



Independent Assessment of the Washington River Protection Solutions, LLC Management of Safety Issues at the Hanford Site

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Acronyms

ALARA	As Low As Reasonably Achievable
AR	Action Request
CA	Corrective Action
CAP	Corrective Action Plan
CARB	Corrective Action Review Board
CAS	Contractor Assurance System
CONOPS	Conduct of Operations
COVID-19	Coronavirus Disease 2019
CR	Condition Report
CSR	Collective Significance Review
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
DST	Double-shelled Tank
EA	Office of Enterprise Assessments
ECN	Engineering Change Notice
EIR	Event Investigation Report
ESRB	Executive Safety Review Board
ETF	Effluent Treatment Facility
iCAS	Integrated Contractor Assurance System
KPI	Key Performance Indicator
LCO	Limiting Condition for Operation
LERF	Liquid Effluent Retention Facility
LTCA	Long-term Corrective Action
NQA	Nuclear Quality Assurance
OFI	Opportunity for Improvement
ORP	DOE Office of River Protection
PDSA	Preliminary Documented Safety Analysis
PER	Problem Evaluation Request
PERS/E-STARS	Problem Evaluation Request System database and the Electronic Suspense Tracking and Routing System
PIE/CIM	Process Improvement Evaluation/Continuous Improvement Measure
PM	Preventive Maintenance
RES	Conditions Requiring Resolution or Conditions Adverse to Quality
RM	Responsible Manager
SC	Safety Class
SIG	Significant Condition Adverse to Quality
SME	Subject Matter Expert
SS	Safety Significant
SSC	Structure, System, and Component
SST	Single-shelled Tank
TSCR	Tank Side Cesium Removal
TSR	Technical Safety Requirement
TUF	Track Until Fixed
WRPS	Washington River Protection Solutions, LLC

INDEPENDENT ASSESSMENT OF THE WASHINGTON RIVER PROTECTION SOLUTIONS, LLC MANAGEMENT OF SAFETY ISSUES AT THE HANFORD SITE

Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of the management of safety issues at the Hanford Site from April to July 2021. Specifically, this assessment evaluated the Washington River Protection Solutions, LLC (WRPS) management of issues associated with nuclear engineering, safety bases, criticality safety, nuclear maintenance, conduct of operations, and industrial hygiene since January 1, 2019.

EA identified several strengths and four best practices. Strengths of WRPS's issues management program are its self-identification of issues, integration with other elements of the WRPS contractor assurance system, and senior management engagement in the management of issues. The best practices are that WRPS:

- Rewards (e.g., with movie tickets) and interfaces with employees identifying issues
- Integrates its issue investigation, causal analysis, and corrective action development into one report
- Causal analysis teams develop success criteria to be used during effectiveness reviews to determine whether the cause(s) of an issue was resolved
- Maintains a comprehensive collection of tools to proactively identify and correct issues during the development of engineering products (e.g., drawings).

EA also identified two findings and several weaknesses summarized below. The findings warrant a high level of attention from WRPS management.

- WRPS inappropriately under-categorized a few of the issues reviewed. For example, the most significant nuclear safety issues identified by WRPS since January 1, 2019, were not categorized as required to ensure their adequate management (resolution). (Finding)
- WRPS has not reported or analyzed issues causing nuclear safety systems to be inoperable. EA identified 11 such cases since January 1, 2019. (Finding)
- WRPS Requirement Area Managers are not adequately reviewing issues for trends. For example, WRPS significantly improved its monitoring, reporting, and control of tank vapors and odors in response to a "significant increase in odor events in 2014." However, more recently, its Requirement Area Manager for industrial hygiene is not adequately evaluating for potential trends from reports of abnormal vapors or odors in the WRPS issues management system to implement additional actions to reduce worker exposure to as low as reasonably achievable (ALARA).
- Responsible managers assigned to manage issues have sometimes inadequately implemented WRPS processes causing a small percentage of the nuclear safety issues reviewed to persist or to not be corrected "as soon as practicable" as required and a small percentage of all issues reviewed to be closed without adequate documentation.

In summary, WRPS adequately manages most of its issues and has strengths over that observed at other sites. Until the concerns identified in this report are addressed or effective mitigations are put in place, some issues will go uncorrected, reducing the layers of defense preventing significant nuclear safety events and preventing WRPS from attaining its goal of personnel exposure to tank vapors being ALARA. EA, through its semi-annual assessment planning and resource allocation process, will consider conducting independent reviews of ongoing issues associated with leakage from tank B-109 and persistent, adverse trends in fire system maintenance and impairments on the Hanford site.

INDEPENDENT ASSESSMENT OF THE WASHINGTON RIVER PROTECTION SOLUTIONS, LLC MANAGEMENT OF SAFETY ISSUES AT THE HANFORD SITE

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Environment, Safety, and Health Assessments, within the independent Office of Enterprise Assessments (EA), assessed the effectiveness of Washington River Protection Solutions, LLC (WRPS) in identifying and correcting issues impacting safety to prevent recurrence. This assessment was conducted remotely due to the pandemic from the coronavirus disease 2019 (COVID-19), with interviews occurring May 17 – 28, 2021, and June 28 – July 2, 2021.

In fiscal year 2019, EA identified issues management as a targeted review area. This assessment is the fifth review examining corrective action processes at various DOE facilities. Results from these targeted reviews and from other EA assessments will be documented in a lessons-learned report that will contain EA's overall assessment on issues management across the DOE complex.

In accordance with the *Plan for the Assessment of Issues Management at the Hanford Site, April-July 2021*, this assessment evaluated WRPS's management of issues associated with nuclear engineering, safety bases, criticality safety, maintenance management, conduct of operations (CONOPS), and industrial hygiene since January 1, 2019.

WRPS manages the Hanford Site Tank Farms. The Office of River Protection (ORP) oversees WRPS with assistance from the Richland Operations Office. In January 2021, WRPS began managing issues using the integrated Contractor Assurance System (iCAS), which is being deployed across the site (with the exception of the Waste Treatment and Immobilization Plant). All closed issues that were initiated from January 2020 to January 2021, as well as all open issues, were transferred to iCAS from WRPS's previous issues management systems (i.e., the Problem Evaluation Request System database and the Electronic Suspense Tracking and Routing System, or PERS/E-STARS). PERS/E-STARS were accessible for issues closed before January 2020. Issues previously referred to as Problem Evaluation Requests (PERs) in PERS/E-STARS are now initially referred to as Action Requests (ARs) upon identification and, after screening, as Condition Reports (CRs) in iCAS.

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 DOE Order 227.1A.

EA used Criterion 5 of Objective 1 and the criteria of Objective 3 of EA Criteria and Review Approach Document 30-01, Revision 1, *Contractor Assurance System (CAS)*, February 15, 2018, to assess the flowdown and implementation of issues management requirements from DOE directives and invoked national consensus standards.

EA examined key documents, such as procedures, quality assurance program descriptions, internal and external assessments, reports on issues and potential improvements, extent-of-condition reviews, causal

analyses, corrective action plans (CAPs), effectiveness evaluations, and evidence of corrective action completion. EA conducted a detailed review of 300 ARs as they were being screened and 580 CRs. Reports on issues and potential improvements reviewed included: (1) those WRPS identified as having a potential to significantly impact safety, (2) a sample of issues WRPS identified as having less significant impact to safety, and (3) conditions that WRPS screened (transferred) to other management systems for consideration/resolution (e.g., suggestions). These reviews enabled EA to determine whether issues impacting nuclear safety and industrial hygiene are adequately identified and corrected to prevent recurrence.

EA interviewed WRPS personnel responsible for individual issues and for implementation of the WRPS issues management processes, as well as DOE field office managers and subject matter experts (SMEs) responsible for overseeing WRPS's issues management and nuclear engineering, safety bases, criticality safety, maintenance management, CONOPS, and industrial hygiene. In addition, EA assessment team members attended teleconferences that WRPS used to: (1) screen and categorize issues; (2) identify and discuss the status of efforts to correct declining trends in performance and safety; (3) review the causal analyses and CAPs for significant issues and adverse trends; and (4) brief WRPS senior management on the resolution of adverse trends and significant conditions, overall issues management performance, and performance of safety management programs (e.g., the CONOPS program, the nuclear maintenance management program, the conduct of engineering program, the safety basis program, and the criticality safety management program).

