Tracking and Routing System (ESTARS) and its Problem Evaluation Request (PER) module for resolution by the assessing organization. In addition, ART result trends are evaluated to identify broader performance problems that need further management attention. Independent Oversight observed the review process at an ART meeting. The reviews were thorough and have identified weaknesses and deficiencies in assessment program implementation that, in some cases, have resulted in revisions to assessment reports. In many instances, the review meetings include members from line organizations.

In addition to management and independent assessments, B&W Pantex has established a formal workplace surveillance process. B&W Pantex management is focused on improving the performance of these documented workplace surveillances by watching work, verifying procedure adequacy, and ensuring compliance. Many of the surveillances are performed by former PTs with considerable field and operations experience.

B&W Pantex has established and implemented a strong self-assessment program that performs many assessments providing input for improved processes and performance. However, a few weaknesses were noted in the performance and documentation of management assessments. For example, in an assessment of PM (MFG-12-07), the checklist identified that 20 PM WPs were reviewed, and the analysis was that the software needed improvement in processing of work orders and that the criteria were met, but there was no discussion of the issues identified with respect to the work orders. An assessment with NPO (PROJ-12-04-MSA) showed no indication that NPO had reviewed or concurred with the report, and it included non-specific conclusion words in the executive summary (e.g., “subcontractors are complying with the essence of the approach and performing as well as can be expected”). Assessment report PROJ-13-LISTB-23 included issues categorized as observations that appear to be deviations from requirements and should have been findings or weaknesses. In addition, Observations 2 and 3 in that report were not discussed in the attached requirements/implementation matrix. Assessment PA-13-03 (assessment of the B&W Pantex assessment program) identified that in seven of the 50 assessments sampled issues had been incorrectly categorized as observations instead of findings or weaknesses. However, PA-13-03 did not document the excessive number of issue categorization errors (7 of 50, or 14 percent of assessments sampled) as a new deficiency to be addressed. (See **OFI-B&W Pantex-F&I-1.**)

## **Issues Management**

B&W Pantex has established a general suite of WIs and desk aids that detail the processes, requirements, and guidance for documenting, categorizing, evaluating (i.e., causal analysis, extent of condition, and corrective action effectiveness), and correcting deficiencies and identifying opportunities for improvement using a graded approach. Many tools in the form of guidance documents (desk aids), checklists, and record forms are provided to facilitate appropriate application of issues management processes. Independent Oversight reviewed procedures and guidance documents, attended meetings, reviewed a sample of issues management documents for issues identified in the reviewed assessments, and interviewed managers and staff responsible for program administration and implementation. Many

process and performance issues at the Pantex Plant identified either during assessment activities or through incidents and events or proactive initiatives, are formally documented, evaluated, and resolved. PER/ESTARS is used effectively for documenting issues management activities and results and tracking actions to closure. Any employee can initiate a PER. The initiator's Division point of contact (DPOC) processes the PER in accordance with the WI, determines the issue's validity, determines ownership of the issue, and assigns a due date. Assigned issue owners manage the disposition the issue in accordance with the PER WI, employing causal analysts and Price-Anderson Amendments Act coordinator/screeners. The completed PERs reviewed by Independent Oversight were generally well documented and complete, with appropriate analysis and corrective/preventive actions.

A panel of senior managers called the Executive Issues Review Board (EIRB) meets every two weeks, with topics alternating between performance metrics and a general review of emerging issues, actions, and potential precursors. Issues from all sources (e.g., events, assessments, PERs, and NPO) are reviewed daily by an Issues Review Team (IRT) composed of G&PA Department staff and other B&W Pantex organizations to ensure proper management attention to significant or emerging issues, appropriate compensatory measure implementation, and proper application of the issues management process. Another G&PA staff entity called the Corrective Action Review Team (CART) reviews PERs against a checklist of issues management elements, such as timeliness, proper causal analysis type and results, extent of condition, and appropriate corrective actions and recurrence controls. Results are fed back to responsible managers to drive continuous performance improvement. Results are also trended to identify broader performance problems needing further management attention.

For significant issues from events, which management considers "information rich," a more rigorous causal factors analysis (CFA) is performed. B&W Pantex has performed 19 CFAs since 2007. These analyses are performed by a team lead designated by a senior manager using high reliability organization (HRO) techniques and result in judgments of need and lessons learned, in addition to corrective actions developed as part of the PER processing of the event. Independent Oversight reviewed several recent CFA reports and found them to be rigorous and comprehensive, identifying substantive organizational weaknesses and recommendations for addressing them. All management and workers at the Pantex Plant have received some level of training in HRO and human performance improvement (HPI) concepts and application techniques. Subject matter experts (SMEs) in the Environment, Safety, Health and Quality (ESH&Q) Division also provide assistance upon request to division managers in evaluating events or adverse trends by performing HRO investigations in accordance with available industry organization (e.g., Institute for Nuclear Power Operations) tools and techniques. The processes and techniques for conducting HRO investigations and applying HRO/HPI concepts in the field are contained in manuals but have not been put into implementing WIs or integrated into other processes. There are no senior management drivers or process champions to maintain and encourage application in the field.

