

**Independent Oversight Review of the
Pantex Site Office's Compliance with
DOE Order 425.1D, Verification of Readiness to
Start Up or Restart Nuclear Facilities**



June 2012

**Office of Safety and Emergency Management Evaluations
Office of Enforcement and Oversight
Office of Health, Safety and Security
U.S. Department of Energy**

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¹ In accordance with the PXSO assessment plan, this report uses the format of Attachment 7 of PXSO Procedure 226.1-2D, *Line Oversight Program*, and will be entered into the Pantex Plant's ePegasus system.

Acronyms

B&W Pantex	Babcock & Wilcox Technical Services Pantex, LLC
CR	Core Requirement
CRA	Contractor Readiness Assessment
CV	Containment Vessel
D&I	Disassembly and Inspection
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
FY	Fiscal Year
HSS	Office of Health, Safety and Security
IP	Implementation Plan
ISM	Integrated Safety Management
IVR	Independent Verification Review
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NRC	U.S. Nuclear Regulatory Commission
ORR	Operational Readiness Review
POA	Plan of Action
PXSO	Pantex Site Office
RA	Readiness Assessment
RTG	Radioisotopic Thermoelectric Generator
SNM	Special Nuclear Material
SS-21	Seamless Safety for the 21st Century
TSR	Technical Safety Requirements
WI	Work Instruction

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1.0 PURPOSE

This report documents the U.S. Department of Energy (DOE) Office of Enforcement and Oversight (Independent Oversight), within the Office of Health, Safety and Security (HSS), independent review of the Pantex Site Office (PXSO) compliance with DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*. This review was conducted by the HSS Office of Safety and Emergency Management Evaluations onsite from April 2 to 5 and off site through April 24, 2012. PXSO coordinated with HSS to perform the assessment as an external independent oversight review in lieu of PXSO staff performing a self assessment. The purpose of the assessment was to evaluate PXSO's effectiveness in implementing the requirements of DOE O 425.1D through PXSO Procedure 425.1B/C, *Pantex Site Office Startup and Restart of Pantex Plant Activities* to provide PXSO confidence that the readiness review program is actively and thoroughly evaluating plant programs and functional areas as required.

2.0 INTRODUCTION

The Pantex Plant fiscal year (FY) 2012 site integrated assessment plan approved by PXSO in October 2011 specified the essential elements for evaluating the quality and depth of PXSO's implementation of DOE Order 425.1D, which was approved on April 16, 2010. The assessment evaluates the PXSO flowdown process and compliance with requirements after the performance of several readiness reviews, primarily through a record review of the National Nuclear Security Administration (NNSA) readiness reviews performed at the Pantex Plant since implementing PXSO Procedure 425.1B, approved on April 3, 2011. This procedure was recently updated as PXSO Procedure 425.1C, approved on March 8, 2012, with only minor changes from the previous version.

This independent assessment was conducted following the NNSA readiness assessment (RA) for the B83 Tooling Upgrade, which occurred in April 2012 and was evaluated as part of this assessment; Independent Oversight observed part of this RA on site April 2 to 5, 2012. Independent Oversight also evaluated three other RAs conducted at the Pantex Plant since the implementation of DOE Order 425.1D: Electrical Testing of Radioisotopic Thermal Generators (RTGs), B53 End Cap Transportation Operations, and the Startup of Stage Right Pit Staging.

3.0 ASSESSMENT METHODOLOGIES AND APPROACH

The assessment criteria, review and approach document for evaluating the effectiveness of implementing and complying with readiness review requirements as delineated in the approved assessment plan is documented on Assessment Results Form 1 (Attachment 1).

As specified in PXSO Procedure 226.1-2D, issues may be characterized as:

- Deficiencies: when conditions or specified requirements have not been met
- Weaknesses: conditions or events (or a series of conditions or events) that, if left unaddressed, could lead to non-compliance with requirements

- Observations: assessment items provided for information. Observations cannot be items that result in a conclusion that a problem exists in programmatic safety, effectiveness or formality of operations.

The assessment issues are documented on an Assessment Issues Form 2 (Attachment 2).

The assessment primarily involved review of RA activities since the implementation of DOE Order 425.1D and PXSO Procedure 425.1B/C. This assessment also included other independent document reviews and personnel interviews to ensure sufficient depth and breadth to adequately assess the implementation of PXSO Procedure 425.1B/C.

