



Independent Assessment of Specific Administrative Controls at the Pantex Plant

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Office of Enterprise Assessments
U.S. Department of Energy

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Acronyms

AC	Administrative Control
CNS	Consolidated Nuclear Security, LLC
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
HPI	Human Performance Improvement
NPO	National Nuclear Security Administration Production Office
OFI	Opportunity for Improvement
Pantex	Pantex Plant
SAC	Specific Administrative Control
SAR	Safety Analysis Report
SC	Safety Class
SS	Safety Significant
TSR	Technical Safety Requirement

INDEPENDENT ASSESSMENT OF SPECIFIC ADMINISTRATIVE CONTROLS AT THE PANTEX PLANT

Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of the identification, development, and implementation of selected specific administrative controls (SACs) at the Pantex Plant (Pantex) from March to May 2023. This assessment was performed within the broader context of ongoing assessments of the development and implementation of SACs across the DOE complex to ensure that credited safety functions of SACs can be fulfilled when needed to prevent or mitigate postulated accidents. The assessment focused on the approach to meeting SAC requirements in DOE-STD-3009-94, Change Notice 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*.

Consolidated Nuclear Security, LLC (CNS) manages Pantex under the direction and oversight of the National Nuclear Security Administration Production Office. CNS appropriately identified the reviewed SACs based on the hierarchy of controls listed in DOE-STD-3009-94 and the CNS hazard and accident analyses. Except as noted below, the selected SACs are adequately developed, and their requirements are added to implementing procedures to ensure that safety functions are reliably met.

EA identified the following strengths:

- CNS is effectively implementing a modernization plan to upgrade safety basis controls so that they align with the format and content requirements and expectations of DOE-STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*, where practicable.
- CNS establishes teams with members from engineering, operations, and nuclear safety who evaluate human performance for safety class SACs to ensure that the controls can be executed.
- CNS is implementing a rigorous process to ensure SAC implementation, including the assignment of control owners for SACs and periodic verification by an independent organization.
- The National Nuclear Security Administration Production Office summarizes and trends issues, including SAC implementation issues, that it identifies monthly and enters them into the CNS issues management system for resolution.

EA identified two deficiencies with respect to meeting the requirements of DOE-STD-3009-94, as summarized below:

- One SAC does not provide a performance criterion to protect accident analysis assumptions.
- For two safety class SACs, implementing procedures do not provide specific implementing steps, required verification, or the documentation necessary to ensure that SAC performance criteria are reliably met.

In summary, the identification, development, and implementation of SACs at Pantex generally meet the requirements of DOE-STD-3009-94. Although EA identified specific deficiencies associated with SAC development and implementation, the SACs as written and implemented are sufficient for controlling the analyzed hazards. Resolution of the issues identified in this assessment will support a more robust and reliable control set.

INDEPENDENT ASSESSMENT OF SPECIFIC ADMINISTRATIVE CONTROLS AT THE PANTEX PLANT

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Nuclear Engineering and Safety Basis Assessments, within the independent Office of Enterprise Assessments (EA), assessed the identification, development, and implementation of selected specific administrative controls (SACs) at the Pantex Plant (Pantex) from March to May 2023. This assessment was performed within the broader context of ongoing assessments of the development and implementation of SACs at selected high risk (i.e., hazard category 1 and 2) nuclear facilities across the DOE complex. The purpose of these assessments is to evaluate the effectiveness of both the contractor and field office in developing, implementing, and maintaining SACs to ensure that the credited safety functions of SACs can be fulfilled when needed to prevent postulated accidents or mitigate hazards.

This assessment was conducted in accordance with the *CY [Calendar Year] 2023 Plan for the Independent Assessment of Specific Administrative Control Implementation Across the DOE Complex*. The assessment focused on the line management approach to meeting SAC requirements in DOE-STD-3009-94, Change Notice 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*.

Consolidated Nuclear Security, LLC (CNS) manages Pantex under the direction and oversight of the National Nuclear Security Administration Production Office (NPO). Pantex supports the U.S. nuclear stockpile through nuclear explosive assembly and disassembly, special nuclear material staging, testing and evaluations, and manufacturing of high explosives.

