Independent Oversight Review of the Pantex Plant Implementation Verification Review Processes

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Table of Contents

Acronyms

AB	Authorization Basis
AMFO	Assistant Manager for Facility Operations
AMNE	Assistant Manager for Nuclear Engineering
CAS	Contractor Assurance System
COA	Condition of Approval
CFR	Code of Federal Regulations
CRAD	Criteria, Review and Approach Document
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
FR	Facility Representative
FY	Fiscal Year
HSS	Office of Health, Safety and Security
IVR	Implementation Verification Review
M&O	Management and Operating
MSA	Management Self-assessment
NNSA	National Nuclear Security Administration
NSS	Nuclear Safety Specialist
OFI	Opportunity for Improvement
PXSO	Pantex Site Office
SAC	Specific Administrative Control
SSC	Structures, Systems, and Components
TSR	Technical Safety Requirement

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1.0 PURPOSE

This report documents the independent review of implementation verification review (IVR) processes at the Pantex Plant conducted by the Office of Enforcement and Oversight (Independent Oversight), which is within the Office of Health, Safety and Security (HSS). The review was performed by the HSS Office of Safety and Emergency Management Evaluations from January 17 to 24, 2012, and was carried out within the broader context of an ongoing program of assessments of the execution of IVRs at U.S. Department of Energy (DOE) sites with hazard category 1, 2, and 3 nuclear facilities. The overall purpose of these Independent Oversight reviews is to evaluate the processes and methods used for verifying and re-verifying implementation of new or substantially revised safety basis hazard controls. The objective of this assessment was to evaluate the extent to which the site management and operating (M&O) contractor – Babcock & Wilcox Technical Services Pantex, LLC (B&W Pantex) – and the Pantex Site Office (PXSO) have developed and employed appropriate implementation verification methods.

2.0 BACKGROUND

Subpart B of Title 10 Code of Federal Regulations (10 CFR) 830.201, *Performance of Work*, states, "A contractor must perform work in accordance with the safety basis for a hazard category 1, 2, or 3 DOE nuclear facility and, in particular, with the hazard controls that ensure adequate protection of workers, the public, and the environment." In addition, 10 CFR 830, Subpart A, *Quality Assurance Requirements*, establishes requirements for conducting activities that may affect safety at these facilities, including performing work in accordance with hazard controls, using approved instructions or procedures, conducting tests and inspections of items and processes, and independently assessing the adequacy of work performance.

In February 2008, the Defense Nuclear Facilities Safety Board requested that DOE evaluate the need to conduct "independent validations on a recurring basis" to ensure that facility equipment, procedures, and personnel training related to safety basis controls have not degraded over time. In response, the Department conducted an evaluation that led to the conclusion that the existing requirements for implementation of safety controls and DOE policy for oversight of the implementation of nuclear safety requirements were appropriate. The evaluation also concluded that Departmental directives contained no explicit requirement to validate safety basis hazard controls, so the Department committed to develop guidance on the validation of safety controls and to add that guidance to its directives.

A DOE working group developed a "best practices guide" for the independent validation of safety basis controls. In November 2010, the guidance for performing IVRs was incorporated in DOE Guide 423.1-1A, *Implementation Guide for Use in Developing Technical Safety Requirements*, Appendix D, *Performance of Implementation Verification Reviews (IVRs) of Safety Basis Controls*.

3.0 SCOPE

At the Pantex Plant, PXSO provides onsite management, day-to-day oversight, and surveillance of B&W Pantex, as well as operations and support for accomplishing DOE and National Nuclear Security Administration (NNSA) strategic and long-term general goals. For this review, Independent Oversight

assessed the establishment and execution of both B&W Pantex and PXSO processes and activities for verifying the implementation of changes to safety basis hazard controls. This scope is consistent with completion of Objectives 1 and 2 in the HSS Criteria, Review and Approach Document (CRAD) HSS CRAD 45-39, Rev. 1, *Implementation Verification Review of Safety Basis Hazard Controls: Inspection Criteria, Activities, and Lines of Inquiry*. The objectives were to determine whether:

- Processes have been established that provide assurance that safety basis hazard controls are maintained and hazard control changes are correctly implemented.
- B&W Pantex and PXSO have developed and implemented appropriate methods for performing IVRs or similar reviews.

The assessment was accomplished by reviewing the documentation that establishes and governs the B8W Pantex and PXSO IVR processes (for example, work instructions, procedures, forms, and checklists) and interviewing key personnel responsible for developing and executing the associated practices.

4.0 RESULTS

Objective 1: Processes have been established that provide assurance that safety basis hazard controls are maintained and hazard control changes are correctly implemented.

B&W Pantex

Independent Oversight reviewed the procedures and processes that B&W Pantex has established to implement and maintain the safety basis hazard controls at the Pantex Plant. The review was conducted to determine whether these processes and/or procedures include an independent IVR or similar process for examining the implementation of new or revised safety basis documents. The review also assessed these processes and procedures to determine whether they contain an appropriate level of planning and formality for re-verification of safety basis hazard controls and for verification of the implementation of safety basis requirements prior to the startup of new or modified facilities with new or revised safety basis documents.

The B&W Pantex processes for implementing and maintaining safety basis hazard controls include an independent IVR process for new or substantially revised controls. A master audit plan was developed for conducting IVR reviews of new and substantially revised technical safety requirement (TSR) controls. The master audit plan includes requirements concerning the reviews to be conducted by an independent group (the Assessments Department), the methodology for performing the IVR, the requirement for a specific audit plan, the resolution of any PXSO conditions of approval, selection of team members, criteria for concluding that the TSR is adequately implemented, final report format, and resolution of deficiencies.

A B&W Pantex work instruction (WI 02.04.06.03.08, *Technical Safety Requirements Implementation Verification Review Process*) adequately defines the process for the independent verification of implementation of new or substantially revised TSR controls. The work instruction addresses when to use the IVR process, including a definition of what constitutes a substantial revision. A supporting flow diagram (FLOW-0046, *Implementation Verification Review of New or Substantially Revised TSR Controls*) describes the process, which begins with the submittal of an authorization basis (AB) change package to the Quality and Performance Assurance Assessment Department, along with Pantex Form PX-4307, *Pantex Plant Basis for Proposed Change to Documented Safety Analysis*. The line organization is required to verify that the TSR controls have been implemented before submitting the form and package to the Assessments Department. The work instruction addresses four options: 1) the change package is

not significant, so an IVR is not required; 2) the change package will be implemented through a readiness review; 3) the change package will be implemented after PXSO approval; and 4) the change package will be implemented before submittal to PXSO. 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.

