Independent Assessment of Conduct of Operations at the Hanford Site Tank-Side Cesium Removal Facility

October 2022

Office of Enterprise Assessments
U.S. Department of Energy

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Acronyms

CSE	Cognizant System Engineer
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
IXC	Ion-Exchange Column
MOP	Management Observation Program
NCO	Nuclear Chemical Operator
OE	Operations Engineer
OFI	Opportunity for Improvement
SOM	Shift Operations Manager
TSCR	Tank-Side Cesium Removal
WRPS	Washington River Protection Solutions

INDEPENDENT ASSESSMENT OF CONDUCT OF OPERATIONS AT THE HANFORD SITE TANK-SIDE CESIUM REMOVAL FACILITY

Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of selected elements of the conduct of operations program implemented by Washington River Protection Solutions (WRPS) at the Hanford Site tank-side cesium removal (TSCR) facility in July 2022. This assessment evaluated the effectiveness of WRPS in managing and maintaining a conduct of operations program and included performance-based evaluation of conduct of operations at TSCR as WRPS was shutting down processing and preparing outage activities following TSCR's second operating cycle.

EA identified the following strengths, including two best practices:

- WRPS monthly conduct of operations council meetings demonstrate excellent engagement by personnel throughout the organization and provide evidence of the strong pursuit of continuous conduct of operations improvement. (Best Practice)
- WRPS's training and qualification program for operators includes hands-on conduct of operations and human performance training that includes a variety of rigorous training activities to ensure that trainees understand and appreciate the importance of conduct of operations fundamentals. (Best Practice)
- Personnel demonstrated a thorough understanding of their roles and responsibilities established in the WRPS conduct of operations program. Communications and operator performance during observed activities demonstrated strong adherence to conduct of operations principles in almost all instances.
- TSCR operations and engineering personnel used component labeling effectively to accurately identify the observed process equipment. Observed equipment labels were properly applied, were durable, and contained the required information.

EA also identified several weaknesses and areas of concern, as summarized below:

- WRPS procedures were not always technically accurate such that they could be accomplished as written and did not always accurately incorporate higher-level requirements, and document management processes do not always permit field verification of in-use procedures as required. Not providing field personnel with accurate procedures that include all requirements, or the ability to always ensure they were operating to the latest version of a procedure, could lead to field operations being performed incorrectly.
- Hoisting and rigging of a large load near safety significant components within the TSCR yard during operations mode was not controlled with comparable protections to other required controls that prevent impacts to critical components.
- Turnover checklists and operator aids in the TSCR at-the-controls area were not controlled as required. As a result, there was no method to verify that accurate guidance was provided that included all appropriate requirements.

In summary, WRPS manages and maintains a generally effective conduct of operations program. All elements of conduct of operations evaluated as part of this assessment were systematically developed consistent with DOE Order 422.1, *Conduct of Operations*, and effectively implemented, with a few notable exceptions described in this report. Additionally, during EA observations, operations personnel demonstrated strong adherence to conduct of operations principles in almost all instances. Several programmatic areas of concern were also identified that represent departures from the Department's expectations for disciplined operations of DOE nuclear facilities. Until the concerns identified in this report are addressed or effective mitigations are put in place, some TSCR facility operations will be at an elevated level of risk.

INDEPENDENT ASSESSMENT OF CONDUCT OF OPERATIONS AT THE HANFORD SITE TANK-SIDE CESIUM REMOVAL FACILITY

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of selected elements of the conduct of operations program implemented by Washington River Protection Solutions (WRPS) at the Hanford Site tank-side cesium removal (TSCR) facility. EA conducted the onsite portion of this assessment July 18-26, 2022.

WRPS manages the Hanford tank farms under the direction and oversight of the DOE Office of River Protection and the Richland Operations Office (together "DOE Hanford"). The TSCR facility provides the capability to remove undissolved solids and cesium from tank waste. The waste treated by TSCR will be fed into the Hanford Waste Treatment and Immobilization Plant Low-Activity Waste facility for vitrification once that facility becomes operational. TSCR facility construction and commissioning were completed in late 2021, and operations began in January 2022. The TSCR process involves pumping low-activity liquid waste (supernate) from Tank 241-AP-107 to the TSCR process enclosure, filtering the waste, removing cesium via ion-exchange columns (IXCs), and delivering the treated supernate to Tank 241-AP-106. After each operating cycle, two spent IXCs are removed from the system, placed on an adjacent storage pad, and replaced in the process enclosure prior to system restart.