Pantex nuclear facilities are located in material access areas in Zones 4 and 12. Zone 4 operations are related to staging nuclear explosives and nuclear material. Zone 12 operations include assembly, disassembly, inspection, staging, and transportation of nuclear explosives and components. EA reviewed the safety basis documentation and select SACs supporting nuclear material and explosive processes and operations within the material access areas and transportation within and between these zones (e.g., SACs that provide credited facility and operational restrictions).

2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which EA implements through a comprehensive set of internal protocols, operating practices, and assessment and process guides. This report uses the terms “best practices, deficiencies, findings, and opportunities for improvement (OFIs),” as defined in the Order.

As identified in the approved plan, this assessment considered requirements from EA Criteria and Review Approach Document (CRAD) 34-02, *Specific Administrative Controls*, and CRAD EA-30-07, *Federal Line Management Oversight Processes*. The assessment was conducted in two parts. The first part of the assessment focused on SAC identification and development. EA reviewed SAC-related aspects of the Pantex sitewide, transportation, staging, and nuclear material safety analysis reports (SARs) (four of the eight Pantex SARs); the technical safety requirements (TSRs) document; and supporting documents to determine whether SAC identification and development meet DOE-STD-3009-94 requirements. DOE-STD-1186-2004, *Specific Administrative Controls*, clarifies those requirements, provides expectations for

the development and implementation of SACs, and is cited as a requirement in the nuclear material SAR and the CNS contract.

To facilitate comparing assessment results with those from other DOE sites, this assessment focused on the handling and transportation of nuclear material components or explosive hazards not associated with weapon assembly or disassembly, which is unique to Pantex. Pantex SARs identify 47 non-weapons-specific SACs, of which 17 were selected for evaluation in the assessment. The selection of SACs was prioritized based on the following:

- The SAC has broad application and high utilization across Pantex operations.
- Evaluation of the SAC would not require review of weapons system hazards analysis reports.
- Onsite activities would not require observation of nuclear explosive operations.

EA reviewed the accident analysis in the SARs and 7 of 15 programmatic administrative controls (ACs) to determine whether they are appropriately categorized (i.e., programmatic ACs do not perform a safety significant [SS] or safety class [SC] function). EA also reviewed implementing documents (e.g., procedures) to determine whether SAC requirements are adequately captured. The second part of the assessment consisted of field observations of SAC-related operations and interviews with CNS and NPO personnel responsible for SAC development, review, approval, and implementation.

EA used a written comment and response process to address issues identified during the first part of the assessment. Follow-on discussions among EA, CNS, and NPO personnel were conducted to clarify and resolve comments.

There were no previous findings for follow-up addressed during this assessment.

3.0 RESULTS

3.1 SAC Identification and Development

This portion of the assessment evaluated whether the Pantex SACs are appropriately identified and developed in the SARs in accordance with the requirements of DOE-STD-3009-94 and the expectations of DOE-STD-1186-2004.

The reviewed SACs are appropriately identified based on the control selection in the hazard and accident analyses. The Pantex SARs follow the hierarchy of controls from DOE-STD-3009-94 and appropriately credit SC and SS structures, systems, and components prior to identifying SACs. Sixteen of the reviewed SACs are designated as SC, and the remaining reviewed SAC is designated as SS for worker protection. The SC SACs protect accident analysis assumptions and reduce the probability of accidents with high unmitigated consequences to the public. SAC safety functions are adequately derived in the hazard and accident analyses.

Although the reviewed SACs are appropriately identified, many SAC descriptions and evaluations in the SARs do not meet the systematic format and content expectations of DOE-STD-3009-94. For example:

- Chapter 4 of the transportation and staging SARs do not evaluate how the *Walker/Spotter* SACs meet their safety functions. This information is instead included in the chapter 3 accident analysis.
- The SARs contain no information on SACs in chapter 5 other than the SAC titles. The control information is instead included in the chapter 4 SAC sections.

- Not all functional requirements for the *Fire Protection Program* SAC in the sitewide SAR are found in the functional requirements section of the SAC but are in various sections of the SAC in chapter 4. Functional requirements are appropriately included in TSRs.
- Multiple functional requirements for the *Fire Protection Program* SAC in the sitewide SAR inappropriately include control failure probabilities. These probabilities may be appropriate in the SAC evaluation to demonstrate control reliability but are not functional requirements.