Responsibility for documented safety analysis (DSA) controls is assigned to a specific individual, typically a process or system engineer, as documented by the master DSA control owner list. The AB change package is submitted to the Assessments Department, which is required by the work instruction to evaluate and peer-review each package. The Assessments Department is independent from the control owner, thus providing an independent review of the change package. If an IVR is required, the Assessments Department manager assigns an IVR team leader. Although the IVR work instruction does not specifically address the independence of the IVR team leader, the Assessments Department manager confirmed that his organization leads the IVR assessments. The work instruction requires that the following be assessed during the performance of the IVR: flowdown of controls to procedures and drawings; whether installation matches the drawings for credited equipment or tooling; TSR-defined maintenance procedures and in-service/surveillance inspections; training; specific administrative controls (SACs), including a human factors evaluation; and whether work orders for structures, systems, and components (SSCs) are complete. The work instruction does not specifically mention the calibration and testing of process instruments, tools, and measuring and test equipment. The assessment is required to be documented with an IVR report. Forms PX-5840 and PX-5481 are used to document any deficiencies and their subsequent resolution. These processes and procedures include an appropriate level of planning and formality.

In addition to the independent IVR process for new and substantially revised safety basis controls, B&W Pantex conducts periodic re-verification of safety basis hazard controls through management self-assessments (MSAs) performed by the control owner of the specific TSR control. The AB department develops training for the control owner on the safety basis controls. The work instruction for the AB control owner requires that the control owner maintain configuration control, perform periodic assessments, use a formal checklist (DESKAID-0433, *Instructions for Verifying Proper Implementation of TSR Controls*) to verify the proper implementation of TSR controls, and conduct MSAs each year on 20% of the AB TSR controls. To ensure a consistent approach to conducting MSAs, B&W Pantex has developed templates for an MSA master plan and reports for TSR controls. These templates are comprehensive and apply to all TSR controls (SACs, administrative controls, key elements, and engineered controls). The CRADs are included for review of the safety basis (System Engineering also includes a review of the supporting calculations), TSR implementation, configuration management, system and equipment verification, operations, maintenance, training, surveillance and testing (including calibration of instrumentation and measurement and test equipment), and past assessments. The work instruction for AB control owners documents their roles, responsibilities, and requirements and includes both SSCs and administrative controls.

The B&W Pantex processes for performing re-verification of safety basis controls are institutionalized through their management systems. The contractor assurance aystem (CAS) assessment manual and the work instruction for managing the CAS both address the development of an annual assessment schedule. The contractor's CAS assessment manual specifically addresses the topical area of MSAs for TSR controls, and the Management Self-Assessment Training course includes a discussion of lessons learned from TSR assessments. A commitment to evaluate 20% of the TSR controls per year is documented in PLN-0040, *B&W Pantex Contractor Assurance System Description Document*, which is approved by PXSO, and also included as an incentive in the performance evaluation plan. In addition, the work instruction specifies that 20% of documented TSR controls be included in the annual CAS assessment schedule, as well as 20% of the documented safety management programs. In response to Independent

Oversight questions regarding how the contractor ensured that the 20% commitment resulted in each of the TSR controls being reviewed at least once every five years, the contractor indicated that assessments are tracked to determine when each TSR control was last assessed, although this information is not published. (See opportunity for improvement **OFI-1**.)

If a readiness review is required, B&W Pantex confirms implementation of the safety basis controls as part of the readiness review, rather than conducting a separate IVR. B&W Pantex readiness processes are described in the manual for planning and conducting readiness reviews, which addresses determining the type of readiness review required, the startup notification report, the plan of action, the implementation plan, conduct of the readiness review (including team members), and documentation and closure of findings. The manual appropriately includes the prerequisites for safety basis controls, including implementation and flowdown into appropriate documents for operation. PD 02.04.06.03, *Process for Readiness Reviews*, documents the process for preparing for and conducting readiness reviews and addresses the need to conduct an IVR, as appropriate. Additionally, the work instruction for developing the readiness review plan of action addresses the core requirements for facility safety, SSCs, and vital safety systems. The work instruction for developing an implementation plan requires that the CRADs be reviewed to ensure adequate coverage of the core requirements defined in the plan of action.

The processes for developing and updating safety basis documents are described in the *Pantex Plant Authorization Basis Manual*, MNL-254543. This manual addresses DSA implementation and discusses the formation of the AB change package team and the development of the implementation plan, including such topics as schedule, procedure changes, training, hardware installation, assignment of control owner, and ease of implementing the controls. The implementation plan is submitted, along with PX-4307, to the Assessments Department for review to determine whether the change package is substantially revised and thus requires an IVR. A Control Flowdown Matrix is used to identify the effective TSR controls for each facility and/or weapon program. The manual requires an annual review and submittal of the DSA to PXSO. WI 02.01.06.02.03, *Developing an Implementation Plan for Authorization Basis Control Changes*, requires the preparation of an implementation plan for all changes or modifications to surveillance requirements or in-service inspections; however, it does not mention the IVR process or the need to submit PX-4307 to Quality Assurance. (See opportunity for improvement **OFI-2**.)

Pantex Site Office

Independent Oversight reviewed PXSO processes to determine whether those processes adequately assess the contractor's implementation of new and revised safety basis documents and provide sufficient information to confirm the ongoing effectiveness of contractor processes for the implementation of safety basis requirements.

NNSA provides direction for assessments of safety class and safety significant SSCs through SD 226.1A, *NNSA Line Oversight and Contractor Assurance Supplemental Directive*, which includes direction for site offices to perform assessments of nuclear safety. Assessments are to be sufficient to validate the continuing effectiveness of TSRs on an annual basis. Each safety class SSC is to be assessed every three years, safety significant SSCs every five years, and safety management programs every five years. SD 226.1A also requires NNSA contractors to address nuclear safety in the CAS, but it does not address the periodicity expectations for contractors, as it does for the site offices. DOE Guide 423.1-1A provides good guidance for performing initial IVRs and IVRs following safety basis changes (which B&W Pantex performs via the PX-4307 process), but guidance for performing periodic IVRs to re-verify safety basis control implementation is less clear. The guide recommends re-verification of safety controls that are susceptible to the effects of the degradation of human knowledge (e.g., procedural controls) every three years and controls dependent on hardware functionality every five years. Overall, the guidance for the

periodicity of IVR re-verification activities is unclear or inconsistent. (See opportunity for improvement **OFI-3**.)

