



**Independent Assessment of
Specific Administrative Controls
at the
Los Alamos National Laboratory
Weapons Engineering Tritium Facility**

November 2022

Office of Enterprise Assessments
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Table of Contents

Acronyms.....	iii
Executive Summary.....	iv
1.0 Introduction.....	1
2.0 Methodology.....	1
3.0 Results.....	2
3.1 SAC Identification and Development.....	2
3.2 SAC Implementation.....	3
4.0 Best Practices.....	4
5.0 Findings.....	4
6.0 Deficiencies.....	5
7.0 Opportunities for Improvement.....	5
Appendix A: Supplemental Information.....	A-1

Acronyms

AC	Administrative Control
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EA	Office of Enterprise Assessments
FTWC	Flanged Tritium Waste Container
LANL	Los Alamos National Laboratory
NA-LA	National Nuclear Security Administration Los Alamos Field Office
OFI	Opportunity for Improvement
SAC	Specific Administrative Control
SC	Safety Class
SS	Safety Significant
Triad	Triad National Security, LLC
TSR	Technical Safety Requirement
WETF	Weapons Engineering Tritium Facility

INDEPENDENT ASSESSMENT OF SPECIFIC ADMINISTRATIVE CONTROLS AT THE LOS ALAMOS NATIONAL LABORATORY WEAPONS ENGINEERING TRITIUM FACILITY

Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of the development and implementation of specific administrative controls (SACs) at the Los Alamos National Laboratory Weapons Engineering Tritium Facility (WETF) from June to August 2022. This assessment was performed within the broader context of ongoing assessments of the development and implementation of SACs across the DOE complex. 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*.

EA identified the following strengths:

- The WETF documented safety analysis follows the hierarchy of controls from DOE-STD-3009-94 and appropriately credits safety class and safety significant structures, systems, and components prior to identifying SACs.
- Operations personnel at the WETF demonstrated thorough and extensive planning and rehearsal, which included the use of mockups, before performing a high hazard container venting activity.

EA identified three deficiencies in meeting the requirements of DOE-STD-3009-94, as summarized below:

- In two instances, functional requirements or SAC evaluations are missing or incomplete in the documented safety analysis.
- Two SACs in a documented safety analysis addendum do not identify functional requirements for instruments supporting the SACs or provide a justification for not functionally classifying the instruments as safety significant.
- In one instance, Triad did not identify a programmatic administrative control that performs a safety significant function as a SAC.

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

INDEPENDENT ASSESSMENT OF SPECIFIC ADMINISTRATIVE CONTROLS AT THE LOS ALAMOS NATIONAL LABORATORY WEAPONS ENGINEERING TRITIUM FACILITY

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 development and implementation of specific administrative controls (SACs) at the Los Alamos National Laboratory (LANL) Weapons Engineering Tritium Facility (WETF) from June to August 2022. 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) 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.

This assessment was conducted in accordance with the *CY [Calendar Year] 2022 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*.

Triad National Security, LLC (Triad) manages WETF under the direction and oversight of the National Nuclear Security Administration Los Alamos Field Office (NA-LA). WETF, which is located in Technical Area 16 at LANL, performs research and development and processes tritium to meet the requirements of the current and future stockpile stewardship program. The tritium-processing activities support the nuclear weapons program and other programs at LANL. Typical WETF tritium-processing activities include repackaging, removing impurities, mixing tritium with other gases, analyzing mixtures, loading tritium onto getter materials, performing various user-defined experiments, and testing components that contain tritium.

2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which is implemented through a comprehensive set of internal protocols, operating practices, assessment guides, 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 was conducted remotely and focused on SAC identification and development. EA reviewed the WETF documented safety analysis (DSA), the technical safety requirement (TSR) document, and relevant reference documents to determine whether SAC identification and development meet the requirements of DOE-STD-3009-94. DOE-STD-1186-2004, *Specific Administrative Controls*, clarifies those requirements and provides guidance for the development and implementation of SACs. Administrative controls (ACs) were reviewed to determine whether they are appropriately classified as ACs rather than SACs (i.e., the 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 and

AC requirements are adequately captured. The second part of the assessment was conducted at LANL and consisted of field observations of SAC-related operations and interviews with Triad and NA-LA personnel responsible for SAC development and implementation.

