Independent Assessment of Specific Administrative Controls at the Hanford Site Solid Waste Operations Complex

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Office of Enterprise Assessments
U.S. Department of Energy

Table of Contents

Acronyms

AC	Administrative Control
CFR	Code of Federal Regulations
CPCCo	Central Plateau Cleanup Company
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EA	Office of Enterprise Assessments
LCO	Limiting Condition for Operation
OFI	Opportunity for Improvement
PAC	Programmatic Administrative Control
RL	Richland Operations Office
SAC	Specific Administrative Control
SMP	Safety Management Program
SWOC	Solid Waste Operations Complex
TSR	Technical Safety Requirement

INDEPENDENT ASSESSMENT OF SPECIFIC ADMINISTRATIVE CONTROLS AT THE HANFORD SITE SOLID WASTE OPERATIONS COMPLEX

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 Hanford Site Solid Waste Operations Complex from April to June 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 strength:

- Solid Waste Operations Complex contractor operators demonstrated strong ownership of their assigned facilities.

EA identified two deficiencies as summarized below:

- Elements of one programmatic administrative control and one safety management program are credited assumptions in the hazard and accident analyses but are not designated as SACs, contrary to DOE-STD-3009-94.
- The Container Management SAC in the documented safety analysis identifies a surveillance requirement frequency for the Container Integrity SAC element that is not accurately captured in the technical safety requirements, contrary to 10 CFR 830.205(a)(1).

EA also noted that SAC descriptions and evaluations in the documented safety analysis do not follow the format and content expectations of DOE-STD-3009-94; however, there is sufficient information in the document to demonstrate the SAC safety functions can be met.

In summary, although EA identified specific deficiencies associated with both SAC development and implementation, 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 HANFORD SITE SOLID WASTE OPERATIONS COMPLEX

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 Hanford Site Solid Waste Operations Complex (SWOC). This assessment, conducted from April to June 2022, 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 DOE field office in developing, implementing, maintaining, and overseeing SACs.

This assessment was conducted in accordance with the *CY 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*.

Central Plateau Cleanup Company (CPCCo) manages SWOC under the direction and oversight of the DOE Richland Operations Office and the Office of River Protection (together DOE-Hanford). SWOC is divided into four main areas that store transuranic, low-level, and mixed waste, primarily in drums and boxes until final disposition. This assessment focused on SACs associated with the Central Waste Complex. The Waste Receiving and Processing Facility and the Low-Level Burial Grounds have a restricted set of authorized operations; therefore, EA performed a limited evaluation of SAC implementation at these areas. T Plant was not part of this assessment as EA separately evaluated its standalone, upgraded (though not yet approved) documented safety analysis (DSA) in 2019.

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 SWOC DSA, 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, provides guidance for the development and implementation of SACs, and is cited as a requirement in the SWOC DSA. 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 or safety class 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 the Hanford Site and consisted of field observations of SAC-related operations and interviews with CPCCo and DOE-Hanford personnel. The interviews included personnel responsible for SAC development and implementation, training and qualification, and periodic assessments of SAC effectiveness.

EA used a written comment and response process to address issues identified during the offsite review. Follow-on discussions among EA, CPCCo, and DOE-Hanford 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 SWOC 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 four SACs (those not associated with T Plant) in the SWOC DSA. Each SAC contains multiple elements applicable to the various SWOC areas. The SACs are designated as safety significant to protect accident analysis assumptions and minimize risk from operational, external, and natural phenomena hazard events. In general, SACs are appropriately identified in the control selection process of the hazard and accident analyses to prevent or mitigate an accident scenario. 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. Functional requirements and performance criteria are sufficient to ensure that the SACs can be effectively implemented.

SAC descriptions and evaluations in the DSA do not follow the format and content expectations of DOE-STD-3009-94. Specific examples include:

- Elements of SAC descriptions and evaluations are in DSA chapter 5.0 and the TSR bases rather than chapter 4.0 of the DSA.
- The DSA SAC evaluations do not contain information ensuring that operators can perform the prescribed tasks; however, the tasks are not complex, and the implementing procedures contain necessary information.
- The combustible loading control, designated in chapter 3.0 of the DSA, is not carried forward into subsequent chapters; however, credited aspects of the control are found in the Container Management SAC.