The site office functions, responsibilities, and authorities manual assigns to the Assistant Manager for Nuclear Engineering the responsibility for providing line management oversight of nuclear and nuclear explosive safety and ensuring the implementation of hazard mitigation programs and controls. The Assistant Manager for Facility Operations is assigned the responsibility for monitoring proper implementation of TSR-level controls and compliance with the TSRs.

The PXSO line oversight program procedure, PXSO P 226.1-2C, defines an appropriate set of roles, responsibilities and processes for conducting oversight of B&W Pantex activities. Site office assistant managers are expected to provide oversight of their functional areas, ensure that assessment results are reviewed for trends, and review the CAS reports and assess CAS effectiveness in their area. Fundamental program elements include evaluation of the CAS through formal assessments, shadow assessments, and operational awareness; independent evaluation of contractor performance; and self-assessment. The procedure includes appropriate guidance for developing a master assessment schedule, including risk prioritization of assessment activities and use of an appropriate mix of assessment types, and it contains detailed guidance for planning, performing, and reporting assessments, including shadow assessments. The procedure includes attachments that provide guidance for a number of the oversight activities, including, for example, an assessment plan format, CRAD, shadow assessment plan, and shadow assessment report format (with an evaluation form).

PXSO P 830A, *Pantex Site Office Safety Basis Program*, describes requirements for oversight of safety basis control implementation. The Assistant Manager for Nuclear Engineering is assigned responsibility for oversight and implementation of the Pantex safety basis, including implementation of TSRs and tracking of open conditions of approval (COAs) and technical comments from safety evaluation reports and their addenda. All assistant managers have responsibility for oversight and implementation of TSR implementation and conduct of readiness reviews or assessments for new or updated TSRs. The Nuclear Engineering safety basis supervisor has specifically-assigned responsibilities; including monitoring the contractor's program to ensure, for example, that the safety basis is established and TSRs are developed and implemented. The procedure establishes a set of "requirements" that address the safety basis, the unreviewed safety question process, DSA, TSRs, safety in design, safety basis approval, and training and qualification. Processes for oversight of safety basis programs and for ensuring the implementation of systems and controls defined in the safety basis are established in Nuclear Engineering procedures.

Within Nuclear Engineering, the procedure for safety basis document review, approval, implementation, and oversight process, AMNE-OP 420.1-J, defines responsibilities and establishes processes for safety basis control implementation. The Nuclear Engineering safety basis supervisor is responsible for TSR implementation and determines the need for formal assessment, based on operational awareness data. One of the requirements in the procedure is that PXSO must concur with the "applicability matrix" provided by the contractor for changes implementing TSRs before the controls are declared effective. In accordance with the procedure, safety basis oversight includes periodically assessing continued effective implementation of DSA and TSRs, using criteria (provided in an attachment) to evaluate SACs, shadowing contractor assessments of safety basis and TSRs, and assessing the contractor's safety basis development and implementation based on operational awareness data.

The Nuclear Engineering safety system oversight program's system engineering procedure provides an appropriate set of instructions for implementing oversight of safety system controls. The procedure, which applies to systems and controls credited in the DSA for a safety class or safety significant function, assigns responsibilities for the assistant manager, system engineering team lead, and safety system oversight personnel. Areas of responsibility for monitoring contractor performance include configuration

management, surveillance testing, preventive maintenance, special tooling, electrical testers, fire protection, and in-service inspection programs. The team lead uses both operational awareness data and defined assessment frequencies to prepare the line oversight plan, whose scope includes active safety systems and controls and some passive systems (design features). The list of systems is maintained in a contractor document (CMD-006), and assignments are maintained by the technical lead. The frequency of assessments of SSCs is in accordance with the requirements of SD 226.1A. Procedure attachments provide detailed criteria for conducting safety system functional assessments, which adequately address the safety function, surveillance testing, and guidance for conducting system walkdowns.

In addition to the safety basis oversight procedures discussed above, PXSO has a specific internal policy, PXSO P 423.1-1B, that sets expectations for IVR implementation. The policy indicates that PXSO will partner with B&W Pantex to ensure that operations remain within the safety basis and sets an expectation for an IVR for all new or revised safety basis controls that are not subject to a readiness review under DOE Order 425.1D. The policy also indicates that re-verification of controls will rely on the CAS. The policy addresses SSCs, SACs, and safety management programs. Assessments of design features and safety systems are to be performed as determined by quarterly operational awareness reviews and are to include assurance of the capability to perform the intended safety function. The policy indicates that the CAS will be used for this assurance and that PXSO is to evaluate the effectiveness of the CAS by shadowing a representative sample of assessments and comparing the results to the results of PXSO independent assessments. SACs are to be verified and re-verified through CAS assessments, with PXSO shadowing a sample of the assessments based on the quarterly operational awareness reviews to verify effectiveness; however, the policy does not require independent evaluation of SACs. Finally, the policy indicates that safety management programs will be verified through the shadowing of CAS assessments. This policy is not in the B&W Pantex M&O contract. (See opportunities for improvement **OFI-4** and **OFI-5**.)

Though not a contractual requirement, PXSO expectations for contractor performance of ongoing IVRs are currently included as an incentive in the performance evaluation plan and the approved CAS description. The fiscal year (FY) 2012 performance evaluation plan incentive regarding CAS assessments (O-9) and planning states "assess a minimum 20% of the TSR controls (includes administrative controls, SACs, surveillance requirements, and in-service inspections) and the Safety Management Programs (SMPs) in the DSA." A recent memo from PXSO to B&W Pantex provides firmer direction to institutionalize the 20% assessments and provide status reports.

PXSO P 425.1B, *Pantex Site Office Startup and Restart of Pantex Plant Activities*, provides instructions for conducting startup and restart of plant activities. As noted previously, when the readiness review process applies to an activity, no IVR is required. The procedure appropriately defines the roles and responsibilities of the PXSO senior managers and the readiness review team leader. The process is overseen by the Senior Scientific and Technical Advisor, who reviews and approves the startup notification reports, and is implemented by the Assistant Senior Scientific and Technical Advisor, who acts as the startup manager. The Assistant Manager for Nuclear Engineering is responsible for reviewing the Control Flowdown Matrix to ensure that appropriate controls are identified. The team leader is responsible for the implementation plan using DOE-STD-3006, which provides a set of CRADs for performing the readiness review, including verification of implementation of safety basis hazard controls. The procedure also requires that the plan of action prerequisites include completion and implementation of flowdown of safety basis controls into appropriate documents; identification of TSRs in the Control Flowdown Matrix; approval and implementation of procedures; and assurance that surveillances, tests, inspections, and calibrations are current.