EA report *Office of Enterprise Assessments Targeted Assessment of the Double Shell Tank Ventilation Systems at the Hanford Site Tank Farms – September 2016* documented two findings concerning WRPS safety system management. This 2021 assessment examined the completion and effectiveness of corrective actions for those findings. Results of the corrective action assessment are in Section 3.4 of this report.

The members of the EA assessment team, Quality Review Board, and management responsible for this assessment are listed in Appendix A. EA comments on individual issues are in Appendix B.

3.0 RESULTS

In this section, results are grouped into the following functions for issues management: issue identification and categorization, issue resolution (including evaluations of the effectiveness of actions), timeliness of actions and closure of issues, and the EA assessment of WRPS actions for the findings in *Office of Enterprise Assessments Targeted Assessment of the Double Shell Tank Ventilation Systems at the Hanford Site Tank Farms – September 2016*.

3.1 Issue Identification and Categorization

The objective of this portion of the assessment was to examine whether issues and trends are identified and categorized to meet the requirements for issues management in the WRPS TFC-PLN-02, *Quality Assurance Program Description*. For issues management, the WRPS quality assurance program commits to DOE requirements and the American Society of Mechanical Engineers consensus standard Nuclear Quality Assurance (NQA)-1-2008, with the NQA-1a 2009 addenda, *Quality Assurance Requirements for Nuclear Facility Applications* (NQA-1). These commitments are implemented per WRPS TFC-PLN-50, *Quality Implementation Plan and Graded Approach*, and TFC-ESHQ-Q_C-C-01, *Problem Evaluation Request* (the PER procedure).

3.1.1 Issue Identification

WRPS manages over 2,000 issues per year and exceeds its goal of self-identifying over 85% of the issues, indicating a willingness to identify issues. Employees at all levels of the WRPS organization identify issues, with most issues identified during routine activities. WRPS encourages employees to identify issues by recognizing and rewarding employees (e.g., with movie tickets) for identifying an issue considered to be a “Good Catch” (see CONOPS CR 2021-3268 in Appendix B for an example). Additionally, if requested by the employee, the PER procedure requires that the employee be contacted by the assigned Responsible Manager (RM) within seven calendar days. The PER procedure also includes a process for “If the resolution does not meet the initiator’s expectation.” (**Best Practice**)

Per TFC-CHARTER-76, *Problem Evaluation Request Screening Meeting*, a screening committee typically reviews ARs each workday. In general, the committee adequately screens ARs to be addressed via the PER procedure as CRs, and adequately determines issues to be addressed more appropriately via other approved management systems.

WRPS employees (including managers) submit many potential issues (i.e., ARs in iCAS) that do not include enough information for the committee to categorize their significance or assign the RM. Committee members commonly contact employees submitting ARs to obtain needed information, but this information is sometimes not included in the record. This lack of information in ARs was discussed as a problem during several screening meetings, but no AR was initiated or other action taken to ensure that adequate information was included in future ARs. (See **OFI-WRPS-1** and **OFI-WRPS-2**)

The PER procedure effectively integrates other WRPS processes that identify issues. For example, management observations of work, such as for the management observation program (MOP), are effectively used to diagnose or discover adverse conditions, evaluate concerns and potential trends, and review the effectiveness of corrective actions. Approximately 150 ARs were initiated from MOP-observations between January and July 2021, many to improve CONOPS.

Per TFC-ESHQ-Q_C-C-06, *Trend Analysis Process*, issues are evaluated each quarter for trends as “a means of discovering and binning low-level or emerging issues that may affect performance, and [to provide] managers with a basis for better leveraging of their problem-solving resources. ... Trending is performed based on both cognitive knowledge of processes and issues (cognitive trending) and analytical data review that may include trend coding.” Trending with user-defined codes and data processing tools is facilitated by iCAS. WRPS senior management rigorously review the results of trend analyses during monthly Collective Significance Review (CSR) meetings that are also attended by representatives of the DOE field offices. Per TFC-ESHQ-Q_C-C-06, these senior managers direct additional compensatory measures for adverse trends, as needed, during CSR meetings.

During the monthly CSR meetings, approximately a third of the Requirement Area Managers present their analysis of detailed metrics via a Trend Determination and Status Form so that each area is reviewed quarterly. The performance metrics are well constructed, with thresholds established to identify expected performance goals as well as conditions considered adverse and worthy of additional management attention. A 12-month rolling window is commonly used to display key indicators and to support detection of negative trends for resolution via the PER process. As a result of these statistical analyses of performance metrics, the Engineering Department self-identified adverse trends in the rigor of its technical products, the incorporation of engineering change notices (ECNs), and drafting errors missed during peer reviews. Additionally, CONOPS issues are coded by the RMs to proactively identify trends by analyzing (binning) data (issues) by the key elements of the CONOPS program.

In October 2015, WRPS identified an adverse trend in the number of delinquent fire system preventive maintenance (PM) items, documented in CR 2016-0019. Similarly, in September 2016, WRPS identified an adverse trend in the number of fire system impairments and restrictions, documented in CR 2016-2039. In October 2019, WRPS again identified an adverse trend in both the delinquent fire system PM items and the fire system impairments for WRPS-managed facilities, documented in CR 2019-2220. Fire system maintenance in WRPS facilities is performed by a separate Hanford Site prime contractor. An assessment of actions and performance by this other Hanford Site prime contractor is outside the scope of this assessment, so EA has identified it as an item for follow-up in Section 8.0.

Although WRPS identifies some trends using the TFC-ESHQ-Q_C-C-06 process, Requirement Area Managers are not adequately reviewing issues for cognitive trending as required by TFC-ESHQ-Q_C-C-06. (See **Deficiency D-WRPS-1**) For example:

- CRs 2018-3102, 2018-2326, and 2020-0388 documented issues of poor internal communication or coordination between engineering disciplines (e.g., mechanical and instrumentation). However, there is no metric on internal Engineering communication or coordination, and Engineering did not identify this trend based on its “cognitive knowledge of processes and issues.”
- CR 2014-0602 reported “a significant increase in odor events in 2014” (i.e., the number of tank vapor odor events increased from 4 and 14 in 2012 and 2013, respectively, to 41 in 2014). WRPS took significant action in response to CR 2014-0602. The WRPS review, completed on April 29, 2021, verified the effectiveness of actions for the two identified root causes associated with the monitoring and characterization of tank vapors and the trust and communication with employees on the hazards associated with tank vapors. These actions improved (increased) the reporting of tank vapors events by both personnel and personnel monitoring equipment that detects ammonia levels (which WRPS has correlated to concentrations of other tank vapors) and resulted in improved event response and physical modifications (e.g., WRPS personnel exit areas following the detection of abnormal vapors, and some tank ventilation systems were upgraded). However, the Industrial Hygiene Requirement Area Manager is not adequately evaluating CRs reporting abnormal vapors or odors for potential trends to implement additional actions to reduce worker exposure to as low as reasonably achievable (ALARA), as demonstrated below. WRPS committed to reducing worker exposure to ALARA in Section 1.3 of TOC-IH-58435, *Industrial Hygiene Manual*.
 - In calendar year 2019, 12 odor or vapor issues (CRs) were reported, and 10 were reported in 2020. Within the first six months of 2021, 16 were reported. These CRs and the supporting industrial hygiene reports confirmed that no workers exceeded ammonia occupational exposure limits during these events. Ammonia is the dominant chemical vapor used to predict, or detect, other vapor contaminants from the tanks.
 - Nine of the 38 vapor-related CRs since January 1, 2019, were not assigned a code for trending, and three were only assigned codes to identify trends related to operations.
 - The Industrial Hygiene Requirement Area Manager stated that he is “not the responsible manager to (sic) assign trend codes when generating and assigning the odor and vapor related CR (sic)” and that Industrial Hygiene “is not assigned the CR relative to odor and vapor events until the CR has been closed.” However, TFC-ESHQ-Q_C-C-06 states that Requirement Area Managers identify a trend analyst responsible for “Assigning trend codes to PERs” (i.e., CRs in iCAS). Additionally, CRs are commonly closed months after an event was reported, so delaying assignment or evaluation of CRs by the Requirement Area Manager until their closure can delay identification of trends. For vapor- and odor-related CRs, later identification of trends may result in unnecessary exposure (i.e., prevent reducing exposure to ALARA). (See **OFI-WRPS-3**)