EA used a written comment and response process to address issues identified during the review. Follow-on discussions among EA, Triad, and NA-LA 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 determined whether the WETF SACs are appropriately identified and developed in the DSA in accordance with the requirements of DOE-STD-3009-94 and the expectations of DOE-STD-1186-2004.

EA evaluated all 14 SACs in the WETF DSA and associated addenda. In most cases, SACs are appropriately identified in the control selection process of the hazard and accident analyses. The WETF DSA follows the hierarchy of controls from DOE-STD-3009-94 and appropriately credits SC and SS engineered features prior to identifying SACs. Most SACs are designated as SS because they reduce the probability or consequences of accident scenarios. Four of the SACs are designated as SC. The SC SACs control the tritium inventory in the facility and processes or support the safety functions of SC design features. SAC safety functions are adequately derived in the hazard and accident analyses. The descriptions contain sufficient detail for an understanding of each SAC safety function and its relationship to the facility safety analysis.

In most cases, DSA chapter 4 functional requirements and performance criteria are sufficient to ensure that the SACs can be effectively implemented. However, EA identified the following two instances where functional requirements or SAC evaluations in the DSA do not meet the requirements in DOE-STD-3009-94 sections 4.5.X.3 and 4.5.X.4. (See **Deficiency D-Triad-1.**)

- The Combustible Loading SAC is missing the SC functional requirements identified in DSA chapter 3 (although the performance criteria for these missing functional requirements are included in the SAC evaluation).
- The Containerization SAC compensatory measures are not adequately described or evaluated in DSA chapter 4 for legacy tritium containment vessels with vulnerabilities.

Incomplete functional requirements and SAC evaluations may result in inadequate controls. Triad is currently funded to rewrite the DSA to meet the requirements of DOE-STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*, as part of the WETF DSA rewrite project, PEP-WETF-584, *Project Execution Plan for WETF: Plan to Develop a DOE-STD-3009-2014 Documented Safety Analysis (DSA) for the Weapons Engineering Tritium Facility*. This project, which is developing a new DSA starting with a new hazard analysis, is scheduled for completion in 2025. In its comment responses, Triad committed to evaluate this deficiency for resolution in the new DSA.

Additionally, contrary to the requirements of DOE-STD-3009-94, section 4.5.X.2, there are two SACs in the DSA addendum for venting of the Area G Flanged Tritium Waste Containers (FTWCs)

that do not identify functional requirements for instruments supporting the SACs or provide a justification for not functionally classifying the instruments as SS. (See **Deficiency D-Triad-2.**) Impacted instrumentation includes the vent fan flowmeter supporting the Minimum Airflow for Portable Ventilation SAC and the pressure gauges necessary for the Area G FTWC Headspace Gas Pressure SAC. An incomplete SAC evaluation and improper functional classification of equipment may result in an ineffective hazard control.

EA evaluated all nine programmatic ACs in the TSR document to determine whether they are properly categorized (i.e., whether they do not perform a SS function and therefore are not required to be SACs). There is one accident scenario where a programmatic AC (Hazardous Material Protection Program) is used instead of a SAC to limit the quantity of gas released into the Tritium Gas Containment System to protect an over-pressurization assumption of the accident analysis that could otherwise result in high consequences to the worker. Contrary to the definition of a SAC in DOE-STD-3009-94, this AC performs a SS function but is not identified as a SAC. (See **Deficiency D-Triad-3.**) DOE-STD-3009-94 requires formal evaluation of SACs in the DSA to demonstrate that the controls can perform their safety functions. There are no similar requirements for ACs. Using an AC when a SAC is required may result in an ineffective hazard control. Triad committed in its comment response to evaluate this deficiency for resolution in the new DSA.

Additionally, contrary to the definition of a SAC in DOE-STD-3009-94, the DSA identifies and credits numerous programmatic ACs as SS. Programmatic ACs identified as SS include the Pressure Safety, Gas Cylinder Safety, Training and Qualification, Maintenance, and Procedures Programs. Although this concern is prominent in the DSA, EA did not identify it as a deficiency because the hazard and accident analyses show that crediting these programmatic ACs as SS is not necessary to achieve acceptable risk reduction. In general, programmatic ACs could be identified as defense-in-depth rather than SS. Triad indicated in its comment response that it will evaluate the functional classification of ACs during development of the new DSA.