Finally, procedures establish appropriate roles and responsibilities for the Facility Representatives (FRs) under the Assistant Manager for Facility Operations and provide direction for their routines. FRs are

assigned responsibility for day-to-day oversight of the contractor's activities, including monitoring safety performance and proper implementation of TSRs and coordinating with Nuclear Engineering personnel for operation of safety systems. The FR routine includes verification that facilities are operating within the AB and TSR requirements, observation of operations and maintenance activities, and oversight of TSR surveillance tests. The FRs publish summaries of their activities in "quick check" reports.

Objective 2: The contractor and site office have developed and implemented appropriate methods for performing IVRs or similar reviews.

Independent Oversight reviewed the B&W Pantex and PXSO IVR methods to determine whether they adequately address the implementation of safety basis hazard controls. The review also examined whether the review criteria and approaches are appropriately tailored to the hazard controls being verified and sufficient for the scope of the review, and whether the review activities are sufficiently well documented (per procedures) to support the conclusions of the review.

B&W Pantex

B&W Pantex has conducted over 40 independent IVRs during the past 12 months. Independent Oversight interviewed the Quality and Performance Assurance Manager, the Assessments Department Manager, and other personnel involved with the IVR process, and all were found to be knowledgeable of their roles and responsibilities for the IVR process. According to the Assessments Department manager, the IVR team leaders are required to be qualified; Independent Oversight reviewed the qualification card for one team leader and found it to be adequate. Independent Oversight also reviewed a sample of IVR audit plans and final reports. In all cases, an IVR plan, a final report, and a posting memo were issued. The specific audit plans included a description of the proposed change, the team composition, the control owner, and the criteria documents and checklists to be used by the assessors. In most cases, the IVR team leader was independent of the work being performed, although one final report listed the control owner as a team member. For each assessment, a final report is prepared that includes the purpose and scope of the assessment, conduct of the assessment, team composition, results of the assessment, deficiencies, any follow-up activities, and the completed checklist(s).

B&W Pantex has a commitment to review 20% of their TSR controls annually. The FY 2010 and FY 2012 CAS assessment schedules were found to include the TSR controls selected to meet the 20% commitment, so a total of over 60 MSAs for TSR controls is scheduled each year. The assessment schedule includes assessments of design features, SACs, limiting conditions for operation, and key elements of safety management programs. Interviews with the Performance Assurance Manager, the Weapon Engineer Section Manager, and the System Engineering Department Manager and Engineer confirmed that all were aware of the commitment to conduct MSAs of safety basis controls. The control owners were knowledgeable of their roles and responsibilities for administrative and SSC controls, as defined in the work instruction for AB control owners. The MSAs conducted by the System Engineering group included a review of the safety basis data calculations, which in one case resulted in the identification of a potentially inadequate safety analysis. As part of the CAS system, all MSAs are submitted to an assessment review team for a quality evaluation. Independent Oversight observed a meeting of the assessment review team that addressed the review of an MSA for TSR controls. The results of the assessment review team evaluation are documented on a form, and feedback is provided to the MSA owner. Independent Oversight considers this to be an effective method for driving continual improvement in the assessment process. In addition to the MSA reviews, the System Engineering Department conducts a year-end evaluation of SSCs to determine whether a full evaluation is needed in the next fiscal year. The system evaluation includes a review of the safety basis-related requirements, configuration management, technical walkdowns, tracking and trending, surveillance and testing, and whether an assessment was conducted during the previous year.

A sample of completed MSA reports for TSR controls was reviewed and was found to be consistent with the MSA master report template. The reports include a purpose; scope; executive summary; a review of the safety analysis report, chapters 2, 3, 4, and 5; the TSR Control Flowdown Matrix and the flowdown of TSR requirements into work instructions; maintenance procedures; facility drawings; surveillance requirements; in-service inspection requirements; calibrated measuring and test equipment; configuration management; material condition walkdown checklists; the SSC/equipment configuration management data list of active SSCs; technical procedures and work instructions for in-service inspection requirements for TSR design features; maintenance backlog; training; and past assessments. Completed CRADs are included in the report, and findings are identified. The reports were found to be extensive and to contain sufficient detail to support the conclusions of the assessment.

The implementation of safety basis controls is also evaluated as part of the B&W Pantex readiness review process. Independent Oversight reviewed the documentation associated with several readiness review activities: an approved plan of action, appropriately addressing the 14 core requirements, prerequisites (including the implementation and flowdown of safety basis controls), and team leader designation and qualifications; an approved implementation plan, including the scope, breadth and depth of the review, the criteria and review approach documents, and the qualification summary for team members; and the final report, which included completed Form-1s and Form-2s. The reviews had independent team leaders from the Assessments Department. The readiness review process includes an appropriate evaluation of the implementation and flowdown of safety basis controls.

The work instruction for the TSR IVR process includes the requirement that all PXSO COAs be resolved before issuance of the posting memo, which states that the controls have been implemented. Also, WI 02.01.06.02.01, *Develop and Control Authorization Basis Documents*, provides specific instructions for resolving COAs. The master audit plan for conducting IVRs of new TSRs addresses the resolution of COAs, and the specific audit plans show that a prerequisite for conducting the IVR is that no COAs are open. Also, the IVR audit plan checklist for AB-1 included the requirement that COAs be closed. The readiness review process also addresses closure of COAs through the prerequisite that all COAs from the NNSA safety evaluation report for the proposed operation have been closed and that NNSA has concurred with or approved closure. These procedures are adequate to address the resolution of PXSO COAs.

Although the procedures and processes for performing IVR assessments are mostly well implemented, the performance of IVRs by different groups may not be consistent. Whereas the initial IVRs and IVRs following safety basis changes are performed by the Assessments Department per WI 02.01.06.02.01 (PX-4307), the ongoing IVRs to re-verify safety basis control implementation are performed by different AB control owners per WI 02.03.12.01.01 as part of a comprehensive MSA for TSR control verification. All personnel who perform IVRs receive the same assessment training and use the same CRADs, but there has been no assessment of the overall process to verify consistency among the different groups. In addition, the Independent Oversight review of completed reports identified some errors in the final reports (for example, reference to an incorrect audit plan, use of the term "readiness assessment," checklist criteria not marked "yes" or "no," checklist criteria marked "N/A" without explanation), and in several cases the final report was issued within only one day of the audit plan. (See opportunity for improvement **OFI-6**.)