- WRPS has not defined the criteria that constitute an adverse trend in vapor- or odor-related CRs. CR 2014-0602 reported a trend following 14 vapor events in 2014. The number of vapor- or odor-related CRs to date in 2021 exceeds this rate. Although the Industrial Hygiene department tracks alarms of monitoring devices worn by some personnel, the Industrial Hygiene Requirement Area Manager had not reviewed the increase in CRs in 2021 for potential trend(s) until it was identified by EA. Subsequently, WRPS added an item to the agenda for the next CSR meeting, scheduled for the end of July 2021, to review these CRs for potential trend(s).
- Except for the CAS Manager supporting the Engineering Department, Requirement Area Managers were not entering trend codes for issues in iCAS until the CAS Managers identified this deficiency six months after the transition to iCAS.

3.1.2 Issue Categorization

Per TFC-CHARTER-76, the screening committee assigns a significance level and an RM to valid issues (duplicates and maintenance work orders that are tracked via another approved system are not valid issues). For the PERS/E-STAR systems, the significance levels were SIG (for significant conditions adverse to quality), RES (for conditions requiring resolution or conditions adverse to quality), TUF (for minor deficiencies that are tracked until fixed or an explanation is provided why no action is required), PIE/CIM (for items considered a process improvement evaluation or continuous improvement measure), and Trend Only (for tracking and trending minor deficiencies or non-compliances that have been or will be resolved outside the PER procedure). Since the transition to iCAS, the significance levels are Level A – Level D (with Level A assigned for significant issues and Level D for OFIs). The PER procedure specifies more rigor for evaluating issues of greater significance and validating the effectiveness of corrective actions (e.g., causal analyses, extent-of-condition reviews, and effectiveness reviews).

WRPS adequately categorizes most issues “consistent with their importance to safety, cost, schedule, risk, and success of the program” as required by the graded approach in TFC-PLN-50 to implement NQA-1 requirements for conditions adverse to quality and issue management requirements in DOE directives. However, as discussed below, WRPS inappropriately under-categorized approximately 3% (20 out of 580) of the issues reviewed. WRPS did not categorize any issues as SIG or Level A since 2018, and issues meeting the criteria for SIG or Level A are discussed below. Before 2018, WRPS categorized several issues each year as SIG (i.e., from 2008 to 2018, WRPS categorized 50 issues as SIG). Examples of under-categorized issues since January 1, 2019, are listed below. (See **Finding F-WRPS-1**)

- On April 29, 2021, CR 2021-3121 reported “that underground single-shelled tank B-109 at the Hanford Site is likely leaking to the soil beneath the tank. There is no increased health or safety risk to Hanford workers or the public. The specific cause of the liquid level decrease in Tank B-109 has not been determined.” As of April 2021, tanks T-111 and B-109 are the only two single-shelled tanks (SSTs) that are “active leakers” out of the 149 SSTs onsite (58 other SSTs are assumed to have leaked in the past). The leakage rates from tanks T-111 and B-109 are estimated to be 150-300 gallons per year and 1,277 gallons per year (3.5 gallons per day), respectively.

During the April 2021 Executive Safety Review Board (ESRB) meeting, the ESRB considered categorizing CR 2021-3121 as a Level A issue but categorized it as a Level B issue instead because there is no increased health or safety risk and a pump and treatment system for pre-existing contaminants in the soil near tank B-109 will mitigate the effect of this leakage on groundwater and the Columbia River. However, CR 2021-3121 meets the Level A criterion in TFC-CHARTER-76 of having a “high potential or actual consequence, or ... serious effect on the environment ...” (i.e., the “clear evidence of an increase in the subsurface contamination south of the tank that is attributed to B-109” discussed during the ESRB meeting).

The categorization of CR 2021-3121 as a Level A issue would provide for a more rigorous determination of the cause(s) of the tank B-109 leakage and leak rate, the necessary compensatory and mitigating actions, and the effectiveness of actions taken. As of September 2021, WRPS had not yet determined the cause of this leakage. WRPS and DOE continue to assess tank leakage and to explore actions to reduce the release of contaminants to the environment. EA will consider conducting an independent review of actions taken in response to the tank B-109 leakage (see Section 8.0).

- CR 2019-2061 reported that a technical safety requirement of the nuclear safety basis to measure flammable gas concentrations could not be met because sample assemblies are not installed in double-shelled tanks. This issue was incorrectly categorized as Trend Only, instead of SIG (or Level A in iCAS), despite indicating “major systemic weaknesses” in the WRPS implementation verification review process and annual reviews of technical safety requirement implementation.
- CR 2021-3326 reported the unplanned loss of safety significant (SS) instrumentation that provides a high-level alarm for liquid in the annuluses of tanks. Flammable gas exceeding the lower flammable limit can be generated by quantities of liquid exceeding the alarm setpoint. This CR was incorrectly categorized as a Level C issue, warranting no additional action other than the immediate action to refuel the temporary diesel generator to restore power and operability of the instrumentation. Accordingly, the cause, potential implications (extent of condition), and actions to prevent recurrence of this significant condition adverse to quality (including nuclear safety) were not determined. Additionally:
 - Actions for a previous issue (CR 2020-0135) to ensure that these unplanned losses of the high-level annulus alarm are categorized as Level B issues were not effective.
 - WRPS stated that other similar occurrences of inoperable credited safety systems, due to failures of non-credited support systems, are not reported to DOE. EA identified 10 other occurrences since January 1, 2019, that were not reported (see CONOPS CR 2021-3326 in Appendix B). Per DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, the “Performance degradation of any Safety Class (SC) or Safety Significant (SS) Structure, System, or Component (SSC), or any support system that is required for safety operation of the SC or SS SSCs, which prevents satisfactory performance of its design function when it is required to be operable” is a low-level reportable occurrence. (See **Finding F-WRPS-2**)
- In CR 2020-1787, Engineering self-identified a trend with work packages being closed without documenting completion of the ECN and sometimes only partially completing the scope of the work in the ECN. However, this major systemic breakdown in configuration management was incorrectly categorized as a TUF, rather than a SIG per the criteria in TFC-CHARTER-76. Accordingly, no extent-of-condition review or causal analysis was performed to identify and correct impacted drawings and the causes of this major systemic breakdown (significant condition adverse to quality). Per NQA-1, “In the case of a significant condition adverse to quality, the cause of the condition shall be determined and corrective action taken to preclude recurrence.”
- Despite meeting the criteria for a Level B issue, CR 2021-2214 was rescreened to Level C because the individual that misaligned the valve could not be determined. Despite not knowing who misaligned the valve, an apparent cause analysis can determine cause(s) for and actions to prevent valve misalignment.
- Comments provided in Appendix B for Industrial Hygiene CRs 2019-1101 and 2019-1272 and CONOPS CRs 2019-0885, 2020-0986, and 2021-1908 provide additional examples of under-categorized issues.