Because DOE-STD-3009-94 does not explicitly require its described format, and information required for TSR control development can be found in the SARs, EA did not identify this observation as a deficiency. Additionally, CNS is currently implementing a modernization plan for the safety basis. A dedicated CNS team is analyzing and rewriting SACs to meet the format and content of DOE-STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*, where practicable, and include specific functional requirements and performance criteria. EA reviewed two rewritten SACs (approved but not implemented) and determined that they conformed to the format and content presented in the standard, with easily discernible functional requirements and performance criteria. The modernization effort for all controls is scheduled for completion by December 2024.

The *Forklift and Tow Motor Operations* SAC does not provide a performance criterion for the maximum container lift height to protect accident analysis assumptions (a three-foot drop), contrary to DOE-STD-3009-94, section 4.5.X.4. (See **Deficiency D-CNS-1.**) Instead, the requirement is to “keep the tines as low as possible,” which is not specific and subject to interpretation. Incomplete performance criteria may result in controls that do not fulfill their safety functions or cannot be implemented as derived. Interviewed forklift drivers stated that they consider the appropriate lift height to be less than one foot.

Overall, CNS performs thorough human performance improvement (HPI) evaluations for SC SACs that are referenced in the SAC evaluations. CNS effectively uses a team approach with members from engineering, operations, and nuclear safety to perform the HPI evaluations. These HPI evaluations are generally adequate for the SACs to demonstrate that the controls can be reliably performed by the required individuals. However, the *Walker/Spotter* SAC evaluation does not consider that the walker/spotter can be responsible for up to three moving forklifts, and the *Lightning Warning Communications* SAC evaluation does not discuss the need for the plant shift superintendents to be able to differentiate colors on weather system screens (although the requirement to pass a color-blindness test is in an operations procedure). (See **OFI-CNS-1.**)

The reviewed programmatic ACs in the TSR document are properly categorized (i.e., they do not perform an SS or SC function and, therefore, are not required to be SACs).

SAC Identification and Development Conclusions

The reviewed SACs are appropriately identified based on the control selection in the hazard and accident analyses. SAC safety functions are adequately derived in the hazard and accident analyses. Although the SAC sections do not follow the systematic format and content described in DOE-STD-3009-94, sufficient information is available in the SARs to formulate TSR controls. Other than the deficiency regarding the lack of a performance criterion for a maximum container lift height, functional requirements and performance criteria are adequate. The reviewed programmatic ACs are properly categorized.

3.2 SAC Implementation

This portion of the assessment evaluated whether the Pantex SACs are implemented and maintained in accordance with the requirements of DOE-STD-3009-94 and the expectations of DOE-STD-1186-2004.

The evaluated SACs, as developed in chapter 4 of the SARs, are adequately captured in the TSRs as directive action SACs. In most cases, SAC requirements are adequately captured in procedures, and the personnel performing SAC actions understand and effectively complete the actions. For some SACs, the requirements are implemented through general use procedures (procedures not required to be at the job site during the operation) as part of a long list of general and safety requirements. Often, the listed requirements are reliably implemented as standard practice (e.g., use of walkers/spotters, severe weather response, ensuring forklift drivers are qualified for moving nuclear explosives).

Although general and safety requirements are mostly well implemented, EA identified a weakness. Contrary to DOE-STD-3009-94, section 4.5.X.4, which states that “performance criteria characterize the specific operational responses and capabilities necessary to meet functional requirements,” in two cases general use procedures used for SC SAC implementation do not provide specific implementing steps, required verification, or the documentation necessary to ensure that SAC performance criteria are reliably met. (See **Deficiency D-CNS-2.**) Specifically:

- The *Forklift and Tow Motor Operations* SAC requires forklift drivers to stop and position the tines before insertion into the stand for the load. EA observed one material move where the driver made a turn and inserted the tines without stopping to verify their position.
- The *Compressed Gas Cylinder* SAC includes requirements for cylinder restraints and caps that are implemented in general use procedures that do not provide surveillance requirements or documentation of configuration verification.