Pantex Site Office

PXSO schedules both independent and shadow assessments of contractor operations using an annual master assessment schedule that is integrated with the contractor's assessment schedule. Independent assessments in FY 2011 focused on SSCs and safety management program elements, including safety basis development activities. Independent assessments in the FY 2012 schedule are split between review

of SSCs and safety management program implementation, including special tooling. Shadow assessments in FY 2011 examined the contractor's evaluation of SSCs, SACs, and safety management programs, while shadow assessments in the FY 2012 schedule are primarily scheduled for SAC and safety management program implementation. PXSO did not conduct an independent IVR of changes to safety basis hazard controls or an assessment of the contractor's IVR program in FY 2011; however, following a recent IVR program self-assessment, an assessment of the contractor IVR program has recently been added to the FY 2012 assessment schedule. In addition, neither the FY 2011 nor the FY 2012 master assessment schedule includes an independent assessment of SAC implementation. This shortcoming was also noted during the PXSO self-assessment discussed below. (See opportunities for improvement **OFI-4** and **OFI-7**.)

Independent Oversight reviewed a sample of safety system functional assessments and shadow assessments completed in FY 2011. The safety system functional assessments all used a set of CRADs that include evaluation of the credited safety functions in the DSA and TSR (including a comparison to ensure that the TSR matches the DSA) and the performance of system surveillances and tests. In most cases, the reviews included observation of performance of operations or testing. The assessment reports are uniformly well written; provide evidence of a thorough, critical review of the safety controls and their implementation; and document a number of deficiencies and weaknesses. In addition, all assessment reports are of sufficient scope to provide evidence that the criteria were appropriately evaluated and to support the assessor's conclusions.

Independent Oversight reviewed the documentation (plan of action, implementation plan, and final report) for three readiness assessments conducted by PXSO in FY 2011. The plans of action appropriately describe the breadth and depth of the review and adequately justify the core requirements included in the scope of the review. The implementation plans effectively incorporate the plans of action, and the criteria in the functional area CRADs adequately address the implementation of new or revised safety basis controls. The implementation plans use a matrix to provide a crosswalk between the functional area CRADs and the core requirements included in the plans of action. The final reports are well written and provide evidence that each of the criteria in the CRADs was critically evaluated. The documentation provides evidence of thorough reviews and is sufficient to support the reviewers' conclusions.

Independent Oversight found that PXSO conducted a series of assessments of SAC implementation in FY 2009 that addressed all the SACs at the Pantex Plant. These assessments were conducted using a set of criteria and guidelines provided by NNSA Headquarters and consisted primarily of document reviews and interviews with control owners. The assessment reports are well written and adequately document the review, including descriptions of the controls and implementing documents, and the conclusions of the reviewers. Since completion of this review, PXSO has conducted a few shadow reviews of B&W Pantex assessments but has not conducted independent reviews of SAC implementation.

Through the FRs, PXSO provides routine, ongoing oversight of contractor operations, including operation within the established safety basis controls. Until late summer 2011, FR activities were documented primarily in weekly reports. Since then, FR activities have been documented in a "quick check" report that is completed roughly weekly. The quick check report uses a checklist system to guide the FR's observations and provides a summary of those observations. These reports are compiled monthly and sent to the contractor for response to identified deficiencies and weaknesses. A review of a small sample of weekly reports provided evidence of ongoing FR oversight of contractor readiness review activities, surveillance tests, and operations.

In December 2011, PXSO conducted a self-assessment of its IVR processes, using the HSS IVR CRAD 45-39 as a basis. The self-assessment, which is well documented, concluded that independent assessments of SSCs, including design features, are providing effective oversight of TSR implementation.

It also identified the use of shadow assessments to provide oversight of contractor SAC assessments and routine assessment of TSR implementation by the FRs. However, the report also noted that PXSO had not routinely conducted independent IVRs, shadowed contractor IVRs, or independently assessed the contractor's IVR program. The assessment also identified opportunities for improvement through improved tracking of completed re-verification assessments, independent verification of implementation of COAs, and independent assessment of SAC implementation. PXSO has completed and begun implementing a corrective action plan to address the opportunities for improvement identified in the self-assessment report.

5.0 CONCLUSIONS

B&W Pantex

B&W Pantex has established and implemented appropriate processes to confirm that new or significantly modified safety basis hazard controls are implemented, as well as processes to perform periodic re-verification of the safety basis hazard controls. The process for conducting an independent IVR of new or substantially modified TSR controls is established in an issued work instruction. The Assessments Department is responsible for performing the independent IVRs and has significant experience with the process. In addition to the independent review of new TSR controls, B&W Pantex has a commitment to perform re-verification reviews on 20% of their TSR controls annually. The process for conducting and reporting the MSAs for TSR controls is well documented, and the commitment to perform reviews on 20% of the TSR controls per year is institutionalized in numerous documents. Personnel involved in both the independent IVRs and the MSAs for TSR controls were found to be knowledgeable of the processes and procedures, and a review of completed reports confirmed that the reviews are performed in a high-quality manner. The management systems, processes, and procedures provide an appropriate level of planning and formality in the IVR process.

The processes for startup and restart of nuclear facilities are appropriately addressed in the B&W Pantex manual, process description, and work instructions for readiness reviews. If a readiness review must be performed, B&W Pantex confirms implementation of the safety basis controls as part of the readiness review, instead of conducting a separate IVR. The B&W Pantex procedures are in alignment with the DOE directive on readiness reviews, and they appropriately address the implementation and flowdown of safety basis hazard controls. The plans of action, implementation plans, and final reports are reflective of an independent, thorough review.

Overall, B&W Pantex has mature and effective processes to ensure that TSR controls are implemented and reviewed, both initially and on a periodic basis. Notable practices include the independent review performed for the initial verification of new or significantly modified controls, and the well-documented and institutionalized re-verification MSAs performed by the TSR control owner. Although B&W Pantex has a strong program, some enhancements are suggested to further improve the overall quality of the program.