The following may be contributing to these issues being under-categorized:

- A description of Level B issues in the PER procedure is contrary to the WRPS graded approach in TFC-PLN-50. The PER procedure states “Issues are screened as Level B when corrective actions to resolve the issue are not readily apparent, and a cause analysis and extent of condition review are needed to understand the entire scope of the issue” rather than being based on “their importance to safety, cost, schedule, risk, and success of the program” as stated in TFC-PLN-50 to implement the requirements of NQA-1. (See **Deficiency D-WRPS-2**)
- Discussion at screening meetings regarding categorization of issues sometimes focuses on desired outcomes and/or feasibility or desirability of actions to prevent or preclude recurrence, rather than categorizing the issue based on objective significance criteria.
- TFC-CHARTER-76 states that team members “should be a member of the management team and/or an SME,” but a few stated during interviews that they were not “a member of the management team and/or an SME.”
- Some CRs are rescreened without documenting the justification for lowering the significance level (i.e., without documenting “how the CR meets the proposed significance level, using examples in TFC-CHARTER-76 and Attachment B” as required by Section 4.14 of the PER procedure). (See **Deficiency D-WRPS-3** and Industrial Hygiene CRs 2020-1923, 2021-3196, 2021-2962, 2021-3159, and 2021-3081 in Appendix B)
- The criteria in TFC-CHARTER-76 incorrectly state that low-level and informational reportable occurrences should be categorized as Level C issues at a minimum. Causes or generic implications (i.e., an extent-of-condition review) are not required for Level C occurrences. However, per DOE Order 232.2A, facility managers are responsible for determining the causes and generic implications for reportable occurrences. (See **Deficiency D-WRPS-4**)

Issue Identification and Categorization Conclusions

Overall, WRPS employees are proactively identifying issues and trends for resolution using the PER procedure. However, Requirement Area Managers are not adequately reviewing issues for cognitive trending as required by TFC-ESHQ-Q_C-C-06.

Overall, WRPS is adequately implementing a graded approach for issues management by categorizing most issues based on their significance per TFC-PLN-50. However, a few of the issues reviewed were under-categorized, contrary to TFC-PLN-50, resulting in the requirements of NQA-1 not being met in some cases for significant nuclear safety issues. For example, the most significant nuclear safety issues identified by WRPS since January 1, 2019, were not categorized as required to ensure their adequate management (resolution). Additionally, WRPS is not analyzing or reporting to DOE occurrences of inoperable credited safety systems due to failures of non-credited support systems, as required by DOE Order 232.2A.

3.2 Issue Resolution

The objective of this portion of the assessment was to verify that the issues management system includes structured processes, using a graded approach based on risk, for identifying the causes, extent, and corrective actions for issues and for reviewing the effectiveness of actions taken to ensure that issues are resolved.

The PER procedure adequately sets minimum requirements for analyzing and resolving issues based on the assigned significance level from the screening committee’s categorization of the issue. For example,

Level A and SIG issues require root cause analyses, extent-of-condition reviews, corrective actions, and effectiveness reviews. Level B and RES issues require apparent cause analyses, extent-of-condition reviews, and corrective actions. Effectiveness reviews are also required for trends categorized as Level B and RES issues. Level C and TUF issues require corrective actions or an explanation why no action is required. Some Level C issues (i.e., “Level C – No Action” issues) and issues designated as Trend Only in PERS/E-STAR are closed if immediate actions taken adequately resolve the issue or if the issue will be tracked to completion with a unique number in other approved management systems (e.g., maintenance work requests). Level D and PIE/CIM are recommendations and do not require action by the RM.

WRPS’s PER procedure successfully integrates the issue investigation, analysis, and corrective action development processes. For example:

- “If an Event Investigation report is required, the cause analysis [can be] conducted simultaneously and the two can be combined into one report...” preventing inconsistencies between the two reports. Additionally, corrective actions are developed as part of the causal analysis process rather than separately by the RM for the issue, ensuring that they adequately address the identified causes. (**Best Practice**)
- The causal analysis team develops success criteria for use during effectiveness reviews, which can sometimes occur years after the causal analysis or corrective action development, to determine whether actions taken resolved identified causes. This practice avoids reliance on success criteria formulated during effectiveness reviews by personnel who may not have been involved in the causal analysis or corrective action development. (**Best Practice**)

However, three procedures supporting issues management (TFC-ENG-FACSup-C-02, *Operability Evaluations*; TFC-ESHQ-Q_C-C-06; TFC-OPS-OPER-C-28, *Operating Experience/Lessons Learned*) and the Responsible Manager Corrective Active Training, course 357019, have not been updated to reflect the transition to iCAS seven months after the transition. Per TFC-PLN-02, procedures “shall be kept current” and training updated to “adapt to changes in technology, methods, or job responsibilities.” (See **Deficiency D-WRPS-5**)

Contrary to NQA-1, the PER procedure allows conditions adverse to quality to be uncorrected. The screening criteria in TFC-CHARTER-76 state that “A minor deficiency, non-compliance, or condition adverse to quality, safety, health, and/or the environment that requires action to resolve” should be categorized as a Level C issue. However, Section 4.9 of the PER procedure requires the RM to “Evaluate the Level C CR to determine if action will be taken” and “If actions are not warranted, check the “No Actions Required” box and enter justification for no actions in the Evaluation Comments field.” The PER procedure does not ensure that conditions adverse to quality and designated as Level C issues are corrected. NQA-1 requires conditions adverse to quality to be corrected. (See **Deficiency D-WRPS-6**)

Per TFC-CHARTER-05, *Corrective Action Review Board* (CARB), a board comprised of WRPS managers reviews the causal analyses and corrective actions for each Level A and SIG issue and Level B and RES issues that are high-level reportable occurrences, adverse conditions received from the ORP or Richland Operations Office Contracting Officer, issues reported in the non-compliance tracking system, and other issues determined by WRPS management. The CARB meeting observed for CR 2021-3075, concerning contaminated debris found outside of a posted contamination area, reviewed in detail the historical records of similar issues, the apparent cause analysis, CAP, and extent of condition. The CARB noted the cyclic behavior of poor “housekeeping” performance contributing to the spread of contamination and that the CONOPS Safety Council was discussing this issue; however, neither the cause nor corrective actions to resolve the cyclic housekeeping performance were established by the CARB as

required by TFC-CHARTER-05. (See **Deficiency D-WRPS-7** and additional comments in Appendix B for CONOPS CR 2015-0994)

Apparent cause analyses reviewed were adequate and often used two techniques to determine an apparent cause(s). Other sites typically only use two techniques for root cause analyses. WRPS did not perform a root cause analysis for any issues initiated after January 1, 2019, but EA reviewed the root cause analysis report for CR 2014-0602 on tank farm vapor events, since this issue was closed in April 2021. Although this analysis adequately identified root causes and actions to improve the trust between WRPS management and its workers and the monitoring and characterization of tank vapors, the record does not state how these root causes cover the scope of the stated problem, namely that “The purpose of the [root cause analysis] is to determine the cause of the significant increase in odor events in 2014” (see CR 2014-0602 in Appendix B). However, CR 2014-0602 included actions to improve ventilation systems, which did reduce the number of vapor events in 2015, 2016, and 2017.

