



# **Independent Assessment of Work Planning and Control at the Hanford Site Tank Farms**

**November 2023**

Office of Enterprise Assessments  
U.S. Department of Energy

## Table of Contents

Acronyms.....	ii
Executive Summary.....	iii
1.0 Introduction.....	1
2.0 Methodology.....	1
3.0 Results.....	2
3.1 Work Planning and Control Institutional Programs.....	2
3.2 Work Planning and Control Implementation.....	3
3.3 Flowdown of Safety Requirements to Subcontractors .....	7
3.4 Contractor Assurance System and Feedback and Improvement.....	7
3.5 Federal Oversight.....	10
4.0 Best Practices .....	12
5.0 Findings.....	12
6.0 Deficiencies .....	12
7.0 Opportunities for Improvement .....	13
Appendix A: Supplemental Information.....	A-1

## Acronyms

AC	Adverse Condition
AMW	As Low As Reasonably Achievable Management Worksheet
CAS	Contractor Assurance System
CFR	Code of Federal Regulations
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
EAPC	Employee Accident Prevention Council
ECP	Employee Concerns Program
ERA	Electrical Risk Assessment
ESH&Q	Environment, Safety, Health, and Quality
ESRB	Executive Safety Review Board
FR	Facility Representative
FWS	Field Work Supervisor
FY	Fiscal Year
GHA	General Hazard Analysis
iCAS	Integrated Contractor Assurance System
IH	Industrial Hygiene
IHSP	Industrial Hygiene Sample Plan
IHWP	Industrial Hygiene Work Permit
ISMS	Integrated Safety Management System
JHA	Job Hazard Analysis
LOTO	Lockout/Tagout
NFPA	National Fire Protection Association
OFI	Opportunity for Improvement
ORP	Office of River Protection
PPE	Personal Protective Equipment
RL	Richland Operations Office
RMA	Radioactive Material Area
RP	Radiation Protection
RWP	Radiological Work Permit
SHD	Safety and Health Division
SJHA	Standing JHA
SME	Subject Matter Expert
SOC	Skill of the Craft
TQP	Technical Qualification Program
TSCR	Tank-side Cesium Removal
WO	Work Order
WP&C	Work Planning and Control
WRPS	Washington River Protection Solutions

# INDEPENDENT ASSESSMENT OF WORK PLANNING AND CONTROL AT THE HANFORD SITE TANK FARMS

## Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of work planning and control (WP&C) at the Hanford Site Tank Farms (hereinafter referred to as Tank Farms) on July 17-20 and July 31-August 3, 2023. Specifically, this assessment evaluated the Washington River Protection Solutions (WRPS) WP&C processes for Tank Farms work, elements of the WRPS industrial hygiene, radiation protection, and electrical safety programs, and the WRPS contractor assurance system (CAS). This assessment also evaluated the effectiveness of the Federal oversight provided by the Office of River Protection and the Richland Operations Office (together “DOE Hanford”).

EA identified the following strengths, including one best practice:

- WRPS’s *Stepping Stone* training program reinforces the principles of employee engagement and safety culture for employees within 60 to 90 days of their start date. (Best Practice)
- DOE Hanford provides effective Federal oversight through formal assessments and operational awareness activities.

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

- WRPS did not develop an adequate work scope, implement hazard controls, and perform work within appropriate controls associated with some observed work activities.
- WRPS work orders did not always include lessons learned that were relevant to the work scope, and operating experience shared at pre-job briefings was not always relevant to work activities.
- WRPS’s causal analysis program did not result in the timely analysis of Level A and B (the two highest risk/significance categories) issues to prevent recurrence.
- The DOE Hanford Facility Representative (FR) staffing analysis shows that the Tank Farms operations are understaffed by four positions.

In summary, WRPS has developed and implemented an appropriate WP&C framework for the Hanford Site Tank Farms, and DOE Hanford implements effective Federal oversight. The WRPS safety and employee training programs and the flowdown of worker safety and health requirements to subcontractors were satisfactory. However, WRPS is not adequately applying work scope development, hazard identification and controls, lessons learned, and feedback and improvement processes for the implementation of some work activities. Further, while the CAS is generally adequate, the causal analyses of some Level A and B issues are not timely. DOE-Hanford is maintaining effective oversight; however, current vacancies in the FR program could impact oversight coverage as some facilities resume full operations. Resolution of the weaknesses identified in this report will further enhance WRPS’s worker safety and health program.

# INDEPENDENT ASSESSMENT OF WORK PLANNING AND CONTROL AT THE HANFORD SITE TANK FARMS

## 1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of work planning and control (WP&C) for work performed at the Hanford Site Tank Farms (hereinafter referred to as Tank Farms), which is managed by Washington River Protection Solutions (WRPS). EA conducted this assessment on site from July 17-20 and July 3-August 3, 2023.

Consistent with the *Plan for the Independent Assessment of Work Planning and Control at the Hanford Site Tank Farms, March 2023*, this assessment evaluated the effectiveness of WRPS's implementation of the integrated safety management system (ISMS) core functions: define the scope of work, identify and analyze hazards, develop and implement hazard controls, perform work safely within controls, and provide feedback and make improvements. The assessment evaluated activity-level work at the Hanford Site Tank Farms, including elements of the industrial hygiene (IH), radiation protection (RP), and electrical safety programs. The assessment also evaluated the effectiveness of WRPS's contractor assurance system (CAS) and flowdown of safety and health requirements to subcontractors.