Pantex Site Office

In accordance with DOE and NNSA direction, PXSO has established and implemented an appropriate set of policies, procedures, and processes for oversight of nuclear safety at the Pantex Plant. Roles and responsibilities of site personnel are clearly delineated in the functions, responsibilities, and authorities manual and are further defined in PXSO procedures. The PXSO line oversight program procedure provides sufficiently detailed direction to support oversight activities, including preparation of a master assessment schedule (integrated with the contractor's schedule), conduct of independent and shadow assessments, and evaluation of the CAS. A PXSO policy further defines responsibilities for oversight of

the Pantex Plant safety basis, and Nuclear Engineering procedures address oversight of the safety basis development and implementation processes and of the system engineering program. Together, the policy and procedures appropriately address evaluation of the safety basis hazard controls. Procedures governing the oversight activities of the FRs appropriately incorporate verification that facilities are operated within the TSRs as one of the FR duties. PXSO also has a suitably detailed procedure governing the startup and restart processes, which provides adequately for verification of safety basis control implementation. Finally, PXSO has a specific internal policy that establishes expectations for implementation of IVRs, including conduct of an IVR for all new or revised safety basis controls, re-verification of controls using the CAS, and ongoing, periodic assessments of SACs, SSCs, and safety management programs. The policy appropriately includes a mix of independent and shadow assessments for evaluation of safety systems and design features, but it does not require independent assessments of SACs or safety management programs to support evaluation of CAS effectiveness. Additionally, the IVR requirements specified in the PXSO policy do not apply to B&W Pantex.

PXSO schedules both independent and shadow assessments of contractor operations using an annual master assessment schedule that is integrated with the contractor's assessment schedule. PXSO has scheduled and completed independent assessments of SSCs and safety management programs, as well as shadow assessments of contractor MSAs of SSCs, SACs, and safety management programs. Shadow assessments in the current fiscal year schedule are primarily for SAC and safety management program implementation. PXSO also completed three readiness reviews last fiscal year. Independent Oversight reviewed a number of completed assessments, both independent and shadow, and found the reports to be uniformly well written. Each assessment was completed using an appropriately detailed set of criteria, and the reports document the completed review and approach for each criterion. The results of the review are described with adequate detail, and the conclusions, including issues, are discussed in sufficient detail to support the evaluation. Although the PXSO IVR program is sound and addresses the conduct of IVRs for both initial verification and re-verification of controls, some weaknesses were noted: PXSO did not conduct an independent IVR of changes to safety basis hazard controls or an assessment of the contractor's IVR program in previous fiscal years, and neither the previous nor the current fiscal year assessment schedule includes an independent assessment of SAC implementation.

As noted above, PXSO recently conducted a self-assessment of its IVR process. The assessment concluded that the overall PXSO IVR program and processes are sound and identified several opportunities for improvement that are the same as, or similar to, those identified by Independent Oversight. The assessment identified that PXSO had not routinely conducted independent IVRs, shadowed contractor IVRs, independently assessed the contractor's IVR program, tracked the completion of completed re-verification assessments, or conducted independent assessment of SAC implementation. Since then, PXSO has completed and begun implementing a corrective action plan to address the opportunities for improvement identified during the self-assessment, including direction to the contractor to formally track completion of re-verification assessments and addition of an assessment of the contractor's IVR program to the current fiscal year master assessment schedule.

6.0 OPPORTUNITIES FOR IMPROVEMENT

During the review, Independent Oversight identified several issues representing opportunities for improvement (OFIs). These issues are characterized in accordance with the PXSO line oversight procedure (PXSO P 226.1-2C) and are annotated in the report by level and number (for example, **OFI-1**). The PXSO procedure defines three levels of issues. A deficiency or finding is a "conclusion reached when conditions or specified requirements have not been met." A weakness "describes a condition or event (or series of conditions or events) that, if left unaddressed, could lead to non-compliance with requirements" and "in the judgment of the assessor, requires a response from the M&O contractor, but

does not require a corrective action plan." Finally, observations represent "assessment items provided for information." These items cannot result in a "conclusion that a programmatic safety, effectiveness or formality of operations problem exists." Observations can be "minor non-compliances that do not require a response from the M&O Contractor" and "should be evaluated for actions management deems appropriate." Weaknesses closely approximate opportunities for improvement, which according to Independent Oversight protocols "are suggestions offered by the Independent Oversight appraisal team that may assist line management in identifying options and potential solutions to various issues identified during the conduct of the appraisal." Opportunities for improvement are not mandatory and do not require formal resolution by management through the corrective action process.

B&W Pantex

OFI-1: Formally track and report the status of re-verification to ensure that expectations are met to improve awareness of TSR control re-verification assessments.

OFI-2: Revise WI 02.01.06.02.03, *Developing an Implementation Plan for Authorization Basis Control Changes*, to address the IVR process.

OFI-6: Perform an MSA of the overall IVR process to verify the consistency of the IVR assessments performed by various organizations and to identify areas for improvement and lessons learned.

Pantex Site Office

OFI-4: Revise the PXSO IVR policy to clarify expectations to periodically conduct independent assessments of contractor SAC implementation as a means of evaluating contractor performance, including CAS performance.

OFI-5: Update PXSO P 423.1-1B to include expectations for contractor re-verification IVRs (pending DOE and NNSA clarifications) and add it to the M&O contract.

OFI-7: Periodically conduct independent IVRs and assessments of the contractor's IVR program to support evaluation of the CAS and ensure that the contractor is implementing the site IVR processes effectively.

DOE and NNSA Headquarters

OFI-3: Clarify expectations of site offices and contractors for performing re-verification IVRs, consistent with the NNSA Policy Letter (NAP)-21 transition from the current directive-based process toward an integrated and risk-informed process.

7.0 FOLLOW-UP ITEMS

Independent Oversight will follow up on the corrective actions for the PXSO IVR self-assessment and any actions resulting from this assessment as part of its normal operational awareness activities under the site lead program.

Appendix A
Supplemental Information

Dates of Review

Onsite Review: January 17 - 24, 2012

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
Thomas R. Staker, Deputy Director for Oversight
William Miller, Deputy Director, Office of Safety and Emergency Management Oversight

Quality Review Board

William Eckroade
John Boulden
Thomas Staker
William Miller
Michael Kilpatrick
George Armstrong
Robert Nelson