For over 11 years, B&W Pantex has generated and maintained a program for continuous improvement in the areas of weapons and operations quality, administered by the ESH&Q Division. The projects, DPOCs, specified actions and responsible parties, and action/project status are detailed in the Quality Assurance Improvement Plan which is updated quarterly. Current projects include such topics as improving issues management processes, weapon related non-conformances, the operating experience program, developing a tooling quality manual, enhancing the CGD process, and strengthening the assessment program and the workplace surveillance program, which involves B&W Pantex employees and management.

Notwithstanding the general robustness of the management of issues by B&W Pantex, complexity and ambiguity in the many and various process documents (WIs and desk aids) present opportunities for improvement. Successful issues management at the Pantex Plant relies heavily on multiple layers of involvement of SMEs (i.e., DPOCs, G&PA staff, causal analysis team leads, and facilitators) and the

engagement and daily oversight and mentoring provided by the G&PA staff (e.g., IRT, CART, EIRB). WIs (requirements documents) for issues management processes do not define such terms as findings, weaknesses, and Process Improvement Enhancement/Continuous Improvement items. Other terms, such as “full” causal analysis, “natural team,” “natural team leader,” “facilitator,” and “MP” (i.e., “mistake proofing”) are used in WIs but are not defined in desk aids (guidance documents), which include process requirements and descriptions of terms. The requirements for the type of causal analysis to be used for different types and significance of issues are specified in guidance desk aids. Verification of corrective action effectiveness is detailed in a guidance desk aid specifying when an effectiveness review “should” be performed. The WI on the graded approach for causal analysis identifies 15 categories of issues and five guidance desk aids.

The desk aid for corrective action planning for judgments of needs (from CFAs) provides guidance and direction (e.g., “a PER is not needed”), but no clearly defined requirements for when a PER should be generated to address an identified need/weakness from the analysis. It does not address any other method for tracking the disposition of recommendations/actions for addressing judgments of need. This shortcoming in requirements definition is potentially most problematic because CFAs are typically applied to the most significant events or conditions.

The WI for managing PERs provides some action steps that lack discrete assignments for specific responsible parties and implementing action steps that exceed the scope of the specified action. For example, an action step requires DPOCs to determine the “validity” of a PER without defining or providing examples of what would be valid or invalid. Action steps describe adjusting due dates without guidance or target timeframes, conflicting with the desk aid in the case of critiques. The implementing action step to add an effectiveness review needs qualification regarding when it must be added, because many PERs do not require effectiveness reviews. The implementing action step for the DPOC to “select a person to conduct trending” provides inadequate detail as to who can be selected or what the “trending” action is. (See **OFI-B&W Pantex-F&I-2.**)

## **Event Reporting and Analysis**

B&W Pantex has established well defined processes for identifying, investigating, and reporting reportable events, periodically analyzing performance trends for incidents or events, and conducting critiques for non-reportable incidents and reportable events. WIs and desk aids define the requirements, expectations, and guidance for managing incidents and events, including critiques and reporting to DOE as required by DOE directives. To evaluate these processes and their implementation, Independent Oversight reviewed process documents and a sample of calendar year (CY) 2012 and CY 2013 B&W Pantex event and critique reports, attended an event critique, and interviewed the SMEs responsible for event reporting and critique oversight. PDs adequately specify the responsibilities and action steps for immediate response to incidents, including emergency actions, scene preservation, determining the need for work stoppage, categorization, investigation (including the conduct of critiques), reporting to DOE, and periodic trend analysis of events. Desk aids provide a quality checklist for event reports, guidance on when a critique is required, a critique activity checklist, and supporting forms for fact sheets and personal statements. Event reports reviewed by Independent Oversight adequately documented the event details and the resulting analysis and corrective actions as required by DOE directives and site processes.

B&W Pantex conducted approximately nine critiques per month in FY 2013, reflecting an appropriately low threshold for identification and investigation of anomalous incidents and conditions. Critique directors are required to complete formal training before facilitating a critique. The critique observed by Independent Oversight was well managed by the critique director and included identification of event facts, understanding of supporting processes and historical conditions, and productive discussion of the associated processes and activities by personnel involved in the incident and managers responsible for

involved personnel. Every critique is observed by a SME from the G&PA Department, who uses a checklist to evaluate the conduct and results of the critique and provides constructive feedback (positive and negative) and suggestions for improvement to the critique director at the close of the meeting.

### **Performance Indicators**

B&W Pantex functional and organization managers are required to develop metrics to measure performance in their organizations, evaluate data for trends, and generate PERs if needed to track corrective actions. Senior management is directed to establish metrics for the EIRB with “stoplight” color ratings and target goals that are presented and discussed at monthly EIRB metrics meetings. Expectations and general requirements for developing performance indicators are specified in a WI. Independent Oversight reviewed the WI, guidance on intranet website, and a sampling of performance metrics.