This assessment evaluated the effectiveness of WRPS in managing and maintaining a conduct of operations program and included a performance-based evaluation of conduct of operations as WRPS was shutting down processing and preparing for IXC change-out at the end of TSCR's second operating cycle. This assessment was conducted in accordance with the *Plan for the Independent Assessment of Conduct of Operations at the Hanford Site Tank-Side Cesium Removal Facility, July 2022*.

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 assessment plan, this assessment considered requirements related to conduct of operations described in DOE Order 422.1, *Conduct of Operations*, and WRPS implementing procedures. Criteria to guide this assessment were based on portions of those listed in objectives CO.1 through CO.4, CO.8, CO.11, CO.13, CO.18, and CO.19 of EA Criteria and Review Approach Document 31-39, Rev. 0, *Review of Conduct of Operations*.

EA examined key documents, such as system descriptions, work packages, procedures, manuals, analyses, policies, and training and qualification records. EA also interviewed key personnel responsible for developing and executing the associated programs; observed TSCR shutdown and outage preparation activities; and walked down significant portions of selected TSCR and tank farm facilities, focusing on personnel performance and adherence to conduct of operations requirements. The members of the assessment team, the Quality Review Board, and management responsible for this assessment are listed in appendix A.

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

3.0 RESULTS

3.1 Organization and Administration

This portion of the assessment evaluated WRPS's operations organization and administration.

WRPS has established and implemented an adequate conduct of operations program in accordance with DOE Order 422.1. The documented program consists of an adequate policy (TFC-POL-01, *Conduct of Operations Policy*) defining expectations for conduct of operations performance, and a thorough conduct of operations implementation matrix (TFC-PLN-05, *Conduct of Operations Implementation Plan*) specifying a suite of detailed implementing procedures for all 18 DOE Order 422.1 elements. This program adequately defines roles, responsibilities, authority, and accountability for the operations organization personnel.

WRPS has appropriately established shift staffing for all operator, engineering, and support positions. All positions were fully staffed during observations, including relief positions. During the observed operation of the TSCR systems, all personnel appropriately followed the procedural instructions specified in TO-270-700, *Operation of the TSCR System*. Interviews with participants (five nuclear chemical operators (NCOs), three shift operations engineers (OEs), and two shift operations managers (SOMs)) confirmed that they clearly understood their roles and responsibilities and reporting requirements (e.g., proper notification of system status changes), and were appropriately knowledgeable of the TSCR system. Reviewed training and qualification records for each participant confirmed full qualification status, including the two interviewed SOMs, who were appropriately qualified in accordance with TFC-BSM-TQ-STD-02, *Operations Shift Manager Qualification Requirements*.

WRPS conducts adequate monitoring and self-assessments of conduct of operations. Independent assessments of conduct of operations are appropriately required by TFC-ESHQ-AP-C-02, *Independent Assessments/Audits*. The reviewed independent assessment FY-2022-ESHQ-I-0006, *Implementation of Conduct of Operation Safety Management Program*, demonstrated that specified assessments are being conducted as required. Management observation of conduct of operations is adequately governed by TFC-ESHQ-AP-C-03, *Management Observation Program* [MOP]. During an observed monthly conduct of operations council meeting, managers reviewed metrics, MOP reports, and emerging topics, which demonstrates effective engagement with field personnel and attention to operational performance. Additionally, the council responded proactively to the issues identified by EA during this assessment by adding MOP reports for these issues to the next meeting's agenda. The council is chaired by the Production Operation Manager and was attended by personnel from all involved organizations. EA considers these monthly conduct of operations council meetings, which enhance the effectiveness of the program, to be a **Best Practice** because they foster excellent engagement by personnel in both the operations and support organizations and a strong pursuit of continuous improvement by WRPS management, as demonstrated during the observed meeting.