4.0 ASSESSMENT RESULTS

After reviewing the four assessed RA activities, Independent Oversight concludes that:

- PXSO has developed adequate written procedures that sufficiently capture the requirements for startup and restart of nuclear facilities and that the contractor and NNSA are complying with those requirements. One observation was identified: PXSO Procedure 425.1C should include an expectation that the prerequisite section of both the contractor and NNSA plans of action should refer to any implementation verification review.
- PXSO operational awareness and oversight processes and procedures validate that the contractor has achieved the appropriate level of readiness for operations. When pre-start findings were warranted, the RA final reports clearly identified these as prerequisites for restart of nuclear activities.
- PXSO readiness review activities adequately demonstrate effective implementation of PXSO Procedure 425.1B/C. The Pantex Plant routinely performs various startup or restart activities requiring verification of readiness and has recently updated PXSO Procedure 425.1C with only minor changes. Accordingly, Independent Oversight notes as a strength that PXSO is effectively performing readiness reviews and meeting the requirements of DOE Order 425.1D.

Detailed assessment results are documented on Assessment Results Form 3 (Attachment 3).

In summary, Independent Oversight concludes that PXSO is effectively implementing the requirements of PXSO Procedure 425.1B/C and that the readiness review program is adequately evaluating plant programs and functional areas as required by DOE Order 425.1D for startup or restart of Pantex Plant nuclear facilities and activities.

5.0 ATTACHMENTS

1. Assessment Results Form 1 – Criteria, Review, and Approach Document
2. Assessment Issues Form 2 – Assessment Issues
3. Assessment Results Form 3 – Assessment Results

Attachment 1 – Assessment Results Form 1 Criteria, Review, and Approach Document

1. Objective

The purpose of this assessment is to evaluate the effectiveness of implementing the requirements of PXSO Procedure 425.1B/C, *Pantex Site Office Startup and Restart of Pantex Plant Activities*, to provide PXSO confidence that the readiness review program is actively and thoroughly evaluating plant programs and functional areas as required.

2. Criteria

1. PXSO has developed written procedures that capture the requirements for startup and restart of nuclear facilities.
2. PXSO operational awareness and oversight procedures validate that the contractor has achieved the appropriate level of readiness for operations.
3. PXSO readiness review activities demonstrate effective implementation of PXSO Procedure 425.1B/C, *Pantex Site Office Startup and Restart of Pantex Plant Activities*.

3. Approach/Lines of Inquiry

This assessment will be primarily a record review of the NNSA readiness reviews that have been performed since implementing DOE Order 425.1D.

Record Review

- DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*
- DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*
- DOE-HDBK-3012-2003, *Guide to Good Practices for Operational Readiness Reviews (ORR), Team Leader's Guide*
- PXSO Procedure 425.1B/C, *Startup and Restart of Pantex Plant Activities*

Interviews Conducted

- None planned.

Observations

- None planned.

Attachment 2 – Assessment Issues Form 2
Assessment Issues

ISSUE NUMBER: Observation 1

1. Statement of Observation

PXSO Procedure 425.1C, in discussing the requirements for preparing a plan of action (POA), should include an expectation that the prerequisite section of both the contractor and NNSA POAs should refer to any implementation verification review (IVR) that demonstrated satisfactory implementation of safety documentation, such as the documented safety analysis (DSA) and technical safety requirements (TSRs).

2. Requirement

PXSO Procedure 425.1C specifies that PXSO will prepare a POA using DOE-STD-3006-2010 as guidance. This Standard, in discussing operational readiness review (ORR) and RA prerequisites, states that "The prerequisites section of both the contractor and NNSA [ORR] [RA] POAs may refer to specific items such as a project management plan, a readiness self-assessment plan, a compliance assessment program, safety documentation such as DSAs and TSRs, including recently completed IVRs, if possible, or environmental assessments or impact studies, if they were required to achieve readiness to commence nuclear operations."

3. Discussion

DOE-STD-3006-2010 defines IVR as "A formalized verification of the completeness and adequacy of the implementation of the safety basis (DSA and TSRs) for a nuclear facility." The contractor's IVR process is defined in a local procedure, specifically B&W Pantex work instruction WI 02.04.06.03.08, *Technical Safety Requirements Implementation Verification Review Process*.

A successful IVR, including the resolution of all pre-start issues, may be a prerequisite for the start of a readiness review as defined in DOE Order 425.1D. If a readiness review is required, B&W Pantex will not conduct a separate IVR, but will appropriately assess the implementation of the safety basis controls through the readiness review process. B&W Pantex work instruction WI 02.04.06.03, *Process for Readiness Review*, specifies that the Assessments Department Manager or designee "plans and conducts an Implementation Verification Review (IVR), if a Documented Safety Analysis Document or Technical Safety Requirement is revised as required by WI 02.04.06.03.08." Therefore, an IVR must be completed as an integral part of the contractor's readiness review process and should be verified and documented as a prerequisite for the NNSA readiness review.