Although site organizations generate many metrics and higher-level metrics are presented to the EIRB for senior management review, the WI lacks specificity, and it details actions for developing and presenting Line Oversight/Contractor Assurance System performance metrics that are no longer required by NPO. Many of the published metrics that Independent Oversight reviewed lacked established goals or action levels, and many did not analyze the data presented or identify actions or justification for no action. NPO has also identified this as a concern. (See **OFI-B&W Pantex-F&I-3.**)

### **Lessons Learned**

B&W Pantex has established and implemented a robust operating experience/lessons learned program that identifies, evaluates, and provides for appropriate application of lessons learned from external operating experience and internal activities, conditions, and events. The program requirements and expectations are defined in a B&W Pantex WI and two desk aids as part of the quality feedback and improvement process description. The program includes a content-rich and user-friendly intranet site and a designated company program coordinator, who maintains formal documentation, manages screening activities and evaluations, and monitors application actions. The program coordinator provides support for plant personnel and division lessons-learned coordinators in identifying and developing lessons learned. The program coordinator and the industrial safety SME, as well as division lessons-learned coordinators, screen externally generated operating experience reports and disseminate them to SMEs for further applicability evaluations or to potential end users. The approximately 18 division/department-level lessons-learned coordinators are directed to subscribe to receive operating experience reports for applicable topics/functional areas from the DOE Headquarters operating experience program. In the past year, approximately 50 lessons learned were generated internally and approximately 200 externally generated lessons learned were screened and distributed.

The program coordinator routinely interfaces with Division coordinators regarding the applicability of operating experience information and the lessons-learned process. The program coordinator also meets quarterly with the designated NPO operating experience program staff member to determine whether any locally generated lessons are suitable for forwarding to DOE Headquarters for complex-wide distribution.

The WIs for developing maintenance work orders and for training include specific responsibilities for reviewing and including lessons learned in work control packages and lesson plans. The program coordinator maintains a spreadsheet of the externally generated lessons that are screened, the evaluation results, and feedback on actions taken from division/department coordinators. The coordinator summarizes and trends feedback and use data. Value-added management assessments of the program were performed by the program coordinator in 2010 and a B&W parent company review of the contractor assurance system in July 2012.

## Activity-Level Feedback and Improvement

B&W Pantex has defined the requirements, expectations, and processes for executing maintenance work and providing feedback on maintenance activities in a WI, desk aids, and forms for documenting work activities and feedback information. Craft workers document work performed, problems encountered, and equipment that needs repair or additional work on the work performance record form, including a specific section on feedback to planners. Craft supervisors are required to conduct post-job reviews with craft workers to discuss this work performance and feedback information. Craft supervisors are required to contact the planner to provide feedback regarding the work package and activity ensure that any needed corrective actions are initiated, and follow up with workers on the resolution of any feedback issues. Maintenance Programs Department personnel are responsible for coordinating the resolution of any issues identified by the crafts on the work performance record form. Sections 5.1 and 5.3 of this report provide additional discussion on post-job reviews and activity-level feedback processes.

In summary, B&W Pantex has established and effectively implemented the elements of an appropriate assurance system supporting the management of safety systems. However, improvements are needed in identifying topics for management assessments, properly categorizing issues, clarifying terminology and process steps in issues management WIs, and strengthening the content and presentation of performance metrics to consistently include defined thresholds, analysis, and action information.

## 5.6 NPO Safety System Oversight Program

NPO has established and implemented an effective safety system oversight (SSO) program as defined in DOE Order 426.1, *Federal Technical Capability*, for qualifying staff to apply expertise in their oversight of assigned safety systems to ensure that the systems will perform as required by the safety basis and to monitor performance of the contractor's CSE program. NPO procedure NPO-3.4.1.1.1, *Safety System Oversight Program*, identifies the roles and responsibilities for SSO personnel and associated management and also establishes the program requirements related to the oversight of vital safety systems.

SSO personnel are trained and qualified in accordance with NPO-2.2.3.1, *Technical Training and Qualification Program*, and NPO-2.2.3.1.5, *Safety System Oversight Qualification Standard* (final approval pending at the time of this review). Independent Oversight reviewed the qualification cards and training records for the primary and backup SSO personnel for the BDI/DIS to verify compliance with requirements. Independent Oversight found the SSO personnel meet the requirements and are technically competent, but the qualification cards do not explicitly identify their assigned safety systems requiring qualification. Additionally, SSO personnel are expected to complete a mechanical engineering, electrical engineering, or fire protection engineering qualification, with sufficient site-specific requirements to cross-qualify each across their normal boundaries. This degree of qualification was cited as a noteworthy practice in the last Chief of Defense Nuclear Safety biennial review in 2011, and Independent Oversight generally concurs in part with this conclusion; however, although not required by DOE Order 420.1C, SSO qualification could include system-specific qualifications for full qualification and provide for documentation of qualification on additional systems after full qualification. (See **OFI-NPO Pantex-SSO-1**.) Overall, NPO has adequately defined SSO qualification and training requirements and has assigned appropriately qualified and experienced SSO personnel to each vital safety system.

NPO updated the Pantex Plant SSO staffing analysis in July 2013 in accordance with DOE-STD-1151 and determined that it needs an average of 4.8 full-time equivalents. Independent Oversight agrees with this needs analysis. There are currently only three qualified SSO personnel; a nuclear explosive safety intern is assigned to the program, and a project engineer is scheduled to transfer into the program in early 2014. Primary and backup SSO personnel are assigned to each of the 13 vital safety systems and five

safety management programs. Based on an FY 2010 self-assessment of PXSO engineering activities, a degreed mechanical engineer was added to the SSO staff in 2011. Independent Oversight reviewed the staffing analysis and discussed the assignment workload with the SSO lead and determined that current assignments are challenging but manageable. With the retirement of the lead SSO in the past year and no further addition to the SSO staff until 2014, the current staffing is barely adequate. NPO has already identified this as an issue, and Independent Oversight concurs that the path forward with the new SSO personnel should restore the health of the SSO program over the next year.