Overall, WRPS RMs take sufficient action to resolve issues. For Level C maintenance issues, RMs often elect to perform extent-of-condition reviews to look for similar issues in equipment in different locations, even though extent-of-condition reviews are not required for Level C issues. Engineering developed an Engineering Survival Guide providing human performance enhancement tools for identifying and correcting errors prior to issuance of a finished product and preventing recurrence (**Best Practice**). Then after identifying negative trends with the technical rigor of its products and incorporation of ECNs into drawings, Engineering significantly improved its related processes and developed a highly instructive training video to resolve the issues. However, as discussed below, approximately 5% (25 out of 466) of the nuclear safety issues (conditions adverse to quality) reviewed were not corrected as required by NQA-1 (see **Deficiency D-WRPS-8**):

- CR 2019-2128 reported that the preliminary documented safety analysis (PDSA) for the Tank Side Cesium Removal project was not complete in time for the Technical Independent Project Review and ultimately was rejected by DOE ORP. CR 2019-2128 was categorized as a RES issue. For RES issues, the PER procedure requires an apparent cause analysis and corrective actions for these identified causes. However, the causal analysis identified four “lessons learned” rather than causes, and the only action taken was to resolve the comments identified by ORP. A separate issue was written to capture necessary procedure changes, but the actions were closed without correcting the procedure because no additional projects warranting a PDSA were planned in the next five years. Per NQA-1, “Conditions adverse to quality shall be identified promptly and corrected as soon as practicable.” (See CR 2019-2128 in Appendix B for additional comments.)
- CR 2015-0994 documented contamination spread from the Liquid Effluent Retention Facility Basin 44 due to biological vectors (i.e., birds landing in the contaminated basin). Several interim actions were put in place, but the ultimate corrective action was to replace the cover, which was delayed several times to six years from when the initial contamination spread was documented. The cover-replacement action of CR 2015-0994 was referenced in several other CRs during that time, but no analysis was performed to identify causes and corrective actions for other conditions (e.g., poor management of debris and materials at a worksite, a.k.a., poor “housekeeping”) that also continued to spread contamination from the basin. Additionally, despite being delayed for over six years, no review of the interim actions was performed to determine their effectiveness at precluding the spread of contamination from other vectors (conditions). (See **OFI-WRPS-4**)
- RMs for some CONOPS issues use inadequate (less robust and/or less enduring) corrective actions like required reading, lesson-learned reports, and “Red Arrows” (i.e., temporary procedures WRPS uses to implement short-term, compensatory actions), rather than correcting training or procedures or implementing standing orders (see CONOPS CRs 2019-0410, 2020-1315, 2020-1426, 2021-2152, 2021-2611, 2021-3014, and 2021-3268 in Appendix B). (See **OFI-WRPS-5**)

- Comments provided in Appendix B for Nuclear Engineering CRs 2019-2475 and 2021-1886; CONOPS CRs 2018-0626, 2018-1094, 2019-0885, 2019-1503, 2019-2061, 2020-0227, 2020-0134, 2020-1315, 2021-1911, 2021-1938, 2021-2014, and 2021-2286; and Maintenance CR 2018-0648 provide additional examples of issues that were not adequately resolved.

EA also identified that two of the 109 nuclear maintenance issues reviewed have multiple actions listed as a single action in iCAS (see CRs 2019-2108 and 2020-1226 in Appendix B). Per step 4.a of Section 4.9 of the PER procedure, actions are developed and entered in iCAS “ensuring the result is a single, distinct action.” (See **Deficiency D-WRPS-9**)

Per TFC-CHARTER-32, *Executive Safety Review Board* (ESRB), the ESRB reviews the effectiveness of Level A issues, and per TFC-ESHQ-Q_C-C-06, the status and effectiveness of actions for Level B performance trends are reviewed by WRPS management at CSR meetings. The ESRB for CR 2014-0602 adequately reviewed the effectiveness review of actions taken for the increase in tank vapor odor events in 2014, and the CSR meetings observed by EA adequately monitored the status of the identified adverse performance trends. However, most Level B issues are not for performance trends, so effectiveness reviews are performed for relatively few issues. (See **OFI-WRPS-6**) Effectiveness reviews “are conducted after corrective actions have been completed and have had enough time to produce the desired results (approximately six months after action completion).” This notional schedule can significantly delay effectiveness reviews for issues with actions that will take a long time to implement or are delayed. (See **OFI-WRPS-4**)

Issue Resolution Conclusions

Overall, WRPS is adequately implementing its graded, structured approach for issue resolution. Issues management processes are well integrated with other CAS process and event investigations. WRPS management monitors and directs, as needed, the resolution of significant issues and the overall performance of its issues management program. However, inadequate action has sometimes been taken to correct a small percentage of the nuclear safety issues (e.g., to resolve weaknesses in WRPS development of safety analyses and prevent the spread of radioactive contamination).

3.3 Timeliness and Closure

The objective of this portion of the assessment was to verify that planned corrective actions are completed in a timely manner and that closure is adequately documented.

Before May 2020, the WRPS key performance indicator (KPI) for issue resolution timeliness was typically less than the WRPS criterion of 130 days for “Exceeds Expectations.” Since then, issue resolution timeliness declined. During an interview, the WRPS manager of the Corrective Action Group attributed this declining KPI to site access limitations due to the COVID-19 pandemic and a June 2020 revision to the PER procedure removing the designation of long-term corrective actions (LTCAs). Before June 2020, CRs with LTCAs were not included in the calculation of the issue resolution timeliness KPI.

On March 1, 2021, WRPS proactively self-identified an organization-wide “declining [issue resolution timeliness] (Yellow Performance) for the last four months (October 2020 to January 2021) and [that issue resolution timeliness] is close to entering Adverse Performance (Red),” documented in CR 2021-2261. In contrast to the overall decline in issue resolution timeliness, the average age of issues assigned to the Industrial Hygiene department remained below the “Exceeds Performance” threshold of 130 days, with only a few corrective action due dates extended and none of its actions designated as LTCAs.

Through June 24, 2021, the “Action Taken” section remained blank for the only corrective action in CR 2021-2261. This action is to “Evaluate the KPI “Issue Resolution Timeliness for Level A, B & C” and identify any specific trends, corrective actions, or opportunities for improvements to improve the Adverse Performance.” During an interview, the WRPS acting CAS manager and the manager of the Corrective Action Group stated that complications with using iCAS following the transition in December 2020 had prevented the analysis and reporting of issues management performance indicators (metrics) and trends to WRPS departments for action. Despite these delays, no other actions were entered into CR 2021-2261, performance continued to decline, and this KPI indicated Adverse Performance since February 2021.

After June 24, 2021, another action was added to CR 2021-2261 to revise the PER procedure to reestablish the process for designating LTCAs. EA’s review of the existing LTCAs (i.e., corrective actions designated LTCAs before the June 2020 PER revision) identified the untimely resolution of some issues with LTCAs. (See **Deficiency D-WRPS-10, OFI-WRPS-7, and OFI-WRPS-8**) For example:

- Actions to resolve an issue identified by the Defense Nuclear Facilities Safety Board on a documented safety analysis has a due date of seven years to complete (see CR 2015-0794 in Appendix B).
- Actions to resolve incorrect equipment labeling identified by a worker safety representative on May 6, 2019, are scheduled for completion on August 31, 2021. Incorrect component labeling can impact safety (e.g., if a lock-out/tag-out is placed on the wrong component or the wrong component is operated), warranting a timely resolution. Additionally, this issue was categorized as a TUF, so a causal analysis was not performed to determine why so much equipment was mislabeled or taking action to preclude it from happening in the future (see CONOPS CR 2019-0885 in Appendix B).
- On November 9, 2017, CR 2017-2522 documented that annual maintenance (a splash test verifying operation) of the W-314 leak detectors was not being performed. Over three years later, actions to generate the test procedure and enter the PM into the maintenance system are not complete (see Nuclear Engineering CR 2017-2522 in Appendix B).
- All corrective actions (LTCAs and non-LTCAs) for a CR with an LTCA are removed from the analysis of issues management performance, which allows non-LTCAs to be inappropriately deferred. (See **OFI-WRPS-9**)

Comments provided in Appendix B for Nuclear Engineering CR 2019-1226; Safety Basis and Criticality Safety CRs 2019-0854, 2019-2270, 2019-2469, and 2020-0513; and CONOPS CRs 2020-0986, 2021-2014, and 2020-0227 provide additional examples of nuclear safety issues that were not resolved “as soon as practicable” as required by TFC-PLN-50 and NQA-1. Overall, approximately 2% (11 out of 466) of the nuclear safety issues reviewed have not been resolved “as soon as practicable.” (See **Deficiency D-WRPS-10**)

The PER procedure provides the RM the sole authority to set corrective action due dates and extend them an unlimited number of times, including extensions that exceed the WRPS 145-day goal for issue resolution. The WRPS Departmental Performance Indicators for May 2021 show that the number of corrective actions with their due dates extended often exceeds the 10% goal. For example, Production Operations, Engineering, and Maintenance extended 13.1%, 16.7%, and 17.1% of their actions, respectively, since June 2020, but no action has been taken to improve performance to meet this goal. (See **OFI-WRPS-7**)