Attachment 3 – Assessment Results Form 3
Assessment Results

1. Objective

The purpose of this assessment is to evaluate PXSO's effectiveness in implementing the requirements of PXSO Procedure 425.1B/C, *Pantex Site Office Startup and Restart of Pantex Plant Activities*, to provide PXSO confidence that the readiness review program is actively and thoroughly evaluating plant programs and functional areas as required.

2. Criteria

1. PXSO has developed written procedures that capture the requirements for startup and restart of nuclear facilities.
2. PXSO operational awareness and oversight procedures validates that the contractor has achieved the appropriate level of readiness for operations.
3. PXSO readiness review activities demonstrate effective implementation of PXSO Procedure 425.1B/C, *Pantex Site Office Startup and Restart of Pantex Plant Activities*.

3. Approach/Lines of Inquiry

This assessment was intended to be primarily a record review of the NNSA readiness reviews that have been performed since implementing DOE Order 425.1D and PXSO Procedure 425.1B/C.

Record Review

- DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*
- DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*
- DOE-HDBK-3012-2003, *Guide to Good Practices for Operational Readiness Reviews (ORR), Team Leader's Guide*
- PXSO Procedure 226.1-2D, *Line Oversight Program*
- PXSO Procedure 425.1B/C, *Startup and Restart of Pantex Plant Activities*
- PXSO Assessment Plan, *PXSO Compliance with 425.1D, Verification of Readiness to Start Up or Restart Nuclear Facilities*, Revision 0, October 2011
- B&W Pantex WI 02.04.06.03, *Process for Readiness Review*
- B&W Pantex WI 02.04.06.03.08, *Technical Safety Requirements Implementation Verification Review Process*
- B&W Pantex Final Report, *Readiness Assessment for the Restart of the B53 Seamless Safety 21st Century (SS-21) Dismantlement Operations*, September 2, 2010
- B&W Pantex Final Report, *Readiness Assessment for the Restart of the Electrical Test of Radioisotopic Thermoelectric Generators (RTGs) Using a Heat Sink Tester*, May 9, 2011
- B&W Pantex Final Report, *Readiness Assessment for the Startup of Stage Right Pit Staging*, July 27, 2011
- B&W Pantex Final Report, *Readiness Assessment for the Restart of the B53 End Cap Transportation Operations*, August 26, 2011
- B&W Pantex Final Report, *Readiness Assessment for the Restart of the B83 Tooling Upgrade*, February 14, 2012
- B&W Pantex Final Report, Addendum 1, *Contractor Readiness Assessment Functional Area Reassessment for the Restart of the B83 Tooling Upgrade*, March 29, 2012
- NNSA Final Report, *Readiness Assessment for the Restart of Electrical Test of Radioisotopic Thermoelectric Generators Using a Heat Sink Tester*, June 9, 2011

- NNSA Final Report, *Readiness Assessment for the Restart of B53 End Cap Transportation*, September 16, 2011
- NNSA Final Report, *Readiness Assessment for the Start Up of Stage Right Pit Staging Operations at the Pantex Plant*, September 30, 2011
- NNSA Final Report, *Readiness Assessment for the Restart of B83 Tooling Upgrade for Dismantlement and D&I Operations at the Pantex Plant*, April 18, 2012
- NNSA Implementation Plan, *Readiness Assessment for the Restart of Electrical Test of Radioisotopic Thermoelectric Generators Using a Heat Sink Tester*, Revision 0, May 24, 2011
- NNSA Implementation Plan, *Readiness Assessment for the Restart of B53 End Cap Transportation*, Revision 0, August 16, 2011
- NNSA Implementation Plan, *Readiness Assessment for the Start Up of Stage Right Pit Staging at the Pantex Plant*, September 12, 2011
- NNSA Implementation Plan, *Readiness Assessment for the Restart of B83 Tooling Upgrade for Dismantlement and D&I Operations at the Pantex Plant*, March 27, 2012
- NNSA-RA-POA-10-05, *Readiness Assessment Plan-of-Action for the Electrical Test of Radioisotopic Thermoelectric Generators Using a Heat Sink Tester*, April 18, 2011
- NNSA-RA-POA-11-02, *Readiness Assessment Plan-of-Action for the Startup of Stage Right Pit Staging*, Revision 0, April 25, 2011
- NNSA-RA-POA-11-11, *Readiness Assessment Plan-of-Action for the Restart of B53 End Cap Transportation*, Revision 0, July 12, 2011
- NNSA-RA-POA-10-06, *Readiness Assessment Plan-of-Action for the Restart of B83 Tooling Upgrade Operations*, Revision 0, December 21, 2011
- PX-RA-POA-08-03, *Readiness Assessment Plan-of-Action for the Restart of the B53 SS-21 Dismantlement Process*, Revision 0, June 12, 2009
- PX-RA-POA-10-05, *Readiness Assessment Plan-of-Action for the Restart of the Electrical Test of Radioisotopic Thermoelectric Generators (RTGs) Using a Heat Sink Tester*, Revision 1, March 22, 2011
- PX-RA-POA-10-06, *Readiness Assessment Plan-of-Action for the Restart of B83 Tooling Upgrade*, Revision 0, November 11, 2011
- PX-RA-POA-11-02, *Readiness Assessment Plan-of-Action for the Startup of Stage Right Pit Staging*, Revision 0, March 11, 2011
- PX-RA-POA-11-11, *Readiness Assessment Plan-of-Action for the Restart of B53 End Cap Transportation*, Revision 1, July 29, 2011