Organization and Administration Conclusions

WRPS has established and implemented an adequate conduct of operations program. Interviewed personnel demonstrated a thorough understanding of their roles and responsibilities. All positions were fully staffed during observations, including relief positions. The excellent engagement by personnel from multiple organizations at monthly conduct of operations council meetings demonstrates strong pursuit of continuous improvement by WRPS management and is considered a Best Practice.

3.2 Shift Routines and Operating Practices

This portion of the assessment evaluated WRPS's established shift routines and operating practices.

WRPS has established and implemented effective shift routines specified in TFC-OPS-OPER-C-60, *Surveillance Rounds*, including requirements for inspections, equipment checks, and round sheets (data sheets that identify important equipment and acceptable equipment instrumentation readings). These requirements are properly flowed into the operating procedure (TO-270-700). TO-270-700 provides adequate instructions and data recording forms for all facility equipment rounds and surveillances to ensure system functionality and provide data for performance trends, and appropriately specifies response to out-of-tolerance equipment indicators. During observed operator rounds for the hourly TSCR system checks, operators demonstrated strict compliance with round sheet instructions. Also, during operation of the AP Farm Ventilation Parameters process, when system parameters were not met, EA observed that the NCO took actions in accordance with TO-270-700.

WRPS has also established and implemented effective operating practices to ensure that shift operators are alert, informed of conditions, and operate equipment properly. TFC-OPS-OPER-C-08, *Shift Routines and Operating Practices*, provides effective instructions for all operators regarding current and changed facility status, authority to operate equipment, and personnel in training under the observation of a qualified operator. TFC-OPS-OPER-C-08 also specifies requirements for formal, disciplined operations. Interviews with NCOs, OEs, and SOMs confirmed their understanding of the requirements for shift routines and their cognizance of the current facility conditions. EA observed that all personnel involved in evolutions consistently adhered to TFC-OPS-OPER-C-08 requirements.

Shift Routines and Operating Practices Conclusions

WRPS has established and implemented effective shift routines and operating practices through operating procedures. Facility equipment rounds and surveillances are appropriately required by procedure and were effectively performed during the assessment.

3.3 Control Area Activities

This portion of the assessment evaluated WRPS's control area operations practices.

WRPS has established and implemented generally adequate control area operations practices in accordance with procedures TFC-OPS-OPER-C-59, *Control Area and At-The-Controls Area Activities*, and TO-270-700. TFC-OPS-OPER-C-59 appropriately and thoroughly addresses control area access, specifying which positions have unencumbered access. All TSCR system operations are governed and conducted by operating procedures, which limits concurrent operations to those specified by the procedure. EA observed excellent formal and disciplined behavior during most work performance, including reader/worker and step repeat-backs. Operators performed periodic surveillance of equipment conditions as specified in TO-270-700.

Most observed at-the-controls area activities were conducted adequately. However, contrary to TFC-OPS-OPER-C-59 and DOE Order 422.1, att. 2, sec. 2.c(2), the following weaknesses were identified (see **Deficiency D-WRPS-1**):

- Personnel entered the at-the-controls area without permission on three occasions.
- A control room operator was observed using a cell phone for non-work-related activities on two occasions.

- During an independent verification activity, all qualified personnel left the control room, leaving only unqualified observers (i.e., the EA assessors).

A lack of formal and disciplined behavior among operators can lead to unintended events. WRPS responded promptly to EA's observations by generating corrective action requests and immediately moving the at-the-controls area posting to be more visible.

Control Area Activities Conclusions

WRPS has established and implemented generally adequate control area operations practices. However, EA identified some at-the-controls area activities that were not conducted in a formal and disciplined manner.

3.4 Communications

This portion of the assessment evaluated the WRPS operations organization's communications practices.

WRPS has established and implemented effective operations practices that ensure accurate, unambiguous communications among operations personnel through procedure TFC-OPS-OPER-C-31, *Communication Guidelines*. This procedure adequately details communication systems available for normal and emergency operations and describes the use of the radio system to make notifications. TFC-OPS-OPER-C-31 also appropriately governs the use of the phonetic alphabet, abbreviations and acronyms, and repeat-backs. Effective radio use was demonstrated during observed performance of operations. Observed communications were clear and concise and adhered to the requirements of TFC-OPS-OPER-C-31.