EA also evaluated the effectiveness of the Federal oversight provided by the Office of River Protection (ORP) and the Richland Operations Office (RL) (together "DOE Hanford"). ORP oversees Tank Farms operations and is where the Tank Farms oversight team is organized. The safety and health and environmental programs organized under RL support ORP.

## 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, 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 objectives and criteria from DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, appendix D, *Activity Level Work Planning and Control Criterion Review and Approach Documents with Lines of Inquiry*. EA used elements of Criteria and Review Approach Document (CRAD) EA-30-07, Revision 0, *Federal Line Management Oversight Processes*, to collect and analyze data on DOE Hanford oversight activities related to WP&C. In addition, EA used selected objectives and criteria from the following CRADs:

- EA CRAD 30-01, Revision 1, *Contractor Assurance System*
- EA CRAD 30-09, Revision 0, *Occupational Radiation Protection Program*
- EA CRAD 32-03, Revision 1, *Industrial Hygiene Program*
- EA CRAD 32-11, Revision 0, *Control of Hazardous Energy (Lockout/Tagout)*
- EA CRAD 32-12, Revision 0, *Material Handling and Safety*
- EA CRAD 32-13, Revision 1, *Electrical Safety*.

EA observed the planning and implementation of 53 onsite work activities. EA examined key work control documents, such as WP&C plans and procedures, job hazard analyses (JHAs), work orders

(WOs), manuals, analyses, and policies. EA also interviewed key personnel responsible for developing and executing the associated programs and walked down multiple tank farms. The members of the assessment team, the Quality Review Board, and the 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 Work Planning and Control Institutional Programs**

This portion of the assessment evaluated WRPS's WP&C programs and processes at the institutional level that flow down worker safety and health program requirements into work control procedures and enable the safe performance of work.

WRPS's WP&C requirement documents appropriately implement the ISMS guiding principles and core functions in accordance with DOE Policy 450.4A, *Integrated Safety Management Policy*. Integrated safety management is adequately addressed in TFC-POL-16, *Integrated Safety Management System (ISMS) Policy*, and TFC-PLN-41, *Integrated Safety Management System Description*. 10 CFR 851, *Worker Safety and Health Program*, requirements are adequately addressed in TFC-PLN-47, *Worker Safety and Health Program*. Tank operations contract No. DE-AC27-08RV14800, section C.3.2.2, *Integrated Safety Management System*, and safety culture elements are adequately addressed in TFC-PLN-12, *Safety Culture Sustainment*.

WP&C procedure TFC-OPS-MAINT-C-01, *Tank Operations Contractor Work Control*, provides requirements, guidance, and clear roles and responsibilities for the administration and performance of all WRPS WP&C activities and describes, in appropriate detail, the level of work planning required based on a defined set of criteria. TFC-OPS-MAINT-C-01 adequately describes the graded approach criteria that are used to determine the level of work planning based on risk and complexity. Work is classified as Level 1 (most detailed work instructions, highest risk/complexity), Level 2 (work follows approved procedures or previously approved work instructions), Level 3 (no detailed work instructions required, generally skill of the craft [SOC]) or Level 4 (verbal instructions, no work control documents generated, SOC). WRPS has developed and employs several effective WP&C training tools for instructing and qualifying work planners and workers to implement TFC-OPS-MAINT-C-01 and supporting documents.

WRPS procedures provide effective processes for hazard controls. The hazard analysis/evaluation process is appropriately described in TFC-ESHQ-S-SAF-C-02, *Job Hazard Analysis*, and is required for all work performed under technical procedures or work control documents. A general hazard analysis (GHA) adequately addresses routine and SOC safety hazards while the JHA process is used when hazards potentially exceed the scope of GHAs. Standing JHAs (SJHAs) are used when the hazards are applicable to multiple work locations. The JHA process appropriately includes multiple stakeholders, subject matter experts (SMEs), field work supervisors (FWSs), and craft workers in developing the JHA during documented planning meetings and field walkdowns of the work prior to conducting the work. Additionally, WRPS's health, safety, and training programs provide thorough programmatic requirements and procedures to enable the proper identification, analysis, and control of IH, RP, electrical safety, and material handling hazards.

TFC-OPS-MAINT-STD-03, *Tank Operations Contractor Skill of the Craft and Authorized Level 4 Activities*, adequately defines and addresses the SOC program. SOC task listings on the WRPS WP&C website appropriately describe tasks that are permitted to be performed by a specific craft. WRPS

Environment, Safety, Health, and Quality (ESH&Q) SMEs and the FWS routinely evaluate these tasks, with proposed new tasks appropriately added following a defined review and approval process. Level 3 SOC WOs are suitably reviewed to ensure that detailed work instructions are not required, and the FWS aptly ensures that the assigned tasks fall within SOC.

Active employee engagement in the Employee Accident Prevention Councils (EAPCs) was observed during the July 2023 North EAPC monthly meeting. WRPS recently launched the ESH&Q *Stepping Stone* training program for new employees. This training program is cited as a **Best Practice** because it serves to reinforce the principles of employee engagement and safety culture for employees within 60 to 90 days of their start date. Active participation by WRPS senior management representatives clearly demonstrates WRPS leadership's commitment to employee engagement and safety culture.