Independent Oversight Site Lead for SRS

William Macon

Independent Oversight Reviewers

William Macon – Lead
David Odland
Terry Olberding

Appendix B
Documents Reviewed, Interviews, and Observations

Documents Reviewed

- Assistant Manager for Facility Operations (AMFO) OP 1063-01B, Pantex Site Office Facility Representative Program, 4/4/11
- AMFO OP 1063-02C, Pantex Site Office Facility Representative Routine, 4/4/11
- Assistant Manager for Nuclear Engineering (AMNE) OP 420.1-1B, Pantex Site Office Safety System Oversight Program System Engineering, 12/11/10
- AMNE OP 421.1-J, Safety Basis Document Review, Approval, Implementation, and Oversight Process, 10/19/11
- Assessment Review Team Evaluation, ENG-12-TSR-19
- B&W Pantex Contract No. DE-AC54-00AL66620, List B, 3/11
- B&W Pantex FY10 CAS Assessment Schedule-Status Through 4/30/10, 5/10/10
- B&W Pantex FY12 CAS Assessment Schedule, 10/17/11
- DESKAID-0433, Instructions for Verifying Proper Implementation of Technical Safety Requirement (TSR) Controls, R003
- Facility Operations Weekly Report, 4/15/11
- Facility Operations Weekly Report, 4/22/11
- Facility Operations Weekly Report, 4/29/11
- Facility Operations Weekly Report, 4/8/11
- Facility Operations Weekly Report, 8/19/11
- Facility Operations Weekly Report, 8/26/11
- Final Report for the Implementation Verification Review of Authorization Basis Change Proposal AB-11-47, IVR Final Report AB-11-47, R0, 8/8/11
- Final Report of the B&W Pantex Readiness Assessment for the Restart of Laser Gas Sampling System (LGSS) in Building 12-86, 4/11
- Final Report of the B&W Pantex Readiness Assessment for the Restart of W88 Joint Test Assembly (JTA) 7 Build Operations, 12/11
- Final Report of the B&W Pantex Readiness Assessment for the Startup of Stage Right Pit Staging, 7/27/11
- Final Report, Implementation Verification Review, AB-11-15, 12/9/10
- Final Report, Implementation Verification Review, Authorization Basis Change Package, AB-08-29-A27, 2/10/11
- Final Report, Implementation Verification Review, Authorization Basis Change Packages, AB-08-29A29, 4/26/11
- Final Report: Readiness Assessment for the Restart of the B53 Secondary Extraction Operations, 9/11
- Fiscal Year 2011 Performance Evaluation Plan for Contract No. DE-AC54-00AL66620, 8/10
- Fiscal Year 2012 Performance Evaluation Plan for Contract No. DE-AC54-00AL66620, 8/11
- FLOW-0046, Implementation Verification Review of New or Substantially Revised TSR Controls
- FY12 PXSO System Engineering Planned Assessments
- LIST-0080, Master DSA Control Owner List, Issue 12
- Management Self-Assessment for TSR, Facility Structure – Special Purpose, 3/25/11
- Management Self-Assessment Master Report for Technical Safety Requirement (TSR) Controls, ENG-12-TSR-71, 12/9/11
- Management Self-Assessment Master Report for Technical Safety Requirement (TSR) Controls, ENG-12-TSR-55, R2, 12/9/11

- Management Self-Assessment Master Report for Technical Safety Requirement (TSR) Controls, ENG-12-TSR-19, 12/12/11
- Management Self-Assessment Master Report for Technical Safety Requirement (TSR) Controls, ENG-12-TSR-20, 11/28/11
- Management Self-Assessment Program, ENG-09-TSR-64, 9/28/09
- Memorandum from AMNE to B&W Pantex Engineering Manager, Subject: Assessment of TSR Control Implementation, 10/08
- Memorandum from Site Manager to Assistant Deputy Administrator for Nuclear Safety and Operations, Subject: Status of Specific Administrative Controls at Pantex Plant, 10/09
- Memorandum, Assistant Manager for Nuclear Engineering to Engineering Division Manager B&W Pantex and Manager, Quality & Performance Assurance Division B&W Pantex, Subject: Tracking of Nuclear Safety Basis Control Reviews, 1/6/12
- MNL-254543, Pantex Plant Authorization Basis Manual, R30, 5/4/11
- MNL-293104, Contractor Assurance System Assessment Manual, R7, 12/11
- MNL-352175, B&W Pantex Manual for Planning and conducting Readiness Reviews, Rev. 2, 10/11
- NA-1 SD 226.1A, NNSA Line Oversight and Contractor Assurance Supplemental Directive, 10/7/08
- NA-PS-BWP-Pantex-2009-0053, Occurrence Report, PISA-Facility Structure Snow Loading Functional Requirement, 9/10/09
- NE-2012-04, PXSO Self-Assessment of IVR Oversight, 1/12
- NE-2012-04, Self-Assessment of Pantex Site Office Oversight of Implementation Verification Review, 1/12
- NNSA PXSO Assessment of Design Features DF.44N, *Radiography Inspection Equipment*, DF.76(2), *Collimator Cart Hydraulic Fluid*, and DF.102N, *Space Electronic Scale*, 7/11
- NNSA Readiness Assessment for the Restart of B53 End Cap Transportation, Final Report, 9/11
- NNSA Readiness Assessment Implementation Plan for the Restart of Electrical Test of Radioisotopic Thermoelectric Generators Using a Heat Sink Tester, 5/11
- NNSA Readiness Assessment Implementation Plan for the Restart of B53 End Cap Transportation, 8/11
- NNSA Readiness Assessment Implementation Plan for the Startup of the Stage Right Pit Staging in Building 12-64 at the Pantex Plant, Amarillo, Texas, 9/11
- NNSA-RA-POA-10-05, Readiness Assessment Plan-of-Action for the Restart of Electrical Test of Radioisotopic Thermoelectric Generators Using a Heat Sink Tester, Rev. 0, 4/11
- NNSA-RA-POA-11-02, Readiness Assessment Plan-of-Action for the Startup of the Stage Right Pit Staging in Building 12-64, 4/11
- NNSA-RA-POA-11-11, Readiness Assessment Plan-of-Action for the Restart of B53 End Cap Transportation, Rev. 0, 7/11
- Pantex FY12 Site Integrated Assessment Plan, no date
- Pantex FY12 Site Integrated Assessment Plan, no date
- Pantex Site Office FY11 Master Assessment Schedule, 10/10
- Pantex Site Office FY11 Master Assessment Schedule, 10/21/2010
- PD 02.04.06.03, Process for Readiness Review, Issue 3
- PD 02.04.06.03, Process for Readiness Review, Issue 3
- PLN-0001, Documented Safety Analysis Upgrade Initiative (DSAUGI) Project Plan, Issue 3, 5/11
- PLN-0040, B&W Pantex Contractor Assurance System Description Document, R7, 11/10
- PX-3864-UNC, Training Completion Report, IVR Team Leader QC, R20, 12/12/11
- PX-4307, Pantex Plant Basis for Proposed Change to Documented Safety Analysis, R15
- PX-IP-10-06, Contractor Readiness Assessment Implementation Plan for the Restart of B83 Tooling Upgrade, Rev. 1, 1/12