Although the format and content do not conform to DOE-STD-3009-94, EA did not identify the inconsistencies as a deficiency because they do not appreciably affect the technical substance of the DSA or the adequacy of the TSR controls. CPCCo is preparing a new DSA in accordance with DOE-STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*, for the SWOC waste handling facilities (i.e., the Central Waste Complex, Waste Receiving and Processing Facility, and Low-Level Burial Grounds). The Waste Handling Facilities DSA, expected in December 2022, should address the observed inconsistencies.

EA evaluated five of the six programmatic administrative controls (PACs) in the TSR, and two of the 12 safety management programs (SMPs) based on their potential contribution to risk reduction, to determine whether they are properly categorized (i.e., not required to be SACs). The analysis determined that most of the evaluated PACs and SMPs are appropriately categorized. However, EA identified elements of one PAC and one SMP that are credited assumptions in the hazard and accident analyses but not designated as SACs as required by DOE-STD-3009-94. (See **Deficiency D-CPCCo-1**.) 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 PACs or SMPs. Using a PAC or SMP element when a SAC is required may result in an ineffective hazard control. Specifically:

- The Abnormal Container Management Program is a credited preventive PAC that protects waste container integrity and deflagration likelihood assumptions in the hazard and accident analyses for multiple hazard events, but the specific credited elements are not designated as a SAC.
- The Fire Protection Program (an SMP) identifies controls (i.e., combustible liquid storage locations and limits, combustible box heights in the outdoor storage areas) that are assumed in the accident analysis but are not protected with controls in the DSA or TSR document.

CPCCo's responses to EA comments indicate that CPCCo intends to address the EA-identified issues, including those related to format and content, in the pending new DSA.

Several of the EA comments (not identified in this report) were related to the adequacy or implementation of controls for the Low-Level Burial Grounds legacy waste retrieval operations. Waste retrieval operations have not been performed for several years and there is no current plan to restart. These operations are not in the scope of the new DSA, eliminating the need for these controls.

SAC Identification and Development Conclusions

Except for the deficiency 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. Although SAC descriptions and evaluations do not conform to the format and content expectations of DOE-STD-3009-94, they are generally sufficient to demonstrate that the SAC safety functions can be met.

3.2 SAC Implementation

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

Most SWOC SACs, as developed in chapters 4.0 and 5.0 of the DSA, are adequately captured in the TSRs as limiting conditions for operation (LCOs) and directive action SACs. However, contrary to the requirement in 10 CFR 830.205(a)(1), the Container Management SAC in the DSA identifies a surveillance requirement frequency for the Container Integrity SAC element that is not accurately captured in the TSR document. (See **Deficiency D-CPCCo-2**.) The DSA requires containers to be inspected prior to movement; however, the TSR surveillance requirement frequency for container inspection is monthly. The TSR surveillance is performed on containers in arrays, with many drums banded together on pallets and stacked up to three high. Although this in-storage inspection provides some information as to drum integrity, it may not ensure that a container can be safely moved as required by the DSA. Container handling procedures require container inspection prior to movement, effectively implementing the DSA requirement.

Two SAC requirements (related to vehicle access and bulged container controls) contain exceptions that are included in DSA chapters 4.0 and 5.0 and the TSR bases; however, these exceptions are not included in the TSR LCOs. EA did not identify these inconsistencies as a deficiency because the TSRs are conservative without the exceptions as compared to the DSA. Invoking these exceptions during operations could result in a TSR violation.

TSR SACs and ACs are effectively implemented in detailed operating procedures for management of solid waste. EA observed operators performing a variety of surveillance activities that confirmed effective SAC implementation. Operators are familiar with their assigned tasks, and the procedure data sheets are used to document successful completion and record any anomalous observations. Operators demonstrated strong ownership of their assigned facilities.