### **Work Planning and Control Institutional Programs Conclusions**

WRPS's WP&C documents and procedures adequately address DOE's ISMS requirements. WRPS's ESH&Q program provides thorough programmatic requirements and procedures to enable the proper identification, analysis, and control of safety and health hazards. WRPS uses a graded approach to classify work and ensure sufficient planning, analysis, hazard control, and work authorization. The SOC program is well-defined with a list of permitted work activities. WRPS's *Stepping Stone* training program is cited as a best practice because it reinforces the principles of employee engagement and safety culture for employees within 60 to 90 days of their start date.

### **3.2 Work Planning and Control Implementation**

This portion of the assessment evaluated WRPS's implementation of the WP&C institutional programs through the ISMS core functions of defining the scope of work, identifying and analyzing hazards, developing and implementing hazard controls, and performing work within controls.

#### **Defining the Scope of Work**

Reviewed work control documents (technical procedures and WOs) were generally detailed and adequate in the work scope definitions to permit identification of hazards and necessary controls. Thirty-two of 33 reviewed Level 1 and Level 2 WOs contained adequate work scope detail. For example, WO 970238, *Sluicer Removal from Riser 21*, and WO 597060, *POR519Changeout Pre-Filter, HEPA 1 & HEPA 2*, provided clearly defined work scopes, including detailed prerequisites to identify the industrial safety, IH, and radiological hazards, and necessary controls. All seven reviewed Level 3 WOs were appropriately scoped for the observed work, and three of these were supplemented with appropriately scoped technical procedures. However, contrary to TFC-OPS-MAINT-STD-02, *Work Planning and Work Instruction Development*, section 3.5, WRPS has not provided a complete work scope definition, to include the manufacturer's instructions, for installing the VeriSafe Absence of Voltage Tester connectors on POR114 in C Farm. (See **Deficiency D-WRPS-1**.) Ineffective work scope, particularly the omission of manufacturer's instructions, could result in incorrect or incomplete installation and exposure of employees to uncontrolled hazards. Specifically, the work scope of electrical WO 983422, *Installation of VeriSafe on POR114 in C Farm*, did not include the manufacturer's instructions or written procedures for installing the VeriSafe connectors.

#### **Identifying and Analyzing Hazards**

WRPS adequately identified and analyzed hazards for the observed work using the GHA, SJHA, or JHA process. Level 1 and Level 2 WOs contained adequate JHAs, SJHAs, and referenced the GHAs where appropriate. The Level 1 and 2 WO JHAs were generally adequate to identify hazards such as the need for

crane lifts and material handling, exposure to chemicals of concern, and require hazardous energy control, when needed. The GHA and/or SJHA appropriately covered all seven reviewed Level 3 SOC WOs, and tasks were adequately covered by the craft-specific SOC list. For example, Level 3 WO 917743, *2704 HV-Replace Carpet and Vinyl Flooring in General Purpose Facilities*, discussed ergonomic and material handling hazards, odor controls for carpet adhesives, and other hazards with appropriate controls.

Radiological hazards associated with observed intrusive radiological work activities were effectively analyzed through WRPS's as low as reasonably achievable (ALARA) management worksheet (AMW) and radiological work permit (RWP) development processes. The AMW was appropriately performed and documented as required by TFC-ESHQ-RP-RWP-C-03, *ALARA Work Planning*, in support of RWP development for the observed sluicer removal, pre-filter changeout, and tank-side cesium removal (TSCR) temporary shielding installation work. The reviewed AMW documents appropriately analyzed radiological hazards, including source terms associated with the work tasks, expected work area and contact level dose rates, and expected individual and collective dose estimates. The reviewed AMW documents also provided the radiological controls needed to maintain doses ALARA and were properly flowed into job specific RWPs.

### **Developing and Implementing Hazard Controls**

Hazard controls were generally adequately developed in JHAs and implemented through WO instructions, technical procedures, and hazard-specific permits, such as tank vapor information sheets (TVISs), industrial hygiene sample plans (IHSPs), industrial hygiene work permits (IHWPs), RWPs, crane special lift plans, electrical risk assessments (ERAs), and lockout/tagout (LOTO). For example, SJHA-0084 (no document title) was generally adequate in describing the hazards and controls for the performance of technical procedure 5-VT-710, *Radial HEPA Filter Replacements*. Further, the TVIS adequately identified the risk classification of allowed activities, the related IHSP appropriately described required sampling and constituents of concern, and the IHWP included adequate controls for specific work activities. Heat stress controls were adequately addressed in all planned work activities. Reviewed RWPs, including RWP A-056, *241-A-106/06B Pit Cleanout and Sluicer Removal from Riser 21*; RWP A-032, *WRPS Radiological Survey Task WO-597059*; and RWP TSCR-112, *WRPS Radiological Survey Task WO-1019148*, for the observed sluicer removal, pre-filter changeout, and TSCR temporary shielding installation work, were effectively arranged by work tasks and provided the required information on expected radiological conditions, dosimetry, personal protective equipment (PPE) requirements, hold points, and limiting conditions. Special lift plans appropriately included rigging working loads which were correctly sized for the load weight. With one exception (discussed below), ERAs adequately described the hazards and controls needed to protect electrical workers. Also, all reviewed electrical LOTO procedures adequately controlled the hazards identified in the hazard assessments.