Interviews Conducted

- None.

Observations

- Several B83 disassembly and inspection (D&I) demonstrations.

4. Discussion of Results

Brief Summaries of the Assessed Readiness Reviews

- Electrical Test of RTGs

The testing of RTGs using an electrical test heat sink tester, packaging the RTG into an H1700 containment vessel (CV), conducting a leak test of the CV with the T-568 automated leak tester, and packaging the CV into the H1700 outer container is a Category 2 special nuclear material (SNM) operation. B&W Pantex performed a Contractor Readiness Assessment (CRA) April 21 -

May 5, 2011, for the restart of the electrical test of RTGs using a heat sink tester. The CRA identified four pre-start findings, one post-start finding, and five observations.

NNSA performed its RA May 24 - June 9, 2011, for the restart of electrical test of RTGs using a heat sink tester. The RA identified no pre-start findings, one post-start finding, and seven observations.

- B53 End Cap Transportation Operations

The B53 End Cap transportation operations were removed from the scope of the B&W Pantex CRA and NNSA RA reviews during the restart of B53 SS-21 (Seamless Safety for the 21st Century) dismantlement operations due to a nuclear explosive safety study deficiency. This restart activity supported the transportation of the B53 End Caps from a Zone 4 magazine to the round room of a Zone 12 nuclear facility cell. B&W Pantex performed a CRA August 10 -25, 2011, for the restart of B53 End Cap transportation operations. The CRA identified four pre-start findings, no post-start findings, and three observations.

NNSA performed its RA September 8-16, 2011, for the restart of B53 End Cap transportation operations. The RA identified no pre-start findings, one post-start finding, and one observation.

- Stage Right Pit Staging

Pit staging using a Stage Right configuration will allow staging of more components in each facility and will utilize the associated interlocks for bays that were not previously approved for staging of SNM. B&W Pantex performed a CRA June 28 - July 19, 2011, for the startup of Stage Right pit staging. The CRA identified five pre-start findings, one post-start finding, and five observations.

NNSA performed its RA September 19-23, 2011, for the startup of Stage Right pit staging operations. The RA identified one pre-start finding, two post-start findings, and eight observations.

- B83 Tooling Upgrade

The B83 tooling has been modernized and upgraded. Except for non-destructive evaluation activities, all operations will now be performed in a single facility. The process is designed to take place in an electrostatic discharge dissipative environment. The linear accelerator process has also been modified to eliminate hoist lifts and perform operations in the transport configuration. B&W Pantex performed a CRA January 16 - February 6, 2012, for the B83 Tooling Upgrade. The CRA identified 18 pre-start findings, one post-start finding, and 10 observations. B&W Pantex subsequently performed a CRA reassessment March 26-28, 2012, for the restart of the B83 Tooling Upgrade. The CRA reassessment identified no pre-start findings, no post-start findings and one observation (positive).

NNSA performed its RA April 2-18, 2012, for the restart of the B83 Tooling Upgrade for dismantlement and D&I operations. The RA identified one pre-start finding and one observation.