The PER procedure adequately defines the documentation required to close an issue, a.k.a., “closure evidence.” The RM is required by the PER procedure to “Review the action completion comments and attachments to ensure the deliverable and closure documentation satisfy the intent of the corrective action.” Additionally, the manager of the Corrective Action Group stated in an interview that specialists

of the Corrective Action Group review the closure documentation of each issue, but this oversight requirement is not documented in the PER procedure. Overall, the closure of most issues was adequately documented. The Nuclear Safety department entered comprehensive documentation (records) supporting closure of most safety basis and criticality safety issues. However, EA identified that, despite reviews required of the RM and Corrective Action Group specialists, “action completion comments ... and closure documentation [that] satisfy the intent of the corrective action” were not recorded as required by the PER procedure for approximately 1% of the issues reviewed (8 out of 580). (See **Deficiency D-WRPS-11**) Specifically:

- Corrective actions in several CRs, or those identified in supporting documents (e.g., event investigation reports and industrial hygiene investigation reports), were not completed prior to closure of the CR. In some CRs, the only action was to perform an evaluation, with no subsequent action to correct the issue, or the CRs were closed on a promise (or schedule) for future action. (See CRs 2019-1174, 2020-0812, 2020-0141, 2019-2475, and 2021-3159 in Appendix B)
- Several other issues were closed without closure documentation (see CRs 2019-1095, 2020-0243, and 2021-3328 in Appendix B).

Timeliness and Closure Conclusions

Before May 2020, the WRPS issue resolution timeliness typically exceeded expectations. However, performance has declined since then, and the limited efforts by WRPS to reverse this trend were not successful. In February 2021, the WRPS issue resolution timeliness indicator showed adverse performance in this area. Additionally, several specific issues have not been corrected “as soon as practicable” as required by NQA-1, in some cases due to the untimely resolution of some issues with LTCAs. Overall, adequate documentation is added to the record to support issue closure. However, approximately 1% of the issues reviewed were closed with inadequate documentation despite required reviews of closure documentation by the RM and the Corrective Action Group.

3.4 Follow-up of Previous EA Findings

The objective of this portion of the assessment was to examine the completion and effectiveness of corrective actions for the two findings concerning WRPS safety system management in EA report *Office of Enterprise Assessments Targeted Assessment of the Double Shell Tank Ventilation Systems at the Hanford Site Tank Farms – September 2016*.

Finding-F-WRPS-01 identified that contrary to DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*, the WRPS PM program was not maintaining safety SSCs in accordance with the DOE-approved nuclear maintenance management program. Specifically, PMs were not required to be performed on or before the established due date and were not being performed at the required frequency. WRPS clarified the requirements and terminology in procedure TFC-OPS-MAINT-C-12, *Preventive/Predictive Maintenance Administration*, and trained impacted personnel on the changes. Frequencies and due dates for PMs were updated to reflect the clarified terminology in TFC-OPS-MAINT-C-12. A management approval process was established to provide additional accountability for PMs that are extended beyond their due dates. WRPS implemented adequate corrective actions for this finding. No further EA action is warranted.

Finding-F-WRPS-02 identified that contrary to the requirements of DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, nuclear chemical operator training was not ensuring that operators achieve and maintain adequate knowledge and skills. WRPS documented the finding in CR 2016-1857 and developed an apparent cause analysis and CAP. The causal analysis and CAP required multiple revisions over approximately nine months due to

their rejection by the WRPS CARB and then by ORP. Implementing the approved CAP, WRPS revised its operations training program requirements to ensure that operators completed all continuing training before being granted requalification, and revised qualification plans to ensure that required topics were adequately covered. As an extent-of-condition action, WRPS reviewed other program areas with similar training programs. This extent-of-condition review revealed similar vulnerabilities in the maintenance training program and in training for persons-in-charge for operations. WRPS initiated adequate actions to address these vulnerabilities. No further EA action is warranted.

Follow-up of Previous EA Findings Conclusions

WRPS, with oversight from ORP, implemented adequate actions for the two findings in EA report *Office of Enterprise Assessments Targeted Assessment of the Double Shell Tank Ventilation Systems at the Hanford Site Tank Farms – September 2016*. No further EA action for these findings is warranted.

4.0 BEST PRACTICES

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

- WRPS recognizes and rewards employees identifying issues considered to be a “Good Catch” and requires that RMs contact them within seven days of submitting an AR, if requested by the employee.
- WRPS allows the issue investigation and causal analysis and corrective action development to be integrated into one report, avoiding inconsistency between the investigations, analyses, and CAPs identified at other sites.
- Causal analysis teams at WRPS develop success criteria for effectiveness reviews to show that actions taken adequately resolve the identified causes.
- The WRPS Engineering Survival Guide provides a comprehensive collection of human performance enhancement tools promoting the identification and correction of errors prior to issuance of a finished product and preventing recurrence.

5.0 FINDINGS

Findings are deficiencies that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. DOE line management and/or contractor organizations must develop and implement CAPs for findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*, to manage the corrective actions and track them to completion.

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Finding F-WRPS-1: WRPS has not categorized some of its issues “consistent with their importance to safety, cost, schedule, risk, and success of the program.” In some cases, this under-categorization of issues caused the issues management requirements of

NQA-1 for issues (or conditions adverse to quality) affecting nuclear safety to not be met. (TFC-PLN-50, Section 3.1, and NQA-1, Requirement 16)

Finding F-WRPS-2: WRPS does not report “Performance degradation of any ... support system that is required for safety operation of the SC or SS SSCs, which prevents satisfactory performance of its design function when [the SC or SS SSC] is required to be operable.” (DOE Order 232.2A, Attachment 2, Criterion 4.A(1))

6.0 DEFICIENCIES

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

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Deficiency D-WRPS-1: WRPS Requirement Area Managers are not adequately reviewing issues for cognitive trending. (TFC-ESHQ-Q_C-C-06, Section 4.0 and 4.2, Step 1)

Deficiency D-WRPS-2: The WRPS PER procedure does not adequately “address the flow-down of the quality requirements,” specifically the implementation of the graded approach of TFC-PLN-50, as evidenced by the description of Level B issues in Section 4.10 of the PER procedure, which contradicts the WRPS graded approach in TFC-PLN-50. (TFC-PLN-50, Section 2.3)

Deficiency D-WRPS-3: The WRPS Corrective Action Group has not ensured that justification for rescreening some issues to lower significance levels is adequately documented. (PER procedure, Section 4.14, Steps 3 and 6)

Deficiency D-WRPS-4: The WRPS PER procedure allows reportable occurrences to be categorized as Level C issues, which do not require the cause(s) and generic implications (extent of condition) to be determined. (DOE Order 232.2A, Attachment 1, Section 4.b)

Deficiency D-WRPS-5: The WRPS Responsible Manager Corrective Action Training, course 357019, and procedures TFC-ENG-FACSup-C-02, TFC-ESHQ-Q_C-C-06, TFC-OPS-OPER-C-28 have not been updated to reflect the transition to iCAS seven months after the transition. (TFC-PLN-02, Part I, Section 2.3, Requirements 3 and 8, and Section 5.1, Requirement 5, respectively)

Deficiency D-WRPS-6: The WRPS PER procedure allows conditions adverse to quality that are categorized as Level C issues to be closed without correction. (TFC-PLN-50, Attachment A, Chapter 16, and NQA-1, Requirement 16)

Deficiency D-WRPS-7: The WRPS CARB has not adequately ensured that all causes and corrective actions for some issues were identified and managed via the PER process. (TFC-CHARTER-05, Section 4.2, Step 6)

Deficiency D-WRPS-8: WRPS RMs have not corrected some conditions adverse to quality. (TFC-PLN-50, Attachment A, Chapter 16, and NQA-1, Requirement 16)

- Deficiency D-WRPS-9:** For two of the 109 maintenance issues reviewed, WRPS RMs incorrectly list multiple actions as a single action in iCAS. (PER procedure, Section 4.9, Step 4.a)
- Deficiency D-WRPS-10:** WRPS RMs have not corrected some conditions adverse to quality as soon as practicable. (TFC-PLN-50, Attachment A, Chapter 16, and NQA-1, Requirement 16)
- Deficiency D-WRPS-11:** WRPS RMs have not ensured in all cases that “action completion comments ... and closure documentation satisfy the intent of the corrective action.” (TFC-ESHQ-Q_C-C-06, Section 4.9, Step 12, and Section 4.10, Step 20)

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified nine 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.