While hazard controls were generally adequate, EA identified the following weaknesses:

- Contrary to TFC-OPS-MAINT-STD-02, section 3.4.2, during observation of two TSCR work activities (installation of equipment bracing and placement of radiological shielding), WRPS did not incorporate all hazard controls and LOTO requirements into work instructions as work steps or prerequisites and referenced an outdated IHSP. (See **Deficiency D-WRPS-2**.) By not including appropriate job prerequisites, work controls could be missed, resulting in uncontrolled hazards. Some WRPS work control documents omitted prerequisites needed to ensure worker safety, including the following:
  - WO 1019148 did not include a requirement to ensure LOTO or verification of working environment (verification of engineering controls) even though this requirement was included in WO 969700 for the same location on the same day and briefed during the pre-job briefing for the activity.



- WO 969700 included requirements for the conduct of IH sampling in accordance with IHSP-POE-TSCR-001, *Hygiene Sampling Plan*; however, this IHSP is no longer in use, workers used the correct procedure for samplings conducted.
- Contrary to 10 CFR 835.2(a), TFC-ESHQ-RP-ADM-C-14, *Administration of Radioactive Material Area*, allows for areas that do not contain items or containers of radioactive material to be posted as radioactive material areas (RMAs). (See **Deficiency D-WRPS-3.**) Posting of RMAs that do not contain items or containers of radioactive material could desensitize workers to posted RMAs that actually contain radioactive material. 10 CFR 835.2(a) defines a RMA as “any area within a controlled area, accessible to individuals, in which items or containers of radioactive material exist.” During walkdowns, some areas were posted as RMAs out of convenience even though they contained no items or containers of radioactive material. Specifically, EA observed the following:
  - Empty areas with stanchions and radiological rope were posted with RMA signage.
  - Outdoor areas and service garages containing parked vehicles and trailers (containing non-radioactive supplies) had RMA postings for the area and each individual vehicle.
  - Some source cabinets were posted but contained no radioactive material.
  - Many vehicles in use by WRPS (e.g., cranes, trucks, equipment trailers, side-by-side utility vehicles) that did not contain radioactive items or material were incorrectly posted as RMAs. Additionally, most of these vehicles are WRPS designated radiologically controlled vehicles (RCVs), TFC-ESHQ-RP\_MON-C-19, *Radiologically Controlled Vehicles (RCVs) Manual*, requires the parking of RCVs within an RMA, however it does not include the posting of these vehicles as RMAs. These posting conflict with 10 CFR 835.
- Contrary to DOE-0359, *Hanford Site Electrical Safety Program*, sections 4.3 and 4.5, which implements National Fire Protection Association (NFPA) 70E, *Standard for Electrical Safety in the Workplace*, section 130.4(D), WRPS electrical workers were not instructed to use required insulating rubber gloves with leather protectors for protection from shock on 120-volt circuits. (See **Deficiency D-WRPS-4.**) Not using the proper PPE could expose electrical workers to shock hazards. The DOE-0359 program requires workers to wear all PPE necessary to protect personnel performing electrical work from hazards involving electrical shock, arc flash, and any other electrical hazards that may be encountered. The ERA for WOs 955608, *Repetitive DFLAW Team Perform Circuit Verifications*, and 960326, *Install Pressurization Alarm Inside AP-271 (ECN-717637)*, associated with a work evolution, incorrectly identified leather gloves as the appropriate PPE for protection from 120-volt circuits.

### Performing Work Within Controls

WRPS generally conducts work within defined controls. Planned work is appropriately authorized and released, pre-job briefings are generally adequate, and stop/pause work authority is well understood. Observed work was planned at the level required by TFC-OPS-MAINT-C-01, appropriately released, and listed on the approved plan of the day. Observed pre-job briefings for WOs were generally comprehensive, covered the scope of work, and identified hazards and controls needed to perform work. Emergency actions were discussed. IH staff briefed the IHWP, and a health physics technician briefed the RWP, including action levels and responses. Stop/pause work authority was emphasized during observed pre-job briefings, and interviewed workers were aware that they had stop/pause work authority. Observed work was appropriately paused on three separate occasions. IH practices associated with hazard identification, evaluation and control, and work execution for various contaminants and hazards (tank vapors, beryllium, silica, asbestos, noise, heat stress, etc.) for observed work were generally effectively implemented.

IHWPs adequately identified the hazards of heat stress associated with the elevated ambient temperatures (upper 90s to lower 100s) during the assessment. Ambient temperature monitors were present at all observed work, biometric monitoring was observed in work activities, and in one case (WO 588358, *SY VDMS Installation*) an individual reached the lower setpoint for heart rate and was removed to the change house and monitored for heat stress effects as required by procedure. In a second case, WO 997246, *242-A Clean Ember Screen*, work was cancelled following a delayed start time. The delay would have required a heat stress mitigation plan and checklist to be developed compliant with TFC-ESHQ-IH-C-07, *Heat Stress Control*. IH support personnel made the appropriate recommendation to delay and conduct the work earlier the next day.

Radiological control practices for observed work were effectively implemented. WRPS made effective use of AMWs and RWPs to identify and control radiological hazards, and adequate radiation control SME coverage was observed during hands-on work. All observed monitoring equipment (radiological survey meters, personnel contamination monitors, and air sample pumps) was properly calibrated. Worker radiological exposure monitoring for airborne contaminants was adequately preplanned, identified in WP&C documents (RWPs), and conducted in compliance with RWP requirements.