Further, TO-270-700 appropriately requires control room operators to notify the SOM and other designated onsite personnel of any changing system conditions. During EA's at-the-controls area observations, NCOs and the OE strictly adhered to TO-270-700 notification requirements. On two occasions, the OE made an extra effort to walk back to the support facility to verify that all required personnel had received the notification prior to proceeding with the subsequent procedure steps. Other observed communications made to and by the control room were performed in accordance with procedures.

Communications Conclusions

WRPS has established and implemented adequate operations communications practices, which were effectively performed during all observed operations.

3.5 Technical Procedures

This portion of the assessment evaluated WRPS operations practices for developing and maintaining accurate, understandable written technical procedures that ensure safe and effective facility and equipment operation.

WRPS has established and implemented generally adequate operations practices for developing and maintaining accurate, understandable written technical procedures. Requirements for procedure format are contained in standard TFC-OPS-OPER-STD-01, *Technical Procedure Format and Preparation Standard*. Requirements for procedure use and adherence are contained in TFC-OPS-OPER-STD-69, *Technical Procedure Use and Adherence*, which includes direction on procedure use designation (continuous, reference, or routine), critical steps, and human performance tools, such as placekeeping and reader-worker techniques.

Technical procedures are controlled by TFC-OPS-OPER-C-13, *Technical Procedure Control and Use*, which includes processes for completing and documenting review and approval of initial issue and revisions of both hard-copy and electronic procedures. Almost all procedures reviewed by EA were technically and administratively accurate, using clear language in accordance with TFC-OPS-OPER-STD-01 and correctly identifying referenced documents. However, contrary to DOE Order 422.1, att. 2, sec. 2.p(3), EA noted the following two exceptions (see **Deficiency D-WRPS-2**):

- A procedure step in TO-270-700 requiring use of WRPS's administrative lock process described in TFC-OPS-OPER-C-22, *Control and Use of Administrative Locks*, did not accurately describe the actions necessary to apply the administrative lock. TO-270-700 stated, "INSTALL administrative lock on pump AP07F-WT-P-001 TSCR Feed Pump" (to preclude the pump from starting). Operators properly completed the lockout process specified in the administrative lockout paperwork referenced in TFC-OPS-OPER-C-22. This lockout process entailed turning the key switch to "off," removing the key switch, and independently verifying that the key switch was turned off and removed. However, the instruction in procedure TO-270-700 to "INSTALL administrative lock" could not be performed as written because there was nothing to install.
- Procedure TO-270-700 contained numerous references to "the Radiological Monitoring plan." No document existed with that title, though two documents with direction for radiological monitoring had similar titles: TF-RC-058, *Radiological Control Surveys for Tank Side Cesium Removal Operations*, and RPP-PLAN-64846, *Waste Transfer Radiological Monitoring Plan for Tank Side Cesium Removal (TSCR) Campaign TSCR-01*. Through interviews, EA determined that the intent of the TO-270-700 reference was to refer to the latter document.

While these issues did not result in any observable complications, not using specific language in procedures such that actions can be performed exactly as written could cause workers to take actions other than those intended by the procedure author, resulting in improper equipment operation or adverse safety consequences.

EA observed a conduct of operations and human performance fundamentals training class being administered by the WRPS conduct of operations program owner at a WRPS training facility. The training involved both stand-up presentations and hands-on practical exercises including the manipulation of training equipment. In addition, trainees encountered difficult-to-interpret labeling and procedures that included steps that either could not be accomplished as written or directions that were intentionally confusing, thereby ensuring that trainees understood the importance of verbatim compliance and stopping when unsure. EA determined that based on the rigor and variety of the training activities, WRPS's use of hands-on conduct of operations and human performance fundamentals training as part of the qualification process is a **Best Practice**.

EA observed several instances where an NCO or OE in the field identified a procedure step that could not be accomplished exactly as written. On each of these occasions, the NCO or OE paused work in the procedure, and the operations organization processed a procedure change to correct the nonspecific language. As required by TFC-OPS-OPER-C-13, these changes (similar to pen-and-ink field changes but processed electronically and referred to as "unincorporated changes" until issued under a new procedure revision) were processed through multiple levels of approval, including an unreviewed safety question review, and approval by senior operations management.