Per NPO-3.4.1.1.1, SSO personnel routinely review the contractor records on system performance and conduct field observations on system operation. SSO personnel also conduct detailed, comprehensive system assessments on a quarterly basis that are scheduled on the Master Assessment Schedule. SSO personnel conduct these assessments as required by NA-1 SD226.1A, *NNSA Line Oversight and Contractor Assurance System Supplemental Directive*. Independent Oversight reviewed several Safety System Functional Assessment reports for recent quarters and found that SSO personnel appropriately used the established assessment criteria and guidelines to review the major activities for the BDI/DIS: safety basis documentation; material condition; and, configuration management, maintenance, and surveillance testing. Additionally, SSO personnel assess the contractor's CSE program every five years. Independent Oversight reviewed the recently completed 2012 assessment report to verify that SSO personnel used the established in-depth five-year assessment criteria to conduct the scheduled comprehensive program review during August-September 2012. This CSE program assessment identified one finding and six performance problems; Independent Oversight concurs with the identified issues and notes that the assessment was sufficiently comprehensive. Overall, the SSO personnel are adequately performing routine and periodic oversight of their assigned systems.

## **5.7 NPO Oversight/Feedback and Improvement**

In addition to the focused review of the NPO SSO program, Independent Oversight performed a broader evaluation of the establishment and implementation of NPO programs and processes for conducting oversight of B&W Pantex management and operation of nuclear safety systems and NPO internal feedback and improvement systems and performance. Independent Oversight reviewed program and process documents, interviewed responsible managers and staff, and evaluated samples of process outputs (e.g., assessment schedules; assessment, surveillance, and operational awareness reports; issues management data; and contract performance-based incentive criteria and evaluations).

### **Management Oversight**

In June 2012, NNSA initiated the combination of the Y-12 and Pantex Plant field offices into single field element called the NNSA Production Office (NPO). This reorganization/consolidation was to be implemented along with the awarding of the management and operation (M&O) contract of both sites to a single contractor, objectives that have been planned since 2009. The objective of the consolidation was increased efficiency (combined resources, fewer managers, consolidated evaluations and reporting) and a new governance model with streamlined processes, reduced bureaucracy, and oversight more focused on performance and effective contractor assurance system. A formal standup plan was issued in September 2012 documenting the goals, objectives, roles and responsibilities, schedules, and actions to implement the NPO. An unexpected factor affecting the consolidation process was the delay in awarding the consolidated M&O contract for both sites. The plan describes a phased transition strategy to minimize disruption of continuing operations and oversight functions. Three phases are identified: merger, transition, and consolidation. This Independent Oversight review was conducted during the initial part of the transition phase, with many of the identified actions completed and some in progress. At the time of this review, as reflected in the standup plan, the combined organizational structure had been established, with managers and staff selected and assigned to their positions. Also at the time of this review,

command media in the form of 74 policies, procedures, guidance, and forms had been identified, and approximately a third of them have been issued, including some assistant manager (AM)-level implementing procedures. Thus, the operations and oversight functions at the Pantex Plant were being executed using a combination of historical and new policies and procedures. The new policies and procedures did not, however, alter the basic framework and implementation of oversight at the Pantex Plant, which consists of independently performed assessments, shadowing of contractor self-assessments, operational awareness by Facility Representatives (FRs) and SMEs, safety document review and approval, metrics reviews, event analysis, quarterly issues management meetings, and annual contractor performance evaluations.

A new policy describes the NPO oversight processes, and new procedures describe the processes for oversight planning and occurrence reporting and processing of operations information. An NPO procedure for issues management had not yet been issued. The NPO Nuclear Safety and Engineering organization has issued implementing procedures for SSO, criticality safety oversight, and issues evaluation and management. The NPO Operations Management organization has issued a new FR program qualification standard, and the NPO ESH&Q organization has drafted a guidance document for oversight. Independent Oversight's review of the new procedures identified a number of omissions and weaknesses that warrant management attention. (See **OFI-NPO Pantex-F&I-1.**) For example:

- The NPO oversight process procedure lacks sufficient detail in a number of areas. It has no explicit linkage to the NPO oversight planning process procedure (NPO-3.1.2) or any process steps for managing issues. The procedure consists primarily of a flowchart of actions and decision points and a listing of responsibilities, typically using “should” or “may” statements. The terminology is sometimes insufficiently defined and/or confusing (e.g., “informal assessments” are not described in the oversight planning procedure; preplanned and scheduled oversight activities are “generally” documented in a report, without citing allowed exceptions; and the quarterly issues management meeting is briefly described, without details of responsibilities or process). The procedure states that AMs “may be” assigned various specific responsibilities without indicating who will assign the responsibility, the drivers, the requirements for accomplishing the action, or the expected output. The process flowchart and text includes process, input, action, and decision points that lack sufficient detail or definition. Examples include AM guidance on metric reviews (“may” be provided to staff members), “[contractor assurance system] information from contractor counterpart,” and “progress sufficient to drop issue from watch list” (undefined). AMs are given discretion to determine the format of oversight reporting, the frequency and mode of communicating the results, and the recipients (unspecified, but assumed to be the contractor or NPO/NNSA management).
- The NPO oversight process procedure provides new definitions for issues identified by NPO as Findings, Performance Problems, and Management Concerns. Findings are defined as a violation of “performance requirements that in the judgment of the assessor could have an immediate effect or systematic impact to mission accomplishment.” Performance Problems are defined as any issue that is not a finding, including weaknesses, observations, and technical inaccuracies (all undefined), as well as opportunities for improvement. All of these are identified as issues that are judged to not have a systemic impact on mission accomplishment. Management Concerns are defined as “broad scoped or significant system breakdowns in management or operations.” Along with the lack of definition of terms, the ambiguity and the discretion allowed to assessors and management in determining “immediate” effect or impact (as opposed to a longer term or delayed effect or impact) are too subjective and NPO management should clarify its expectations.
- The NPO oversight process procedure does not address the processing of issues identified by NPO self-assessments or discuss expectations or requirements for the content of contractor or NPO responses/management of issues, such as causal analysis, extent of condition, recurrence controls,

timeframes for actions and issue closure, effectiveness reviews, guidance on corrective action development, or trending of issue data.

- There are no issued or planned NPO procedures that provide the requirements and processes for performing assessments, issuing assessment reports, and managing issues identified by NPO oversight activities. Items that are not addressed include reporting format, review, approval, and issuance, and issue causal analysis, extent of condition, action and closure timeframes, assignment of ownership, use of the issues tracking system, and communication of issues to the contractor.
- The NPO oversight planning process procedure inadequately explains the development of the list of “system elements” that provides the foundation for identifying assessment areas and priorities. The discussion section describes hierarchical diagrams of a “system” with terms such as “subject” and examples of “risk” and “cost.” It is unclear what a “subject” such as “risk” means in the context of systems or system elements warranting Federal oversight. The risk-ranking discussion identifies “boxes” and “tiers” of the hierarchy previously described and developed, but those terms are not used in the hierarchy diagram discussion. This section also uses the undefined/unexplained term of “specific aim.” The section describing assigning oversight levels and creating a schedule provides a discussion of “dial settings” in Step 4, which is confusing for a number of reasons (e.g., there have been no identified steps 1, 2, or 3 and the discussion states that contractors and DOE have worked together to get through the first three steps, although contractor involvement in the planning process has not been described in the procedure). This section also describes “sampling” the contractor reports as Level 1 (low level) oversight but does not describe what constitutes sampling (e.g., evaluating how well the contractor evaluates the element, what criteria the contractor uses, whether the contractor has identified significant or numerous performance issues indicating a need to increase the level of DOE oversight for that element). Level 2 oversight (medium risk) is described as shadowing the contractor’s assessment of the element, but no details are provided on what actions are required/expected in performing, evaluating, or documenting a shadow assessment. Although the procedure is titled “oversight” planning, it focuses completely on assessment activity, with only an oblique, single-sentence reference to two other essential elements of Federal oversight (i.e., operations awareness and metrics reviews) and does not mention other oversight activities cited in the oversight process procedure, such as the quarterly issues management meeting.

Independent Oversight reviewed the NPO FY 2012 and FY 2013 Site Integrated Assessment Plans for the Pantex Plant, a sample of NPO assessments of B&W Pantex and self-assessments, surveillance reports, FR CONOPS and maintenance monthly “quick check” reports, NPO Operations Management weekly report of FR activities, and quarterly issues management meeting reports from the previous 18 months. The assessment activities documented in these reports were generally thorough and adequately documented, and they provided value in evaluating and improving contractor safety processes and performance. However, Independent Oversight identified several problems in the documentation of these assessment activities. Some assessment reports identified issues (findings, weaknesses, or performance problems) that were not input to the ePegasus tracking system. In one case, CRAD checklists used contradictory terms for issues specifying the “Finding Designation” for issues as “Weaknesses” or “Observations.” Only three safety-related NPO self-assessments were scheduled for FY 2013, one each in emergency management (directive mandated), operations management (FR directive mandated), and nuclear explosive safety oversight (directive mandated). (See **OFI-NPO Pantex-F&I-2.**)

### **Facility Representative Program**

NPO has established an effective FR program as defined in DOE-STD-1063-2011, *Facility Representatives*, for qualifying staff to monitor the safety performance and the day-to-day operational status of their assigned facilities. Independent Oversight reviewed NPO procedure NPO-3.4.1.4, *NPO*

*Facility Representative Program*, the current implementing document for the FR program, to verify the program adequately satisfies the requirements of STD-1063.

FRs are trained and qualified in accordance with NPO-2.2.3.1, *Technical Training and Qualification Program*, and NPO-2.2.3.1.4, *Facility Representative Qualification Standard*. As required by STD-1063, the NPO FR qualification includes the DOE-STD-1151 FR functional area qualification standard and site-/facility-specific competencies. Candidates must successfully pass a facility walkthrough, a written examination, and an oral board for full qualification, with requalification required every five years. Independent Oversight reviewed the qualification cards for several FRs and determined that they are well-trained and qualified.