Three observed crane special lift operations were generally adequately performed within the controls of the WO and special lift plan. Pre-lift meetings were held and adequately documented on the pre-lift checklist. Dedicated spotters were appropriately used at all three lifts to verify that cranes maintained the limited approach boundary for overhead power lines.

While WRPS generally conducts work within defined controls, EA identified the following weaknesses:

- Contrary to DOE-0343, *Hanford Site Stop Work Procedure*, which implements DOE Order 422.1, *Conduct of Operations*, attachment 2, appendix A, section 2.p.(1)a, WRPS electrical workers did not initiate stop/pause work when they discovered that the procedures lacked VeriSafe connectors installation instructions, including the manufacturer's instructions. (See **Deficiency D-WRPS-5**.) By not following prescribed instructions, the work could have resulted in an incorrect or incomplete installation and damage to equipment or hazards exposure to workers. DOE-0343 requires workers to stop or suspend work and notify management when procedures cannot be executed as written. The job supervisor emphasized this requirement during the pre-job briefing. WO 983422, *Installation of VeriSafe on POR114 in C Farm*, was performed without stopping work and modifying the WO or requesting a copy of the manufacturer's instructions when specific VeriSafe connectors installation instructions were not included; the workers instead accessed uncontrolled instructions from the internet to complete the work.
- Contrary to DOE-0359, section 6.3.2, which implements 29 CFR 1926.1400 subpart CC, *Cranes and Derricks in Construction*, WRPS performed two of three observed crane special lifts, WO 970238, *A-106 Remove Sluicer From 06B Pit, Riser 21*, and WO 973160, *Pit Scans and Equipment Removal at SY Farm*, without establishing required visible barriers or elevated warning lines. (See **Deficiency D-WRPS-6**.) Not using visible barriers or elevated warning lines could potentially expose workers to electrical shock hazards. WOs 970238 and 973160 contained crane special lift plans, which are developed for non-critical lifts requiring special precautions and documentation.
- Contrary to DOE/RL-92-36, *Hanford Site Hoisting and Rigging Manual*, section 2.2.6.c, WRPS did not document frequent (daily) crane pre-use inspections. (See **Deficiency D-WRPS-7**.) Not documenting the completion of pre-use inspections may expose workers to falling load hazards.
- One pre-job briefing incorrectly identified that co-located workers would not be in the area.

## **Work Planning and Control Implementation Conclusions**

WRPS's implementation of the WP&C institutional programs to define the scope of work, identify and analyze hazards, and develop and implement hazard controls was generally adequate. However, weaknesses associated with one WO scope, some work instruction hazard controls, RMA postings, electrical worker PPE, and electrical powerline limited approach boundary controls were identified. Additional weaknesses associated with performing work included not initiating appropriate stop/pause work, and not establishing proper barriers and documenting the completion of pre-use inspections for some observed crane special lifts.

### **3.3 Flowdown of Safety Requirements to Subcontractors**

This portion of the assessment evaluated WRPS's flowdown of DOE safety requirements to its subcontractors and sub-tier contractors performing construction and operations support work.

Safety and health requirements are adequately flowed down to subcontractors and sub-tier contractors performing construction and operations support work. WRPS adequately documents the required flowdown of safety and health requirements in the *On-site Work Provisions* attachment that is included in procurement documentation for onsite subcontracted work. This document appropriately states that 10 CFR 851 requirements are to be implemented and flowed down to sub-tier contractors. Review of specific contracts showed that 10 CFR 851 requirements applicable to the work scope are adequately listed in the contracts. WRPS has established metrics that track and measure subcontractor performance and is evaluating improvements to those metrics. Subcontractors and sub-tier contractors are required to follow WRPS and applicable Hanford Site procedures and are trained by WRPS in those procedures. Observed subcontractor and sub-tier work was generally satisfactorily performed except for two previously discussed crane special lifts where a subcontractor did not identify the electrical power limited approach boundary with elevated warning lines, flags, or high visibility markings.

### **Flowdown of Safety Requirements to Subcontractors Conclusions**

WRPS has adequately established programmatic requirements for the flowdown of 10 CFR 851 requirements to subcontractors and sub-tier contractors performing construction and operations support work. The observed subcontractors properly implemented requirements during work except for two previously discussed crane special lifts.

### **3.4 Contractor Assurance System and Feedback and Improvement**

This portion of the assessment evaluated WRPS's established CAS to plan and conduct risk-based assessments, analyze and manage WP&C-related issues and associated corrective actions, review performance (including feedback and improvement), and share lessons learned.

#### **CAS Program**

WRPS has established a generally adequate CAS program as required by Tank Operations Contract No. DE-AC27-08RV14800, section 3.2.4.2, that satisfies the requirements of DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*. TFC-PLN-083, *WRPS Assurance Program Description Document*, was approved by the DOE Hanford Contracting Officer on February 25, 2013, with no later substantial changes requiring DOE approval.