WRPS has implemented a strong review and approval process for unincorporated changes. However, once an unincorporated change is added to an in-use procedure, the record copy of the procedure is put on hold in WRPS's electronic procedure database and is replaced by a "splash screen" that informs a user to contact the manager responsible for the procedure, who maintains physical custody of the procedure with

the unincorporated change added. Without access to the electronic record copy, procedure users cannot verify prior to the start of an activity, and daily thereafter for procedures being used more than one day, that the most current copy of the procedure is in use, as required by TFC-OPS-OPER-C-13, step 4.17, and DOE Order 422.1, att. 2, sec. 2.p(7). (See **Deficiency D-WRPS-3**.) The inability to verify procedure revisions could result in field personnel using out-of-date procedures that do not include important revisions.

Further, procedure TO-270-700 is a 239-page procedure that covers the full operational cycle of TSCR, from actions to prepare for the start of a process run, through the operations phase, to shutdown and post-shutdown actions at the end of an operational cycle. Consequently, this procedure is in continuous use for a multiple-month period, requiring multiple unincorporated changes and complete revisions to the procedure throughout the cycle while the procedure remains in use. In addition to periodic inability for operators to verify that their in-use copy was current, as discussed above, this continuous use of the procedure creates challenges with version control of the record copy (i.e., after completion, the final version retained as a quality record may have sections from several different revisions of the procedure, making it difficult to verify that the record is complete or that all requirements have been met). (See **OFI-WRPS-1**.)

In most cases, WRPS procedures incorporate appropriate information from applicable source documents, including design, safety bases, and vendor technical documents. However, EA identified one notable exception. A hoisting evolution, observed by EA, in which a 150-ton crane was used to lift a 14,120-pound load into the TSCR yard was not controlled as a "critical lift," despite the crane boom being extended over the TSCR yard and the large load being maneuvered while suspended in close proximity to the safety significant TSCR process enclosure and other safety significant structures, systems, and components.

DOE Hanford sitewide procedure DOE-RL-92-36, *Hanford Site Hoisting and Rigging Manual*, specifies that certain lifts shall be designated as critical lifts, requiring rigorous specified administrative and physical controls to minimize the possibility of equipment failure or human error during a hoisting operation involving a load that poses unacceptable consequences if mishandled. One of the seven criteria requiring a lift to be designated as critical is, "The item, although non-critical, is to be lifted above *or in close proximity to* a critical item or component" (emphasis added). In flowing down this requirement into TFC-ENG-FACSUP-C-25, *Hoisting, Rigging, Load Handling, and Transport*, and the associated lift determination checklist (section 1 of form A-6003-884, *Hoisting and Rigging Lift Package*), WRPS non-conservatively requires critical lift controls only for lifts that swing over TSCR facility structures or the IXC pad and restricts the "in close proximity" requirement for critical lift controls to safety class structures, systems, and components. Because TSCR and tank farms have no safety class controls, these two criteria as written effectively eliminate any requirement to use critical lift controls for lifts in close proximity to critical components and therefore do not effectively incorporate appropriate information from DOE-RL-92-36 as required by DOE Order 422.1, att. 2, para. 2.p(3). (See **Deficiency D-WRPS-4**.) Inaccurate flowdown of requirements from source documents into operating procedures and checklists may result in violation of the higher-level requirements during procedure implementation.

Additionally, RPP-13033, *Tank Farms Documented Safety Analysis* [DSA], derives a substantial set of controls to restrict vehicle operation inside the TSCR perimeter and prohibit vehicle operation inside the TSCR yard during operations in order to prevent potential impacts with the TSCR process enclosure or loaded or spent IXCs. The movement by crane of a 14,120-pound load inside the TSCR yard during operations mode, in very close proximity to the safety significant TSCR enclosure and with the crane boom extended in a direction such that failure would result in impact to safety significant components, may not be consistent with other DSA controls for vehicles. (See **OFI-WRPS-2**.)

Technical Procedures Conclusions

WRPS has established and implemented generally adequate operations practices for developing and maintaining accurate, understandable written technical procedures. In several observed cases where procedure steps were not clear, WRPS's use of conduct of operations and human performance fundamentals training as part of the qualification process, cited as a Best Practice, ensured that field personnel identified the discrepant steps, paused operation, and pursued WRPS's robust process to safely incorporate a field change prior to proceeding. However, WRPS processes were not adequate to ensure that procedures were technically and administratively accurate, in-use procedure versions could be verified at the required periodicity, and site hoisting and rigging requirements were accurately flowed down into local procedures.