SAC Identification and Development Conclusions

Except for the deficiencies identified above, SACs are adequately identified and developed based on the control selection in the hazard and accident analyses. SAC safety functions are adequately derived in the hazard and accident analyses. In general, the functional requirements and performance criteria are sufficient to ensure that the SAC safety functions can be met.

3.2 SAC Implementation

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

WETF SACs, as developed in chapter 4 of the DSA, are adequately captured in the TSRs as limiting conditions for operation and directive action SACs. SACs are effectively implemented in detailed operating procedures and programs. EA observed operators performing surveillance activities that confirmed effective SAC implementation. Operations personnel at WETF demonstrated thorough and extensive planning and rehearsal, which included the use of mockups before performing a high hazard container venting activity. Operators are familiar with their assigned tasks, and procedure data sheets are used to document successful task completion and to record anomalous observations.

EA reviewed the training and qualification of WETF personnel responsible for SAC implementation and compliance activities to determine whether training is sufficient to ensure SAC effectiveness. EA reviewed qualification cards, course material, on-the-job training requirements, and performance

demonstration records. The evaluation also included discussions with the facility operations manager, qualified operations staff, material balance area custodian, cognizant system engineer, and function tester qualified personnel. Personnel demonstrated sufficient knowledge of SACs and proficiency in implementation during field walkdowns and interviews. Training and qualification are sufficient to ensure effective SAC implementation.

Triad does not periodically reverify that WETF SACs are performing, or capable of performing, their intended safety functions. Periodic reverification is expected by DOE-STD-1186-2004, section 2.2 and is identified as a best practice in LANL procedure FSD-115-003, *Implementation Verification Review Process for Safety Basis Changes*. Directive action SACs are not regularly tested (similar to limiting conditions for operations) by surveillance requirements. Verifying effectiveness on a periodic basis is necessary to ensure that the safety function can be met on demand. DOE-STD-1186-2004 is not in the Triad contract or a requirement in the DSA, so although Triad used this standard for SAC development in the DSA, it has not implemented the expectation for periodic SAC reverification. (See **OFI-Triad-1**.)

Triad has not conducted independent SAC assessments but has performed multiple performance assurance activities in the past three years. These activities included independent verification reviews of DSA changes, management observations and verifications, and assessments related to quality assurance, vital safety systems, readiness, and various programs (e.g., conduct of operations, conduct of maintenance, emergency management, training and qualification, and conduct of engineering).

Federal oversight is adequately prioritized and implemented at WETF. EA reviewed Site Integrated Assessment Plan records, which reflect Federal assessments and shadowing of contractor-led nuclear safety assessments at WETF. EA interviewed NA-LA management and staff, including the WETF Facility Representative. A dedicated Facility Representative and a safety system oversight engineer are assigned to WETF. In addition, two nuclear safety specialists are assigned to the facility. The NA-LA management team stated that oversight of Triad operations is a top priority and that they are committed to strengthening their processes and accountability for oversight performance.

SAC Implementation Conclusions

SACs are adequately implemented at WETF. SAC implementing documents appropriately include requirements from the TSR document. Training on SACs is sufficient for WETF personnel. Although Triad does not perform periodic verification of SAC effectiveness, it does assess nuclear safety functional areas. Federal oversight of WETF is appropriately prioritized and 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-Triad-1: In two instances, functional requirements or SAC evaluations are missing or incomplete in the DSA. (DOE-STD-3009-94, sections 4.5.X.3 and 4.5.X.4)

Deficiency D-Triad-2: For two SACs in the Area G FTWC addendum, Triad did not identify functional requirements for instruments supporting the SACs or provide a justification for not functionally classifying the instruments as SS. (DOE-STD-3009-94, section 4.5.X.2)

Deficiency D-Triad-3: In one instance, Triad did not identify a programmatic AC that performs a SS function as a SAC. (DOE-STD-3009-94, definition of SAC)

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified one OFI 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-Triad-1: Consider identifying DOE-STD-1186-2004 (or the 2016 version, DOE-STD-1186-2016) as a requirement in DSA chapter 4 and implementing periodic reviews of SAC effectiveness.

Appendix A Supplemental Information

Dates of Assessment

June to August 2022

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