## Assessments

WRPS has established and implemented an effective assessment program that uses a risk-informed approach to evaluate performance and determine the effectiveness of programs and procedures. WRPS appropriately uses input based on regulatory requirements, past performance, issue reports, assessments, management observations, surveillances, metrics, and trending reports to collect and consider risks during development of the integrated assessment schedule (IAS). The WRPS fiscal year (FY) 2023 IAS appropriately includes a blend of required management-directed, independent, and external assessments as well as management observations governed by implementing procedures that provide adequate instruction and guidance on processes, requirements, and responsibilities for conducting assessments. Assessment team leads are properly trained and qualified on these implementing procedures.

Further, reviewed assessment reports completed since 2021 demonstrate that the WRPS safety management programs are appropriately self-assessed by managers annually or biannually as required by procedures. Reviewed WP&C-related assessments performed from FY 2021 to FY 2023 include one required assessment, four management-directed assessments, five independent assessments, and one third-party corporate reach-back assessment. The reviewed assessments were generally comprehensive, with identified issues and corrective actions tracked in the Integrated Contractor Assurance System (iCAS). In addition, 3,292 management observations were conducted during the same timeframe. This collection of WP&C related assessments demonstrates management attention to WP&C performance.

## Issues Management

WRPS has established and implemented generally effective processes for event and issue analysis, development of corrective actions, and tracking of corrective action status. Action requests are appropriately screened daily by a team of program SMEs and line managers and dispositioned in iCAS according to the level of significance (Levels A-D, with Level A being the highest risk/significance) as required by a documented procedure. The Executive Safety Review Board (ESRB) appropriately reviews causal analyses and effectiveness reviews for significant issues. The timeliness of corrective actions is measured and reported monthly. As of June 2023, WRPS had 668 open actions in iCAS, of which 95 are overdue and another 107 were extended in June; this performance does not demonstrate consistent timely corrective action closure.

The iCAS application generally effectively supports tracking of issues and events, causal analyses, corrective actions, extent-of-condition reviews, development of lessons learned, and effectiveness reviews. For example, WRPS personnel thoroughly documented their response to a Level A issue (tank farm chemical odor detection events) in iCAS in October 2014; the actions identified in the root cause analysis (WRPS-PER-2014-0602, *Root Cause Analysis Report for the Tank Farms Chemical Vapor Odor Detection Events*) were properly entered into iCAS and closed over the subsequent years; the documented effectiveness review in March 2021 also confirmed closure. However, iCAS does not provide for the timely tracking of compensatory measures that are put in place to prevent recurrence pending causal analysis. Compensatory measures can only be entered into iCAS when the issue is moved into the “corrective action” phase after the causal analysis is complete. (See **OFI-WRPS-1**.) This information is important for management and DOE to provide confidence that risks are being managed properly.

The causal analysis program is not always effective in the timely analysis of Level A and B issues to prevent recurrence, contrary to DOE Order 226.1B. At the time of this assessment, 28 causal analyses are currently in progress, 9 are over six months old, and 2 are over one year old. Many of the events pending analysis occurred during work execution, and any delays are likely to compromise the quality of the analysis as workers tend to forget the circumstances associated with the issue. Additionally, several indicators over the last year (assessments, ORP feedback, and a corporate review) demonstrated that the

quality of causal analyses is less than adequate. WRPS has developed a set of corrective actions (iCAS condition report WRPS-2023-0614) to address these issues; however, ongoing delays to correct deficiencies in the causal analysis program have resulted in additional non-compliances. Contrary to TFC-OPS-OPER-C-24, figure 1, WRPS did not complete the causal analysis of two technical safety requirement violations (TF-2023-0006 and TF-2023-0007) and submit the final reports to ORP identifying corrective actions within the 60-day requirement. (See **Deficiency D-WRPS-8.**) Delays in analyzing and correcting conditions that led to technical safety requirement violations could result in equipment configurations or conditions that compromise safe operations.

## Performance Feedback and Improvement

WRPS has established and implemented generally effective processes and tools for performance review, sharing of lessons learned, and collection of worker feedback. Periodic performance reviews and reports appropriately include monthly metrics provided for ESRB meetings, risk management reports, and monthly safety and operational performance summaries. An adequate set of metrics has been developed to measure the effectiveness of WP&C. TFC-OPS-OPER-C-28, *Operating Experience Lessons Learned Program*, provides adequate guidance on collecting and distributing lessons learned. The Operating Experience Lessons Learned Specialist appropriately distributes DOE operating experience lessons learned, event lessons learned, and other lessons learned generated locally. TFC-OPS-MAINT-C-01, *Tank Operations Contractor Work Control*, appropriately requires lessons learned to be incorporated into WOs (Levels 1 to 3), but the use of lessons learned in WO planning and work execution was inconsistent. Employee feedback is effectively obtained through several mechanisms, including EAPCs and their associated campaigns and efforts such as “My Safety Focus” cards, Voluntary Protection Program Inspection participation; task-based feedback through the work record; union safety representatives; safety culture surveys; and pre- and post-job briefings. During EA observations of work and EAPC meetings, and discussions with FWSs and employees, employees actively used these mechanisms to improve products and processes.