NPO updated the Pantex Plant FR program staffing analysis in July 2013 in accordance with DOE-STD-1151 and determined that it needs an average of 8.5 full-time equivalents. Independent Oversight agrees with this needs analysis. There are currently only seven qualified FRs plus the Deputy AM for Operations Management, who supervises the FRs. NPO plans to hire at least one additional FR when sequestration ends. FRs are adequately assigned to cover the 52 facilities and systems at the Pantex Plant, with other facilities covered as Balance of Plant. FRs are also assigned as backups to other FRs. Independent Oversight reviewed the FR staffing analysis and assignments list and, based on interviews with several FRs, determined that the current FR coverage with the path forward to hire an additional FR is adequate for all of the facilities on site.

Per NPO-3.4.1.4, FRs at NPO are responsible for several different nuclear safety oversight activities, and management uses the FR assessment results as a source for evaluating the contractor's effectiveness in performing operations in a safe and efficient manner. Independent Oversight attended a FR morning call to review daily activities and observed an FR conducting a facility walkdown. FRs typically document their observations of facility operations and maintenance using "quick checks" that are maintained electronically on the NPO SharePoint website. FRs also maintain a logbook as needed, but primarily it is the FR oversight records (e.g., quick checks, program assessments, weekly reports) that line management uses to assess nuclear safety and contractor performance. Based in part on discussions with several FRs, Independent Oversight determined that FRs provide effective oversight and are adequately communicating their results to NPO management.

## **Issues Management**

NPO uses the computer-based issues tracking system ePegasus to document field activities and surveillances and to manage issues identified by NPO through operational awareness or assessment activities. However, there is no NPO procedure detailing the requirements or process for managing issues and an issues management procedure is not on the list of command media issued or planned for NPO. Previous issues were entered in ePegasus as Findings, Weaknesses, or Observations, but they are now to be documented as Findings, Performance Problems, or Management Concerns. Independent Oversight reviewed a sample of issues from ePegasus that had been closed in the previous ten months and identified a number of weaknesses in documented information, such as lack of documented closure dates and lack of documentation summarizing actions taken or the basis for closure. (See **OFI-NPO Pantex-F&I-3**.)

B&W Pantex provides NPO with quarterly contractor assurance system performance reports. NPO reviews these reports and provides formal feedback and input from NPO oversight activity results, identifying agreement or discrepancies with the contractor's conclusions. In some instances, NPO requires further actions/responses to new issues or trends identified by either the contractor or DOE performance reviews.

NPO employs a contract award fee process with a variety of performance-based incentives to prioritize and monitor contractor performance to ensure or improve nuclear safety. Independent Oversight reviewed the FY 2012 and FY 2013 Performance Evaluation Plans (PEPs) for B&W Pantex, the associated FY 2012 performance evaluation/award fee determination report, and the mid-year FY 2013 performance evaluation/award fee determination report. NNSA Headquarters significantly revised the approach to contractor performance evaluations for FY 2013 and now uses what they characterize as a Strategic PEP. For 2012, there were three performance areas (program, operations, and business/institutional management), with 23 performance incentives for program, 22 for operations, and 2 for business management, each one with specifically defined measures, targets, and required documentation. At least eleven of these incentives directly involved nuclear safety related performance improvement. Incentive fee was essentially equally split among the three performance areas. Under the new Strategic PEP approach for FY 2013, the plan was a much less detailed set of generic NNSA performance objectives, (nuclear weapons mission, broader national security mission, science, technology and engineering mission, security infrastructure, environmental stewardship and institutional management, and contractor leadership) with at risk fee breakdown of 33, 2, 2, 53, and 10 percent respectively. The FY 2013 PEP performance objective for security, infrastructure, environmental stewardship, and institutional management included a general object statement of effectively and efficiently managing the operation of the site, demonstrating accountability for mission performance and management controls and maintaining excellence as a 21st century government owned, contractor operated facility. The objective also identified several contributing factors with respect to nuclear safety performance including delivery of an efficient and effective quality assurance system and environment, safety and health management processes. Pantex Plant site-specific “outcomes” for this objective included maintenance and demonstration of effective use of a comprehensive, transparent, and integrated contractor assurance system and successful execution of the engineering and nuclear safety programs. The contractor leadership objective cited, as contributing factors, creating a work environment that achieves compliant and effective safety performance and leading a culture of critical self-assessment. No specific measures, targets, or deliverables were identified. The lack of specificity in the new PEP objectives provides for less direct communication of expectations to individual contractors, specifies no commonly understood measures of performance, and will potentially result in a more subjective evaluation of performance by both the contractor and DOE. (See **OFI-NPO Pantex-F&I-4.**)

In summary, NPO has implemented generally effective programs and processes for conducting daily and collective oversight of B&W Pantex management and operation of nuclear safety systems and related activities. FRs and SMEs provide effective assessments and continuous, routine operational awareness and surveillance feedback to the contractor and DOE management. However, new NPO procedures do not sufficiently define the requirements and processes for conducting consistent and effective oversight activities. In addition, no procedures have been planned or issued to detail the requirements and processes for two essential elements of oversight, assessment performance and reporting, and management of issues. Improvement is needed in the documentation of assessments and documentation of issue closure in ePegasus. NPO has also established and implements an annual performance evaluation process with award fee incentives evaluated against general performance objectives with elements related to nuclear safety performance. However, the lack of specific criteria measures in the new NNSA performance evaluation plan may result in less defined and understood expectations and more subjective evaluations of performance by both NPO and the contractor.