3.6 Control of Equipment and System Status

This portion of the assessment evaluated WRPS operations processes for initial equipment lineups and subsequent changes to ensure that facilities operate with the designed configuration, including lockout/tagouts, as appropriate.

WRPS has established and implemented adequate equipment control and system status processes. Initial equipment lineup is appropriately described in procedure TO-270-700. Equipment and system status changes are adequately described in procedure TFC-OPS-OPER-C-08. Personnel demonstrated awareness of equipment status during observation of operations. EA observed the effective use of computer control systems that control equipment during all stages of operations and prompt operators to take actions at appropriate times (e.g., open valves, notify specific personnel, verify pressures). TO-270-700 appropriately requires documentation of compliance with operational limits. During observation of the TSCR process, operational limit compliance was adequately documented in facility logs.

Management of equipment deficiencies and temporary modifications is appropriately required by procedure TFC-OPS-OPER-C-08. Maintenance activities, including post-maintenance testing and return to service, are thoroughly described in procedure TO-270-700. Observed repair work (e.g., rinse and blowdown of TSCR piping and filters) demonstrated that post-maintenance testing was properly conducted, and the system was appropriately returned to service. EA observed operators properly recording identified equipment deficiencies and temporary modifications in facility logs.

TO-270-700 appropriately directs operators to take control panel alarm response actions (e.g., record information, change system configuration, contact personnel) and record such events on the facility logs. Reviewed facility logs and observations demonstrated proper logging of control panel alarms and results from round and data sheets.

Control of Equipment and System Status Conclusions

WRPS has established and implemented adequate operations processes for control of equipment and system status. Initial equipment lineups and subsequent changes are adequately documented in operating procedures. Equipment deficiencies and temporary modifications were appropriately logged.

3.7 Independent Verification

This portion of the assessment evaluated WRPS's independent verification practices.

WRPS has established and implemented generally adequate independent verification practices, including adequate processes to ensure that critical equipment configuration is maintained in accordance with

controlling documents. Procedure TFC-OPS-OPER-C-34, *Independent Verification*, appropriately lists TSCR system components that require independent verification. This list is based on a technical review and evaluation, TFC-ENG-FACSUP-C-24, *Safety Equipment Compliance Management*. TFC-OPS-OPER-C-34 appropriately requires independent verification during specific situations, such as lineups to take equipment out of service or return equipment to service (e.g., verifying isolation boundaries, equipment under maintenance or repair, instrumentation lineups for testing, and restoration), and discovery of mispositioned alignment. TFC-OPS-OPER-C-34 also adequately (with one exception) addresses methods for performing and documenting independent verification (including concurrent dual verification).

The reviewed TSCR operator training material (Tank Farms Training Course 350107, *Conduct of Operations Fundamentals*) adequately addresses independent verification techniques and thoroughly explains the difference between independent verification and concurrent dual verification. Operators adequately performed an observed independent verification of the establishment of an administrative lock configuration (including the control area operator asking the OE to leave the at-the-controls area and return prior to conducting a verification action to ensure independence) in accordance with TO-270-700. However, contrary to DOE Order 422.1, att. 2, app. A, attribute 2.j.(5)b, TFC-OPS-OPER-C-34 does not address "maintaining independence to the maximum extent possible" during concurrent dual verification. (See **Deficiency D-WRPS-5**.) Without verification independence, the efforts of one verifier can influence or bias the efforts of the other verifier.

Independent Verification Conclusions

WRPS has established and implemented generally adequate independent verification practices. However, procedure TFC-OPS-OPER-C-34 does not address maintaining independence to the maximum extent possible during concurrent dual verification.

3.8 Turnover and Assumption of Responsibilities

This portion of the assessment evaluated WRPS's operational shift and operator relief turnover processes.