While WRPS has established and implemented generally effective processes for performance feedback and improvement, EA identified the following weaknesses:

- Contrary to TFC-OPS-MAINT-C-01, sections 4.3.1.13, 4.3.2.13, and 4.3.3.10, which implement DOE Order 226.1B, attachment 1, section 2.b.(10), WRPS WOs included lessons learned that were not relevant to the scope of work being performed. In addition, contrary to TFC-OPS-MAINT-C-01, section 4.6.1.7, WRPS work supervisors did not discuss specific lessons learned during some observed pre-job briefings. (See **Deficiency D-WRPS-9.**) Not informing workers of relevant operating experience could result in recurrence of issues and events. Specifically:
  - For Level 3 WO 917743, the included lesson learned was not related to the work being performed. No additional discussion of relevant lessons learned occurred.
  - Level 1 WO 974539, *242-A Erect Modify Dismantle Scaffold at height greater than 10 feet*, was revised to allow the use of an articulated boom lift rather than erecting scaffold. During observation of work using the boom lift, it was noted that the lesson learned in the WO was specific to erecting scaffolding and was not discussed in the pre-job briefing.
  - WRPS work supervisors did not discuss specific lessons learned during the observed pre-job briefings for WO 969700 and WO 1019148, as required in the WO prerequisites.
  - For WO 1006706, *Facility Weekly Portable Eyewash Inspection*, and WO 998170, *241-SY, A-Train Qtrl. Primary Eh. Fan Insp.*, the lessons learned box on the pre-job briefing checklist was checked, but the lessons learned were not discussed during the observed pre-job briefing.

- Although most employee feedback is available for review, it is not formally analyzed, tracked, and trended. (See **OFI-WRPS-2**.) Feedback on Level 3 and 4 WOs was observed to be verbal and not formally captured in the work record. Without this documented data, WRPS misses the opportunity to derive insights that contribute to WP&C continuous improvement. In addition, the preventable changes data managed in the Work Control Feedback Tracking and Reporting System is not trended, and there is no follow-up to ensure that corrective actions were taken.
- A local lesson learned for an event that occurred on October 20, 2022 (WRPS-AR-2023-0044) involving an inadequate LOTO was not issued until July 11, 2023, which is not timely to prevent recurrence.

### **Contractor Assurance System and Feedback and Improvement Conclusions**

WRPS has established a generally adequate CAS that provides appropriate processes, assessments, issue management tools, training, and periodic performance reports. Reviewed formal assessments were generally comprehensive. WRPS uses a systematic approach for event and issue analysis, development of corrective actions, and tracking of corrective action status. WRPS has generally effective processes and tools for performance review, sharing of lessons learned, and collection of worker feedback. However, weaknesses were identified in the areas of timeliness and quality of some causal analyses, the use of lessons learned during work planning and execution for informing workers of recent incidents to prevent recurrence, and trending of worker feedback.

### **3.5 Federal Oversight**

This portion of the assessment evaluated DOE Hanford’s oversight of WRPS Tank Farms operations, as well as specific DOE Hanford programs, including integrated oversight, issues management, the Facility Representative (FR) program, the technical qualification program (TQP), and the employee concerns program (ECP).

#### **Oversight**

DOE Hanford has developed an effective oversight program that is implemented through DOE-PRO-PAI-50085, *Integrated Oversight*. The Tank Farms FRs and Safety and Health Division (SHD) SMEs perform and conduct operational awareness activities, planned assessments, and surveillances; attend meetings; and perform work observations. Oversight activities are documented in iCAS, and reports are thoroughly written and include evidence to support identified issues and performance conclusions. Interviews with FRs and SMEs reflected strong engagement between the two groups, and staff work collaboratively to share information on contractor programs, implementation, field observations, and events.

#### **Issues Management**

DOE Hanford is effective in managing identified issues. Issues identified from oversight activities are appropriately communicated to WRPS in real time using the iCAS business suite. Adverse conditions (ACs) and OFIs, primarily identified through oversight, are appropriately transmitted to WRPS’s iCAS system to undergo issue screening and action following the contractor’s issues management process. Earlier this year, DOE Hanford management provided a letter of concern to WRPS highlighting continued weaknesses of work planning identified by FR oversight; similar weaknesses were also observed by the EA assessors. FRs and SHD SMEs can view the screening level, any actions developed or taken to address the issue, and supporting evidence for issue closure. Interviewed FRs and SHD SMEs stated that issue follow-up occurs effectively, and in some cases, additional ACs or OFIs have been documented due

to the inadequacy of how WRPS addressed previous issues. Individual discretion is used for determining which issues, and to what extent, follow-up is performed.

### **Facility Representative Program**

DOE Hanford completed a FR staffing analysis in November 2022 that shows the Tank Farms operations require nine full-time FRs. At the time of this assessment, the Tank Farms operations were understaffed by four FRs; there are currently four qualified FRs and one newly hired FR. Two experienced contractors hired within the last two years support the FRs with oversight coverage. The FR program self-assessment, conducted in June 2022, identified the FR understaffing and mitigation strategies. DOE Hanford continues to make progress to hire and qualify FRs and retain its qualified FRs. However, current vacancies could impact oversight coverage as some facilities resume full operations; at the time of this assessment, the TSCR facility was in maintenance mode and the effluent treatment facility and 242-A evaporator were shut down.

### **Technical Qualification Program**

DOE Hanford has established and implemented an effective TQP that meets the requirements of DOE Order 426.1B, *Department of Energy Federal Technical Capabilities*. The implementation of the DOE Hanford TQP is captured in DOE-PPD-QT-50521, *Technical Qualification Plan*. Review of Tank Farms FR, SHD SME, and senior technical safety manager qualification records and progress trackers verified completion of qualifications, and those identified as participants were on-track and in the electronic TQP system. DOE Hanford performed a TQP self-assessment in September 2021 and identified two strengths, four ACs, and four OFIs, which were tracked and closed in iCAS. The TQP owners present participant qualification status, current vacancies, continuing training hours, and qualifications for readiness reviews to DOE Hanford management semi-annually. Quarterly feedback surveys are provided to participants and supervisors to continually seek program improvements.