## **6.0 CONCLUSIONS**

Overall, B&W Pantex has established and implemented the programs and processes necessary for effective management of the BDI/DIS at the Pantex Plant. The Pantex Plant programs and procedures are generally adequate, and the activities observed by Independent Oversight were properly planned,

scheduled and executed. Surveillance test activities observed were consistent with the approved safety basis documents and the CSE program was found to be effective in ensuring continued operational readiness of identified systems to meet safety function requirements and performance criteria. B&W Pantex operations, maintenance and CSE staff observed and/or interviewed were knowledgeable and properly trained to ensure that the BDI/DIS were at an acceptable level of equipment reliability. B&W Pantex has also established and implemented the elements of an appropriate assurance system supporting the management of safety systems at the site. The implementation of these elements was also found to be generally effective, and B&W Pantex is identifying and correcting process and performance deficiencies and identifying and implementing opportunities for improvement.

Management attention is needed in some areas of implementation of the programs and processes used to ensure the continued readiness of safety systems at the Pantex Plant. For example, processes used to conduct job-specific pre-job briefings should be applied for all maintenance activities (using a graded approach) instead of only conducting pre-job briefs for complex, hazardous and non-routine work activities. Control of SC/SS spare parts and the procurement of those parts should also be improved to ensure that the proper parts are installed during maintenance activities. In addition, management assessment effectiveness should be strengthened to provide assurance that SC/SS topical areas are rigorously assessed and accurately reported.

NPO has generally implemented an effective suite of programs and processes for conducting daily and collective oversight of B&W Pantex management and operation of nuclear safety systems and related activities. NPO FRs and SSOs provide effective assessments and continuous, routine operational awareness and surveillance feedback to the contractor and DOE management. However, the new NPO oversight procedures should be reviewed and revised to better delineate responsibilities, actions, and processes for implementing oversight of the contractor, and additional procedures are needed to detail requirements and processes for the conduct of assessments and the management of issues. NPO also needs improvement in providing assurance that issues from assessments are entered in to the tracking system, that sufficient statements summarizing the basis for closure of issues are documented in the issues tracking system, that more site-specific performance objectives are developed, and that defined criteria and measures are included in performance objectives.

## **7.0 FINDINGS**

Findings represent identified deviations from the regulatory or procedural requirements. These must be addressed by the site office and contractor management formally with an appropriately graded analysis of the causes and extent of condition, followed by development and implementation of a corrective action plan, effectiveness evaluation, and closure.

None.

## **8.0 OPPORTUNITIES FOR IMPROVEMENT**

This Independent Oversight review identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive or mandatory. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management organizations and accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and priorities.

## **B&W Pantex**

**OFI-B&W Pantex-Maint-1:** B&W Pantex should revise the Pantex site-wide SAR to identify maintenance as a SMP at the next annual update be in full compliance with DOE Order 433.1B and to ensure that all required reviews and activities assigned to SMPs are consistently applied.

**OFI-B&W Pantex-Maint-2:** B&W Pantex should conduct an extent-of-condition review for the issues identified by NPO and observed by Independent Oversight in the area of safety system maintenance work package implementation.

**OFI-B&W Pantex-Maint-3:** B&W Pantex should conduct pre-job briefings for all work activities on a graded approach to ensure that workers are fully prepared and have an opportunity to discuss issues, concerns, hazards, and questions about the tasks they are about to perform.

**OFI-B&W Pantex-Maint-4:** B&W Pantex should consider additional controls and inspections of the SC parts storage to ensure that the correct parts are issued for use in SC/SS applications.

**OFI-B&W Pantex-Ops-1:** B&W Pantex should determine the optimum time period for log reviews and provide guidance to those reviewing the logs on management expectations for the review to ensure that all of the entries receive a review.

**OFI-B&W Pantex-Ops-2:** B&W Pantex should implement repeat-backs as part of the Reader-Worker-Checker communication process.

**OFI-B&W Pantex-Ops-3:** B&W Pantex should revise the CONOPS manuals to clarify that the elements of the documents are requirements, not guidance.

**OFI-B&W Pantex-Ops-4:** B&W Pantex should update the CONOPS matrix and accompanying manuals that support compliance with DOE Order 422.1, *Conduct of Operations*, to fully address the required elements for specific requirement 2.m, *Control of Interrelated Processes*, for personnel operating/controlling interrelated processes.

**OFI-B&W Pantex-CSE-1:** The B&W Pantex CSE qualification should include system-specific qualification requirements.

**OFI-B&W Pantex-CSE-2:** B&W Pantex should review procedure MNL-00054 to ensure that all CSE responsibilities are applicable and consistent with the qualification card.

**OFI-B&W Pantex-CSE-3:** B&W Pantex should review the CSE qualification card to ensure that it does not include tasks that are not specific to DOE Order 420.1C, and that the current elements are more clearly defined so that a candidate can perform the tasks not related to the order independently upon full qualification.

**OFI-B&W Pantex-CSE-4:** B&W Pantex should consider use of a technical pre-job brief in instances where engineering tasks are complex and/or infrequently performed to reduce the likelihood of introducing human error that could affect associated SC/SS SSCs safety status/reliability.