In these cases, reliance on general use procedures does not ensure that performance criteria are implemented in a manner that reliably results in the desired operational response necessary to meet the SAC functional requirements. Although these SAC requirements are implemented in a manner more consistent with implementation of programmatic AC requirements than SC SAC requirements, Pantex has a long history of moving nuclear material and explosives without incident. EA did not identify a safety concern.

EA reviewed the training and qualification of Pantex personnel responsible for SAC implementation and compliance activities to determine whether training is appropriate to ensure SAC effectiveness. EA reviewed qualification cards, course material, and continuing training material, and observed a TSR training course. The evaluation also included discussions with the TSR training manager, along with operator interviews. Personnel demonstrated familiarity with SAC requirements during interviews. Training and qualification are sufficient to ensure SAC implementation.

EA reviewed recent CNS assessments of SAC implementation performed between 2016 and 2023. DOE-STD-1186-2004, section 2.2, requires independent assessment of SACs on a periodic basis to verify safety function performance and focuses on performance-based methods for this verification. Due to the large number of controls at Pantex (more than 1,500), CNS has assigned a control owner to most controls. Until recently, these control owners were responsible for the periodic SAC assessments. In the last 18 months, the Readiness Assurance group was assigned responsibility for all TSR verification assessments to provide an independent verification of implementation. The assessments are performed every five years and follow a defined format. Although the initial assessments performed by this group did not include field observations (which had previously been performed by control owners), the manager of the group stated field observations will be included in the future. The assessment reports include thorough documentation of reviewed implementing documents, interviews, and training, and identified several issues not previously identified by control owners. CNS’s periodic assessment of SACs is appropriately performed and should continue to improve when field observations are performed.

Finally, EA reviewed the Federal oversight of SAC implementation at Pantex. NPO has procedures that govern the oversight process, including conduct of assessments, performance feedback, and corrective

action management. NPO assessments appropriately include document reviews, field observations, and interviews. SAC implementation assessment activities are appropriately included as part of shadow assessments of implementation verification reviews or operational awareness activities. Federal oversight of SAC implementation is primarily performed by Facility Representatives through observation of Pantex activities which involve SACs. EA reviewed NPO SAC assessment reports and daily activities documented in NPO “Quickcheck” forms, interviewed NPO personnel, and verified that assessments are performed by qualified nuclear safety specialists and Facility Representatives. A notable practice by the NPO operations organization is that they summarize and analyze their Quickchecks for significant issues and trends. The results are input into the monthly performance feedback report issued to CNS and entered into the CNS issues management system.

SAC Implementation Conclusions

In general, SACs are adequately implemented at Pantex. Although SAC implementing documents appropriately include requirements from the TSR document, the reliance on general use procedures may not be sufficient to ensure that all SACs are reliably executed. SAC training is adequate for CNS personnel. CNS appropriately evaluates SAC implementation every five years. Federal oversight of Pantex SAC implementation is effectively implemented.

4.0 BEST PRACTICES

No best practices were identified during this assessment.

5.0 FINDINGS

No findings were identified during this assessment.

6.0 DEFICIENCIES

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. Deficiencies that did not meet the criteria for findings are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

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Deficiency D-CNS-1: *The Forklift and Tow Motor Operations SAC does not provide a performance criterion for the maximum container lift height to protect accident analysis assumptions. (DOE-STD-3009-94, sec. 4.5.X.4)*

Deficiency D-CNS-2: *Implementing procedures for two SC SACs do not provide specific implementing steps, required verification, or the documentation necessary to ensure that SAC performance criteria are reliably met. (DOE-STD-3009-94, sec. 4.5.X.4)*

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified the OFI shown below to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in assessment reports,

they may also address other conditions observed during the assessment process. This OFI is offered only as a recommendation for line management consideration; it does not require formal resolution by management through a corrective action process and is not intended to be prescriptive or mandatory. Rather, it is a suggestion that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

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OFI-CNS-1: Consider evaluating operational details in the HPI evaluations, such as challenges for the walker/spotter when responsible for up to three vehicles, and whether color blindness would affect the ability of a plant shift superintendent to effectively read weather system screens.

Appendix A Supplemental Information

Dates of Assessment

March to May 2023

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