TSCR operations personnel adequately performed turnovers (transfer of information) during observed shift changes and operator relief. Procedure TFC-OPS-OPER-C-08 adequately defines all key positions and the process for formal turnover of operations from one shift to another and from one person to another to ensure thorough understanding of equipment status and in-progress or planned activities. This procedure also includes the defined content of turnover checklists, which ensures comprehensive communication and documentation of current operations. All interviewed operations personnel were familiar with the expectations for turning over activities in progress. During observed shift turnovers, operations personnel demonstrated effective transfer of equipment status from the outgoing shift to the incoming shift in accordance with TFC-OPS-OPER-C-08, and properly recorded turnover information. Observed shift turnovers also demonstrated that sufficient time is allowed for oncoming operations personnel to review logbooks and other document updates and discuss any information contained in the turnover documentation. The reviewed operator log at the TSCR control enclosure properly reflected the turnover checklist content.

Despite the adequate performance of turnovers, contrary to the requirements of DOE Order 422.1, att. 2, 2.p, the turnover checklists are not controlled with a form or revision number to ensure they have been appropriately reviewed and approved. (See **Deficiency D-WRPS-6**.) Use of uncontrolled turnover documents could lead to required turnover elements not being communicated to oncoming shift personnel. Even though the turnover checklists met TFC-OPS-OPER-C-08 content requirements, use of an uncontrolled form does not ensure that any changes to the checklist are properly authorized. When EA

notified management of this discrepancy, the operations organization reviewed the identified condition and generated a corrective action request (WRPS-AR-2022-2119).

Turnover and Assumption of Responsibilities Conclusions

TSCR operations personnel adequately performed turnovers during observed shift changes and operator relief. Procedure TFC-OPS-OPER-C-08 defines an adequate process to ensure the transfer of information between outgoing and oncoming shift personnel. Observed shift turnovers were consistent with TFC-OPS-OPER-C-08. However, the turnover checklists are not being reviewed, approved, and controlled as required.

3.9 Operator Aids

This portion of the assessment evaluated WRPS's operational practices used to manage operator aids.

WRPS has established and implemented a generally adequate operator aid program through procedure TFC-OPS-OPER-C-41, *Operator Aids*. This procedure appropriately includes specific requirements to technically evaluate and approve operator aids and provides for effective control of operator aids and quarterly auditing of the program. A review of the most recent operator aid quarterly audit confirmed that this review is being conducted as required. However, contrary to the requirements in DOE Order 422.1, att. 2, sec. 2.q(1) and TFC-OPS-OPER-C-41, operators were using two unapproved operator aids in the TSCR control enclosure. (See **Deficiency D-WRPS-7**.) An unapproved operator aid could result in improper equipment operation. Interviews with operators and the OE confirmed that these operator aids were being used for convenience and were not required to operate equipment. Additionally, these operator aids did not obscure facility equipment. WRPS responded promptly to EA's observation by generating a corrective action request (WRPS-AR-2022-2110), issuing TSCR management approval of the two operator aids, and including the aids in A-6007-380, *Operator Aids Index*.

Operator Aids Conclusions

WRPS has established and implemented a generally adequate operator aid program. However, operators were using two unapproved operator aids in the TSCR control enclosure, which was promptly rectified upon identification.

3.10 Component Labeling

This portion of the assessment evaluated WRPS's use of component labeling by TSCR operations and engineering personnel to accurately identify equipment.

TSCR operations and engineering personnel used component labeling effectively to accurately identify equipment. TFC-ENG-STD-12, *Tank Farm Equipment Identification Numbering and Labeling Standard*, adequately addresses the requirements of DOE Order 422.1, att. 2, sec. 2.r. Additionally, TFC-OPS-OPER-C-32, *Tank Farm Temporary Component Identification Tags*, provides adequate processes to control temporary component identification tags for maintenance, repair, and operation of the TSCR facility. The interviewed facility managers were aware of their responsibility for component labeling. The observation of facility equipment demonstrated that labels were properly applied, were durable, and contained the required information, enabling facility personnel to accurately identify equipment. For example, walkdowns of the facility confirmed that valves, instruments, piping, and safety significant equipment exhibited the appropriate labels. Walkdowns also confirmed adequate maintenance of component labels, ensuring that lost or damaged labels are promptly identified and replaced, as all observed component labels were in good condition. A DOE Hanford TSCR oversight report dated July 7,

2022, identified reagent system components within the TSCR ancillary enclosure that were not labeled. A subsequent EA walkdown of the TSCR ancillary enclosure confirmed that the system components have since been properly labeled.