### **Employee Concerns Program**

DOE Hanford has an effective ECP that is managed by an experienced ECP Manager. The DOE Hanford ECP is advertised on bulletin boards and the Hanford Site intranet, and the Site Manager approves the annual ECP notice. The ECP Manager administers the ECP using the DOE Hanford *Employee Concerns Program Plan Implementation* document (no document number), incorporating the recommendations from the DOE ECP Director's assessment of DOE Hanford completed in April 2023. The ECP Manager appropriately receives, secures, processes, and properly resolves cases as required by the DOE Hanford *Employee Concerns Program Plan Implementation*.

### **Federal Oversight Conclusions**

DOE Hanford provides effective oversight of WRPS work planning and control. FRs and SMEs work collaboratively to conduct oversight and communicate information on contractor programs and implementation. Identified issues are documented and transmitted to WRPS using iCAS. DOE Hanford management is engaged and monitors FR hiring and qualification; progress to meet full staffing levels continues. However, current vacancies could impact oversight coverage as some facilities resume full operations. The DOE Hanford TQP and ECP were effective.

## 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 practice was identified as part of this assessment:

- WRPS's *Stepping Stone* training program reinforces the principles of employee engagement and safety culture for employees within 60 to 90 days of their start date.

## 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.

**Deficiency D-WRPS-1:** WRPS has not provided a complete work scope definition, to include the manufacturer's instructions, for installing the VeriSafe Absence of Voltage Tester connectors on POR114 in C Farm. (TFC-OPS-MAINT-STD-02, sec. 3.5)

**Deficiency D-WRPS-2:** WRPS did not incorporate all hazard controls and LOTO requirements into work instructions as work steps or prerequisites and referenced an outdated IHSP. (TFC-OPS-MAINT-STD-02, sec. 3.4.2)

**Deficiency D-WRPS-3:** WRPS procedure TFC-ESHQ-RP-ADM-C-14 allows for areas that do not contain items or containers of radioactive material to be posted as RMAs, resulting in some improperly posted RMAs. (10 CFR 835.2(a))

**Deficiency D-WRPS-4:** WRPS electrical workers were not instructed to use required insulating rubber gloves with leather protectors for protection from shock on 120-volt circuits. (NFPA 70E, sec. 130.4(D), and DOE-0359, sec. 4.5)

**Deficiency D-WRPS-5:** WRPS electrical workers did not initiate stop/pause work when they discovered that the procedures lacked VeriSafe connectors installation instructions. (DOE Order 422.1, att. 2, app. A, sec. 2.p.(1)a, and DOE-0343)

**Deficiency D-WRPS-6:** WRPS performed two of three observed crane special lifts, WO 970238 and WO 973160, without establishing required visible barriers or elevated warning lines. (29 CFR 1926.1400, subpart CC, and DOE-0359, sec. 6.3.2.)

**Deficiency D-WRPS-7:** WRPS did not document frequent (daily) crane pre-use inspections. (DOE/RL-92-36, sec. 2.2.6.c)

**Deficiency D-WRPS-8:** WRPS did not complete the causal analysis of two technical safety requirement violations and submit the final report to ORP identifying corrective actions within the 60-day requirement. (TFC-OPS-OPER-C-24, fig. 1)



**Deficiency D-WRPS-9:** WRPS WOs included lessons learned that were not relevant to the scope of work being performed, and pre-job briefings did not consistently include lessons-learned discussions. (DOE Order 226.1B, att. 1, sec. 2.b.(10), and TFC-OPS-MAINT-C-01, secs. 4.3.1.13, 4.3.2.13, 4.3.3.10, and 4.6.1.7)

## **7.0 OPPORTUNITIES FOR IMPROVEMENT**

EA identified the OFIs 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. 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.

**OFI-WRPS-1:** Consider benchmarking other DOE contractors, such as Newport News Nuclear BWXT Los Alamos, LLC, and Battelle Energy Alliance LLC, that use the same DevonWay software to explore methodologies for tracking compensatory measures.

**OFI-WRPS-2:** Consider tracking and trending employee feedback received through various mechanisms to identify opportunities for continuous improvement and to inform workers of actions taken in response to their feedback.

## **Appendix A Supplemental Information**

### **Dates of Assessment**

Onsite Assessment: July 17-20 and July 31 – August 3, 2023

### **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  
Thomas E. Sowinski, 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  
Brent L. Jones, Director, Office of Nuclear Engineering and Safety Basis Assessments

### **Quality Review Board**

William F. West, Advisor  
Kevin G. Kilp, Chair  
Timothy B. Schwab  
Sarah C. R. Gately  
Michael A. Kilpatrick

### **EA Assessment Team**

Nimalan Mahimaidoss, Lead  
Amber M. Pentecost  
Harrichand Rhambarose  
James C. Cantwell  
Carole A. Fried  
Joseph Lischinsky  
Daryl D. Magers  
Dennis K. Neitzel  
Beth A. Streeper