**OFI-B&W Pantex-CSE-5:** B&W Pantex should revise procedure MNL-0054 to define requirements for the documentation of some CSE activities, such as system notebooks and logs.

**OFI-B&W Pantex-CSE-6: B&W Pantex should revise procedure MNL-00054 to more clearly describe SSC walkdowns and be flowed down into CSE responsibilities.**

**OFI-B&W Pantex-CSE-7: B&W Pantex should update its system health process to include additional rigor and formality to increase senior management's understanding of the risks being accepted due to degraded system attributes/conditions.**

**OFI-B&W Pantex-F&I-1: B&W Pantex should strengthen its planning and performance of management assessments to provide greater assurance that safety-related topical areas are rigorously and effectively assessed and accurately reported.** Specific actions to consider include:

- Ensure that organizations include appropriate elective assessments of activities and processes in addition to mandatory assessments driven by applicable standards and directives. Ensure that risk model listing of organization activities include all feedback and improvement elements as applicable activities for screening and scoring for self-assessment.
- Increase scrutiny by responsible managers and the assessment review team on the categorization of observations, weaknesses and findings to ensure that issues are appropriately documented.

**OFI-B&W Pantex-F&I-2: B&W Pantex should strengthen its processes for managing safety issues to provide clear direction on requirements, terminology, and implementing action steps in alignment with actual implementing practices.** Specific actions to consider include:

- Incorporate definition of terms in issues management work instructions (requirements documents), especially with regards to categorization of issues.
- Ensure that work instructions contain adequately defined required actions and desk aids provide only guidance and optional actions.
- Review processes to identify opportunities to formally incorporate the application of HRO and HPI concepts and techniques into activities.

**OFI-B&W Pantex-F&I-3: B&W Pantex should strengthen its performance indicator program implementation.** Specific actions to consider include:

- Establish a standard format for presentation of performance indicators and ensure that metric presentations include defined and monitored action levels and color rating thresholds, definitive analysis sections that describe the status, trends, and significance of the data, and corrective action sections that describe needed actions (including monitoring) and responsible parties.

## **NPO-Pantex**

**OFI-NPO Pantex-SSO-1: NPO should include system-specific qualification requirements in its SSO qualification.**

**OFI-NPO Pantex-F&I-1: NPO should strengthen its new oversight procedures.** Specific actions to consider include:

- Develop and issue a procedure detailing the requirements and processes for managing issues identified by NPO, addressing issues that are the responsibility of both DOE and the contractor. Clarify the definitions and criteria for issue types to eliminate ambiguities and ensure consistent, objective classification. Include details on requirements and expectations for processing the types of issues by either the contractor or NPO, including guidance on when a response or corrective action plan is required. Include requirements, expectations and guidance related to determining causes, extent of condition, corrective and preventive actions, effectiveness reviews, etc.

- Develop and issue a procedure or procedures detailing the requirements, expectations, and guidance for the content, planning, performance, documentation of each type of assessment/oversight activity to include content, report format, review and management approval, etc.
- Include self-assessment of DOE processes and activities in the oversight process procedure.
- Review the oversight process and oversight planning procedures and ensure sufficient detail is provided, terminology is defined, and processes, requirements, and responsibilities are unambiguously defined. Provide specific references/linkage in procedures where there is an interface with other procedures.
- Ensure/direct that each AM reviews all NPO procedures to identify and develop as appropriate implementing procedures and guidance documents as the Nuclear Safety and Engineering organization has done.

**OFI-NPO Pantex-F&I-2: NPO should strengthen its assessment program.** Specific actions to consider include:

- Establish review process or process mechanism to ensure all issues identified in oversight activities are input to the issue tracking tool.
- Ensure that internal NPO processes and performance are being evaluated for the need to conduct self-assessments and incorporated into the improvement plan.

**OFI-NPO Pantex-F&I-3: NPO should strengthen its issues management program.** Specific actions to consider include:

- Review the process and implement review mechanisms to ensure that sufficient detail is documented in the issues tracking system to summarize actions taken and to provide a defensible basis for closure of issues.

**OFI-NPO Pantex-F&I-4: NPO should strengthen its contractor annual performance evaluation measures.** Specific actions to consider include:

- Include additional and more definitive site specific performance objective elements with defined criteria, measures, goals, and deliverables in the PEP.
- Provide the contractor with amplification of the generic performance objectives providing more specific expectations for meeting the objectives and providing a common basis for contractor and NPO evaluation of performance to those objectives.

## **Appendix A Supplemental Information**

### **Dates of Review**

Scoping Visit: July 1-2, 2013

Onsite Review: July 22-31, 2013

### **Office of Health, Safety and Security Management**

Glenn S. Podonsky, Chief Health, Safety and Security Officer

William A. Eckroade, Principal Deputy Chief for Mission Support Operations

John S. Boulden III, Director, Office of Enforcement and Oversight

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William E. Miller, Deputy Director, Office of Safety and Emergency Management Evaluations

### **Quality Review Board**

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### **Independent Oversight Site Lead**

William A. Macon, Jr.

### **Independent Oversight Reviewers**

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Robert M. Compton

Glenn W. Morris