The TSCR cognizant system engineer (CSE) confirmed during an interview that he fully understood the responsibility to perform walkdowns of component labeling, as required by TFC-OPS-OPER-C-32. A review of four completed walkdown checklists confirmed that the CSE is meeting this requirement.

Component Labeling Conclusions

TSCR operations and engineering personnel used component labeling effectively to accurately identify the observed process equipment. Observed equipment labels were properly applied, were durable, and contained the required information. The TSCR CSE performs walkdowns of component labeling as required.

4.0 BEST PRACTICES

Best practices are safety-related practices, techniques, processes, or program attributes observed during an assessment that may merit consideration by other DOE and contractor organizations for implementation. The following best practices were identified as part of this assessment:

- WRPS monthly conduct of operations council meetings demonstrate excellent engagement by personnel throughout the organization and provide evidence of the strong pursuit of continuous conduct of operations improvement.
- WRPS's training and qualification program for operators includes hands-on conduct of operations and human performance training that includes a variety of rigorous training activities to ensure that trainees understand and appreciate the importance of conduct of operations fundamentals.

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.

Washington River Protection Solutions

Deficiency D-WRPS-1: WRPS did not ensure that at-the-controls area activities were always conducted in a formal and disciplined manner. (TFC-OPS-OPER-C-59; DOE Order 422.1, att. 2, sec. 2.c(2))

Deficiency D-WRPS-2: WRPS did not consistently ensure that TO-270-700 was technically and administratively accurate, with referenced documents correctly identified. (DOE Order 422.1, att. 2, sec. 2.p(3))

Deficiency D-WRPS-3: WRPS processes do not provide a method for verification of in-use procedures that contain unincorporated changes. (TFC-OPS-OPER-C-13, step 4.17; DOE Order 422.1, att. 2, sec. 2.p(7))

Deficiency D-WRPS-4: WRPS did not ensure that procedures for performing hoisting and rigging activities in the vicinity of TSCR accurately incorporated appropriate information from the DOE Hanford sitewide hoisting and rigging manual. (DOE-RL-92-36; DOE Order 422.1, att. 2, sec. 2.p(3))

Deficiency D-WRPS-5: WRPS procedure TFC-OPS-OPER-C-34 does not address maintaining independence to the maximum extent possible during concurrent dual verification. (DOE Order 422.1, att. 2, app. A, attribute 2.j.(5)b)

Deficiency D-WRPS-6: WRPS turnover checklists are not being controlled as required. (DOE Order 422.1, att. 2, sec. 2.p)

Deficiency D-WRPS-7: WRPS did not properly control two operator aids in the TSCR control enclosure. (TFC-OPS-OPER-C-41; DOE Order 422.1, att. 2, sec. 2.q(1))

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified two OFIs 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. These OFIs are offered only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

Washington River Protection Solutions

OFI-WRPS-1: Consider splitting procedure TO-270-700 into several shorter procedures, by operational phase or otherwise, to facilitate version control, including incorporation of field changes, and to enhance the ability of personnel to verify prior to use that they are using the most up-to-date version of the procedure.

OFI-WRPS-2: Consider implementing hoisting and rigging restrictions within the TSCR yard during operations mode to provide controls similar to those for vehicle operations.

Appendix A
Supplemental Information

Dates of Assessment

Onsite Assessment: July 18-26, 2022

Office of Enterprise Assessments (EA) Management

John E. Dupuy, Director, Office of Enterprise Assessments
William F. West, Deputy Director, Office of Enterprise Assessments
Kevin G. Kilp, Director, Office of Environment, Safety and Health Assessments
David A. Young, Deputy Director, Office of Environment, Safety and Health Assessments
Kevin M. Witt, Director, Office of Nuclear Safety and Environmental Assessments
Kimberly G. Nelson, Director, Office of Worker Safety and Health Assessments
Jack E. Winston, Director, Office of Emergency Management Assessments
Joseph J. Waring, Director, Office of Nuclear Engineering and Safety Basis Assessments

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