- PX-IP-11-02, Contractor Readiness Assessment Implementation Plan for the Startup of Stage Right Pit Staging, Rev. 0, 5/4/11
- PX-IVR-AP-08-01, Master Audit Plan For Conducting Implementation Verification Review (IVR) of New and Substantially Revised Technical Safety Requirement (TSR) Controls, R1, 8/5/08
- PX-RA-IP-10-06, Contractor Readiness Assessment Implementation Plan for the Restart of Bxx Tooling Upgrade, Rev. 1, 1/16/11
- PX-RA-IP-11-10, Restart of Laser Gas Sampling System (LGSS) in Building 12-86 (U), 4/11
- PX-RA-POA-11-02, Readiness Assessment Plan of Action for the Startup of Stage Right Pit Staging, Rev. 1, 4/14/11
- PX-RA-POA-11-10-1, Readiness Assessment Plan of Action for the Restart of Laser Gas Sampling System (LGSS) in Building 12-86, Rev. 0, 3/11
- PXSO Assessment of Special Tooling Interfaces with Components for Potential Adverse Events, 3/11
- PXSO Assessment of the Implementation of Fire Protection Program Administrative Controls, 4/09
- PXSO Facility Operations Quick-check, 12/11
- PXSO- FY-11 Safety System Functional Assessment of the Lightning Detection and Warning System (LDWS), 9/11
- PXSO P 226.1-2C, Pantex Site Office Line Oversight Program, 12/1/10
- PXSO P 411.1-1B, Functions, Responsibilities, and Authorities Manual, 1/11
- PXSO P 423.1-1B, Pantex Site Office Implementation Verification Reviews, 12/2/11
- PXSO P 425.1B, Pantex Site Office Startup and Restart of Pantex Plant Activities, 4/3/11
- PXSO P 830A, Pantex Site Office Safety Basis Program, 1/25/11
- PXSO Safety System Functional Assessment of the Electrostatic Dissipative Flooring, 6/11
- PXSO Safety System Functional Assessment on the Task Exhaust System, 7/11
- PXSO/AMNE 12-104 Fire Suppression Systems Safety System Functional Assessment Report, 6/11
- PXSO/AMNE FY 11 12-104 Fire Suppression Systems Safety System Functional Assessment Report, 6/11
- Readiness Assessment for the Restart of Test of Radioisotopic Thermoelectric Generators Using a Heat Sink Tester, Final Report, 6/11
- Readiness Assessment for the Startup of Stage Right Pit Staging Operations at the Pantex Plant (U), Final Report, 9/11
- RPT-SAR-199801, TSR for Pantex Facilities, R282, 1/18/12
- SB-2009-07, Technical Safety Requirements Implementation Assessment, 4/09
- SB-2009-09, Technical Safety Requirements Implementation Assessment, 6/09
- SB-2009-93, Technical Safety Requirements Implementation Assessment, 1/09
- SB-2010-45, Shadow of CAS Assessment of Nuclear Materials and Explosives Inventory Controls, 8/10
- SB-2011-04, Shadow of Assessment of Operator Actions (TSR 5.7.33.3.7), 9/11
- SB-2011-04, Shadow of CAS Assessment of W88 Operations – Control of Equipment (TSR F.5.1.1), 5/11
- SB-2011-06, NNSA PXSO Assessment of B&W Pantex Management Self-Assessment: Administrative Control to Install Connector Covers and Shorting Plugs, 4/11
- SB-2011-08, NNSA PXSO Assessment of B&W Pantex Management Self-Assessment: Technical Safety Requirement (TSR) Control MSA Plan ENG-11-TSR-02, *Hoist Insulators* (TSR DF.14N), 4/11
- SB-TSD-941418, Control Flowdown Matrices for TSRs for Pantex Facilities, R42, 12/16/11
- Specific Audit Plan (Amplification of Master Audit Plan) for the Implementation Verification Review (IVR) of Authorization Basis Change AB-11-47, IVR Audit Plan AB Change AB-11-47, R0, 8/8/11
- Specific Audit Plan, Implementation Verification Review, Amplification of Master Audit Plan, AB-11-15, R0, 12/8/10

- Specific Audit Plan, Implementation Verification Review, Amplification of Master Audit Plan for Authorization Basis Change Package, AB-08-29-A27, 2/10/11
- Specific Audit Plan, Implementation Verification Review, Amplification of Master Audit Plan for Authorization Basis Change Package, AB-08-29A29, R0, 4/18/11
- TMP-MSA-0001, Management Self-Assessment Master Plan for Technical Safety Requirements Controls, R3
- TMP-MSA-0002, Management Self-Assessment Master Report for Technical Safety Requirements Controls, R2
- WI 02.01.06.02.01, Develop and Control Authorization Basis Documents, Issue 9
- WI 02.01.06.02.03, Developing an Implementation Plan for Authorization Basis Control Changes, R3
- WI 02.03.12.01.01, Authorization Basis Control Owner Roles, Responsibilities, and Requirements for Administrative and Structures, Systems and Component Controls, Issue 8
- WI 02.03.14.04.01, Manage the CAS and annual CAS assessment schedule, R2
- WI 02.04.06.03.02, Create, Submit, and Obtain Approval for a Readiness Review Plan of Action, Issue 4
- WI 02.04.06.03.03, Create a Readiness Review Implementation Plan, Issue 3
- WI 02.04.06.03.04, Conduct a Readiness Review, Issue 3
- WI 02.04.06.03.05, Create and Issue a Readiness Review Final Report, Issue 3
- WI 02.04.06.03.08, Technical Safety Requirements Implementation Verification Review Process, Issue 3
- WI-02.03.12.02.09, Perform System Year-End Evaluation Report, R2

Interviews

- Quality and Performance Assurance Division Manager
- Assessment Department Manager
- Section Manager for Assessments
- Performance Assurance Department Manager
- Lead Assessor
- Weapon Engineer Section Manager, Process Engineering
- Authorization Basis Analyst
- Acting Authorization Basis Section Manager
- System Engineering Department Manager
- System Engineering Department Engineer
- Technical Training Manager
- Performance Assurance Manager
- Work Planning Department, Section Manager
- Preventive Maintenance, Section Manager
- RA Team Member, Quality Assurance Specialist
- Assistant Senior Scientific and Technical Advisor
- Lead General Engineer, Assistant Manager for Facility Operations
- Lead General Engineer (Nuclear Engineering Technical Lead), Assistant Manager for Nuclear Engineering
- Safety Basis Supervisor, Assistant Manager for Nuclear Engineering

Observations

- Contractor Readiness Assessment Evolution

- Training Course 407.51 on Management Self-Assessments
- Assessment Review Team Meeting
- Integrated Plan of the Day Meetings