Criterion 1

PXSO Procedure 425.1B/C provides adequate written instructions for conducting startup and restart of plant activities. The procedure clearly defines the roles and responsibilities of the

PXSO senior managers and the readiness review team leader/members. The procedure also defines the criteria for the contractor to determine and recommend the required level of readiness review, as well as the action steps for each of the processes that the contractor and NNSA will use to implement the requirements of DOE Order 425.1D. However, PXSO Procedure 425.1C should include an expectation that the prerequisite section of both the contractor and NNSA POAs should refer to any IVR (**See Attachment 2, Observation 1**). In reviewing the CRA and RA final reports and supporting documentation, such as POAs and implementation plans (IPs), for the four assessed RA activities to verify performance of each action step, Independent Oversight concludes that PXSO has developed adequate written procedures that sufficiently capture the requirements for startup and restart of nuclear facilities and that the contractor and NNSA are complying with those requirements.

This criterion is satisfied.

Criterion 2

PXSO Procedure 425.1B/C requires that the contractor and NNSA POAs and IPs adequately describe the scope and breadth of the readiness review and address the 17 core requirements (CRs) specified in DOE Order 425.1D. Specifically, CR #9 specifies that adequate and accurate procedures and safety limits must be approved and in place for operating the process systems and utility systems; CR #11 specifies that an adequate startup or restart program must be developed that includes plans for graded operations and testing after restart or resumption to simultaneously confirm the operability of equipment, the viability of procedures, and the performance and knowledge of the operators; CR #12 specifies that the formality and discipline of operations must be adequate to conduct work safely and that programs must be in place to maintain this formality and discipline; and, CR #17 specifies that the DOE field element management systems for DOE oversight of facility operations, such as oversight and assessment programs, occurrence reporting, Facility Representatives, corrective actions, and quality assurance programs, must be adequate. In reviewing the four assessed RA activities to verify that these particular CRs related to criterion 2 were properly addressed in the POAs and IPs and adequately evaluated in the final reports, Independent Oversight concludes that PXSO operational awareness and oversight processes and procedures validate that the contractor has achieved the appropriate level of readiness for operations. When pre-start findings were warranted, the RA final reports clearly identified these as prerequisites for restart of nuclear activities.

This criterion is satisfied.

Criterion 3

PXSO Procedure 425.1B/C provides adequate written instructions for conducting startup and restart of plant activities. The procedure defines the criteria for the contractor to determine and recommend the required level of readiness review, as well as the action steps for each of the processes the contractor and NNSA will use to implement the requirements of DOE Order 425.1D. In addition to the cited records reviewed (POAs, IPs, final reports, etc.), Independent Oversight also reviewed numerous supporting documents (e.g., memoranda, e-mails) for the four assessed RA activities, including the CRA activities, to evaluate both the contractor's and NNSA's implementation of PXSO processes established to comply with DOE Order 425.1D. Based on these reviews, Independent Oversight concludes that PXSO readiness review activities adequately demonstrate effective implementation of PXSO Procedure 425.1B/C.

This criterion is satisfied.

5. Strengths/Noteworthy Practices

The Pantex Plant, with its numerous hazard category 2 nuclear facilities, activities and operations, routinely performs various startup or restart activities requiring verification of readiness. PXSO, therefore, has had ample opportunity to exercise its processes and improve upon its procedures. PXSO Procedure 425.1B was recently updated to PXSO Procedure 425.1C, approved on March 8, 2012. The fact that the update included only minor changes indicates well-established processes that do not need significant changes and could be emulated by other sites. Independent Oversight notes as a strength that PXSO is effectively performing readiness reviews and meeting the requirements of DOE Order 425.1D.

6. Evaluation of Integrated Safety Management (ISM)

Overall, PXSO procedures and processes for startup and restart of plant activities adequately comply with the requirements and expectations of DOE Order 425.1D. The CRs identified in DOE STD-3006-2010, and required per PXSO Procedure 425.1B/C to be implemented in the POAs and IPs, verify the readiness of personnel, procedures, programs, and equipment within the scope of the readiness review to safely start nuclear operations. These CRs are directly related to the seven guiding principles of ISM and also incorporate the five core safety management functions. The four RA activities, as assessed by Independent Oversight, adequately demonstrate that there is reasonable assurance of adequate protection of workers, the public and the environment from adverse consequences from the restart of nuclear activities at the Pantex Plant.

7. Conclusions

In reviewing the four assessed RA activities, Independent Oversight concludes that PXSO is effectively implementing the requirements of PXSO Procedure 425.1B/C and that the readiness review program is adequately evaluating plant programs and functional areas as required by DOE Order 425.1D for startup or restart of Pantex Plant nuclear facilities and activities.

Appendix A
Supplemental Information

Dates of Review

Onsite Review: April 2-5, 2012

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