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- OFI-WRPS-1:** Consider providing additional guidance to employees on the type and level of detail of information for submitting an issue (via training, a template, or similar).
- OFI-WRPS-2:** Consider providing additional guidance to screening committee members to ensure that the record contains sufficient information to support the screening (or re-screening) based on objective criteria implementing the graded approach.
- OFI-WRPS-3:** Consider revising the PER procedure and TFC-CHARTER-76 to indicate when the Requirement Area Managers, or their trend analyst, should initially assign trend code(s), and then later verify that all appropriate trend code(s) are assigned, for CRs associated with their area (e.g., assign trend codes during the screening committee meeting and determine whether others should be added during or following closure of the issue by the RM).
- OFI-WRPS-4:** Consider revising the PER procedure to require that the RM consider performing an interim assessment(s) of the effectiveness actions taken for Level A and B issues when some corrective actions will take a long time to implement or are delayed.
- OFI-WRPS-5:** Consider providing guidance for corrective action development that prioritizes corrective actions by effectiveness and sustainability (e.g., elimination of the hazard; substitution with something less hazardous; engineered controls, barriers, or defenses; administrative controls; personal protective equipment; and briefs/emails).
- OFI-WRPS-6:** Consider revising the PER procedure to require the RM to consider performing an effectiveness review for Level B issues.

OFI-WRPS-7: Consider revising the PER procedure to require that the RM’s manager approve corrective action due dates (including due dates for LTCAs and extensions) greater than the WRPS 145-day goal for issue resolution.

OFI-WRPS-8: Consider revising the ESRB charter to require that the status and barriers for completing each LTCA be presented periodically (e.g., every six months) to the ESRB for validation and/or action, as warranted.

OFI-WRPS-9: Consider requiring completion of non-LTCAs of a CR before designating the remaining action(s) as an LTCA(s).

8.0 ITEMS FOR FOLLOW-UP

Since 2015, WRPS has worked with other onsite contractors responsible for fire system maintenance to resolve persistent, adverse trends associated with fire system maintenance and impairments. WRPS and the current contractor responsible for fire systems, the Hanford Mission Integration Solutions (HMIS) Team, performed a thorough causal analysis and identified corrective actions, but resolution of these trends depends on the performance of HMIS. Therefore, EA, through its semi-annual assessment planning and resource allocation (prioritization) process, will consider conducting a review of fire system maintenance and impairments at one or more facilities on the Hanford Site.

On April 29, 2021, ORP and WRPS reported “that underground single-shelled tank B-109 at the Hanford Site is likely leaking to the soil beneath the tank. There is no increased health or safety risk to Hanford workers or the public.” As of September 2021, WRPS had not yet determined the cause of this leakage. Adequate monitoring of radioactive waste tank integrity and management of assumed/active leakers can limit the impact of tank leakage to the environment at the Hanford Site. WRPS and DOE continue to monitor and assess tank leakage and to explore actions to reduce the release of contaminants to the environment. EA, through its semi-annual assessment planning and resource allocation process, will consider conducting an independent review of actions taken in response to the tank B-109 leakage.

Appendix A Supplemental Information

Dates of Assessment

Remote Assessment: April – July 2021

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
Charles C. Kreager, 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

Quality Review Board

William F. West
James W. Lund
Robert J. Hailstone
Michael A. Kilpatrick – Advisor to the QRB

EA Site Lead for Hanford Site

Eric A. Ruesch

EA Assessors

Joseph E. Probst – Lead
Ronald G. Bostic
Sarah C. R. Gately
Eric A. Ruesch
Thomas M. Wirgau
Charles R. Allen
James R. Lockridge
Eric R. Swanson

Appendix B Comments on Individual Condition Reports

An assessment team from the DOE Office of Enterprise Assessments (EA) conducted a detailed review of 580 condition reports (CRs): reviewing 130 nuclear engineering issues, 97 safety basis and criticality safety issues, 109 nuclear maintenance issues, 114 industrial hygiene issues, and 130 conduct of operations (CONOPS) issues. EA comments on individual issues are documented in this appendix. The WRPS-assigned significance level for each CR is in parentheses and precedes the comment(s). The significance levels are Level A – Level D (with Level A assigned for significant issues and Level D for opportunities for improvement) or SIG (for significant conditions adverse to quality), RES (for conditions requiring resolution or conditions adverse to quality), TUF (for minor deficiencies that are tracked until fixed or an explanation is provided why no action is required), PIE/CIM (for items considered a process improvement evaluation or continuous improvement measure), and Trend Only (for tracking and trending minor deficiencies or non-compliances that have been or will be resolved outside the PER procedure).

Nuclear Engineering CRs	
Problem Evaluation Request (PER)/CR Number	Comment
2017-2522	(TUF) The required “splash test” is not being performed on leak detectors. Corrective actions (CAs) included preparation of a test procedure and a technical basis document. This effort was designated a long-term corrective action (LTCA) under the Problem Evaluation Request System database and the Electronic Suspense Tracking and Routing System (PERS/E-STAR). However, no CA justified this designation or the schedule delay that occurred. CA 1, generating the preventive maintenance procedure, took over three years to complete, causing the remaining three CAs to be late. The LTCA designation was not appropriate for this CR, which represents a significant timeliness issue.
2019-1226	(TUF) This item reported a needed clarification of requirements for Design Authority approvals. One CA is to revise a procedure, FACSUP-C 24. The due date has been extended four times, with 21 months passing since identification. This issue is not being resolved in a timely manner.
2019-2475	(TUF) This item reported problems with inappropriate system downgrades and a reference document that might be used incorrectly as a result. CAs cancelled the reference document but did not fully resolve the issue. A statement was made in the CR that a document change notice, DCN 716217, would be issued to correct system designations. However, the issuance of the DCN was not added as a CA for this CR. The CR has been closed and DCN 716217 is not yet issued. Therefore, this CR did not adequately resolve the identified issue and was closed based on the promised issuance of a document.
2019-2006	(TUF) This item reported a degraded pump seal. CAs 1 and 2 were for technical evaluations to be completed and attached to the CR. Both CAs have been closed with no evidence of completed technical evaluations, either in the Integrated Contractor

	Assurance System (iCAS) or PERS/E-STAR. After this was identified by the EA assessment team, WRPS attached an existing email to this CR requesting a third CA to replace the pump instead of performing the evaluations of CAs 1 and 2.
2020-1787	(TUF) This item identified that work packages were being closed without completing the engineering change notice (ECN) and sometimes after only partially completing the ECN work scope. It noted that these inappropriate closures resulted in configuration management issues, because affected drawings would not be updated until actual ECN closure. The evaluation comments state that a maintenance procedure was revised, and required reading was issued for the technical staff. Video training was also provided. However, this CR was closed with no other actions taken. Given the potential impact of this major systemic breakdown of configuration management, the issue should have been categorized as a SIG (Level A in iCAS) to determine the cause and prevent recurrence, and an extent-of-condition review should have been performed to identify all affected drawings.
2021-1886	(Level C) This item was an assessment finding by the U.S. Department of Energy (DOE) Office of River Protection (ORP) and included a list of CRs where CAs were found to be ineffective or untimely. The ORP list is not attached to the CR. Washington River Protection Solutions, LLC (WRPS) reviewed the list but documented no CAs in response. This issue was not addressed adequately in accordance with the PER procedure.