EA reviewed the training and qualification of CPCCo personnel responsible for SAC implementation and compliance activities to determine whether the training is sufficient to ensure SAC effectiveness. EA reviewed qualification cards, course material, and performance demonstration records. The evaluation included discussions with the facility manager, training manager, operators, and nuclear and criticality safety personnel. Personnel demonstrated sufficient knowledge of SACs during field walkdowns and interviews. Training and qualification are sufficient to ensure effective SAC implementation.

EA reviewed the most recent TSR implementation assessments performed by CPCCo in 2016 and 2019 and interviewed CPCCo nuclear safety and performance assurance staff regarding periodic verification of SWOC SAC implementation. DOE-STD-1186-2004, section 2.2, expects that SACs are independently assessed on a periodic basis to verify safety function performance and focuses on performance-based methods for this verification.

CPCCo appropriately performs triennial reviews of TSR SACs and ACs that cover current operations. The compliance-based assessments verify that SAC and AC requirements are reflected in implementing procedures and include a sampling verification of field records for preventive maintenance and surveillance activities related to SAC implementation. Products resulting from SAC and AC actions, such as Abnormal Container Management Program evaluations, management observations, and condition reports involving SAC non-compliance are not included within the triennial review scope. The assessments do not provide performance-based verification that SAC safety functions are met, as expected by DOE-STD-1186-2004, section 2.2, which states: "SACs implemented by TSRs must be periodically verified to perform their intended safety function. In the context of SACs, this may involve "dry runs," procedure walkdowns, tabletop exercises, or actual hazard/casualty exercises." (See **OFI-CPCCo-1**.)

EA evaluated Federal oversight of SAC implementation at SWOC. The evaluation included review of operational awareness reports and interviews with RL Operations Oversight Division and Nuclear Safety Division personnel. EA reviewed 101 RL-issued operational awareness reports from the 2020-2021 period related to DSA and TSR implementation at SWOC, as well as four RL-issued operational awareness reports evaluating quarterly performance of the nuclear safety function. The quarterly performance evaluations included reviews of condition reports, occurrence reports, and contractor assurance system reports. Oversight is extensive and thoroughly documented in the Hanford integrated contractor assurance system database.

Federal oversight of SAC implementation is primarily performed by Facility Representatives in accordance with master oversight plans; historically, this oversight has been achieved through observation of waste handling activities, which involve multiple SACs. However, due to reduced Facility Representative staffing, current oversight of SAC implementation at SWOC is primarily in response to performance issues. Given the limited SWOC activities, this SAC oversight approach is appropriate.

SAC Implementation Conclusions

SACs are adequately implemented except as noted in the deficiency identified above. SAC and AC implementing documents include appropriate requirements. Training on SACs is sufficient for CPCCo personnel. CPCCo appropriately performs triennial assessments of SAC effectiveness. RL oversight of SAC implementation at SWOC is appropriate.

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.

Central Plateau Cleanup Company

Deficiency D-CPCCo-1: Elements of one PAC and one SMP are credited assumptions in the hazard and accident analyses but are not designated as SACs. (DOE-STD-3009-94, Hazard Analysis section of the Introduction, page 12)

Deficiency D-CPCCo-2: The Container Management SAC in the DSA identifies a surveillance requirement frequency for the Container Integrity SAC element that is not accurately captured in the TSR document. (10 CFR 830.205(a)(1))

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.

Central Plateau Cleanup Company

OFI-CPCCo-1: Consider including performance-based observations, such as observations of SAC implementing activities, and a review of SAC-related condition reports and engineering operability evaluations in the triennial TSR implementation assessment.

8.0 ITEMS FOR FOLLOW-UP

EA may review the new Waste Handling Facilities DSA, which is based on DOE-STD-3009-2014, to determine how EA comments are dispositioned.

Appendix A
Supplemental Information

Dates of Assessment

April to June 2022

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