Safety Basis and Criticality Safety CRs	
PER/CR Number	Comment
2015-0794	(TUF) This item reported an issue identified by the Defense Nuclear Facilities Safety Board noting that the description of features providing defense-in-depth by limiting the combustible loading of the evaporator and pump room was removed from the nuclear safety analysis and replaced with a temporary, compensatory specific administrative control (SAC). The LTCA to restore the defense-in-depth controls or permanently add the SAC to the safety basis has a due date of 3/31/2022, which is nearly seven years after the issue was identified. This issue is not being resolved as soon as practicable as required by Nuclear Quality Assurance (NQA)-1, <i>Quality Assurance Requirements for Nuclear Facility Applications</i> .
2019-0854	(TUF) This item reported three necessary changes to the documented safety analysis (DSA) based on review of lines of inquiry provided by the Defense Nuclear Facilities Safety Board. The issue date is 04/28/19. A separate CA was written to address each of the changes. The due date for CA 3, to estimate distances between onsite locations and the site boundary and compare them to the Tank Farms DSA, was extended five times, from 7/30/19 to 9/30/21. In each case, the justification was that there was other, higher priority work. This issue concerning an active DSA is not being resolved in a timely manner.
2019-2270	(TUF) This item reported that the discussion of two filters in the 242-A Evaporator DSA needed to be revised because it did not match the configuration in the field. The issue date is 12/18/19. The due date for the CA to revise the DSA was extended seven

	times, from 3/24/20 to 12/01/20. The reasons given for the extensions were the need to work on the Tank Side Cesium Removal (TSCR) preliminary documented safety analysis (PDSA), the Liquid Effluent Retention Facility (LERF) potential inadequacy in the safety analysis, and the LERF justification for continued operation. This difference between the DSA and the configuration in the field was not resolved in a timely manner.
2019-2469	(TUF) This item reported that procedure TFC-ENG-SB-C-01 needed to be changed to accommodate the TSCR addendum, because the addendum would be in place for more than a year, and that was not currently included in the scope of the procedure. The issue date is 12/20/19, and the due date of the CA was extended five times from 3/19/20 to 12/15/20. The first extension was due to higher priorities and adjusting to the pandemic, but the next four were all due to higher priorities resulting in the WRPS Nuclear Safety group taking a year to change to an internal engineering procedure. This issue was not resolved in a timely manner.
2019-2128	(RES) This item reported that the TSCR PDSA was not completed in time for ORP to review for the Technical Independent Project Review. The causal analysis identified four “lessons learned” rather than causes, and the only action taken was to resolve the comments identified by ORP. A separate issue was written to capture necessary procedure changes, but the actions were closed without action because no additional projects warranting a PDSA were scheduled in the next five years. Per NQA-1, “Conditions adverse to quality shall be identified promptly and corrected as soon as practicable;” neither of which were completed for causes leading to the rejected PDSA.
2020-0513	(Level C) This item reported a need to revise guidance for preparing documents that implement criticality safety controls and to ensure that required reviews by criticality safety staff are performed and documented. CA 3 is to revise HNF-SD-WM-DQO-014 to remove an out-of-date criticality control. The action was created on 4/07/20 and is due on 3/31/22, but it does not have a reason for the long due date or a LTCA designation.

Maintenance CRs	
PER/CR Number	Comment
2018-0648	(TUF) This item reported the failure to turnover to WRPS in a timely manner newly installed electrical equipment, resulting in gaps in performance of the manufacturer’s recommended maintenance on the equipment. No documentation for the deliverables is provided for CAs 2 and 4. There is no indication that any action was taken for these two CAs. The initial CR actions were to identify additional actions to resolve the issue. However, no additional actions were identified and added to the CR before closing the CR.
2019-2108	(TUF) This item reported inadequate process control of stored items/equipment in the Marshalling Yard. Contrary to Section 4.9, step 4.a of the PER procedure, CA 2 consists of two actions as reflected in the deliverable: a procedure change and a material inventory. CA 1 also includes multiple actions with multiple deliverables.

2020-0582	(TUF) The issue reported not using the Integrated Change Document Notification Application to ensure that the latest versions of documents in a work package are being used. This issue could impact other organizations in addition to 222-S Laboratory, yet there was no extent-of-condition review accomplished even though the initiator raised the concern that the issue could occur in other organizations.
2020-1226	(TUF) The issue reported inadequate performance of assessments to confirm spare parts inventories. Contrary to Section 4.9, step 4.a of the PER procedure, the one CA includes three actions.
2020-1655	(TUF) The CR reports an issue with proper filing of Government Property Transfer (GPT) forms. CAs provide a status for the delinquent GPT forms, but do not ensure that the problem with filling out the forms is corrected.

CONOPS CRs	
PER/CR Number	Comment
2015-0994	(SIG) This item, initiated on May 22, 2015, documented contamination spread by biological vectors (birds), likely from LERF Basin 44 due to a damaged cover. Multiple extensions to the due date of the ultimate CA (replace the damaged cover) were justified, but WRPS took no actions to verify the effectiveness of interim compensatory actions until the final action could be completed. The CR remains open with the final action now due March 15, 2022, and effectiveness review due September 15, 2022.
2019-0410	(TUF) This item reported non-compliant labeling on an air compressor at the Effluent Treatment Facility (ETF). One of the three CAs was a review of lessons learned with project engineers; the deliverable was an “ESTARS statement indicating completion.” The action was closed with no such statement or other documentation. No deficiencies were noted with the other two actions.
2019-0885 also 2018-0626 2018-1094	(TUF) This item reported on 5/6/2019 that the AP and other Farms have equipment without proper labels (not meeting the engineering standard). A review identified over 7,000 electrical components installed since 2014. Four of the five double-shelled tank (DST) farms CAs remain open. Additional problems with labeling were identified in CRs 2018-0626 ((TUF) Quality Assurance assessment finding at SY-AP Farm) and 2018-1094 ((Trend Only) DOE Facility Representative identified missing labels at AN Farm). Actions for 2018-1094 were rolled into 2018-0626. Three of 22 actions remain open from 2018-0626, which limited the effort to DSTs and key systems such as the transfer and ventilation systems. Although action 5 of 2019-0885 intends to address the balance of the electrical component scope, actions for 2018-0626 were narrowed in scope (e.g., excluding single-shelled tanks (SSTs), fire systems, and flow direction) such that the early scoping should be revisited to ensure that labels needed for safe operation are installed. An effectiveness review is not planned. A cause was not identified or corrected to prevent further non-compliance with the labeling standard. The issues, in general, were not screened at a level consistent with the pervasive non-compliance with CONOPS requirements (DOE Order 422.1, <i>Conduct of Operations</i>).

	For CR 2018-0626, CA 21 was to include additional closure evidence to this CR. However, CR 2018-0626 was closed without additional evidence attached to the record.
2019-1095	(TUF) This item reported that requirements from DOE Order 422.1 were not consistently captured in the implementing procedures. Three actions were identified. The third action included a determination of whether an extent-of-condition review was needed. However, the closure documentation for this action did not include the results of an extent-of-condition review, only a revision to TFC-PLN-05, <i>Conduct of Operations Implementation Plan</i> , that implemented changes across WRPS.
2019-1503 2019-2412	(TUF) This item reported that eRounds signature requirements were not met. CAs included an analysis to determine what software change was needed and issuing a training bulletin. However, the software revision did not work and was removed from use. The issue was incorrectly closed based solely on completion of the interim, compensatory action of issuing a training bulletin. Issue 2019-2412 was initiated when software did not work and remains open. It is not clear how the training bulletin regarding the incomplete software change is effective when the software is not in use, or why a compensatory measure is in place when the manual system is in use.
2019-2059	(TUF) This item reported an assessment finding for the ETF Integrity Assessment; however, the assessment was not attached or linked, and the issue was closed to a statement of work to perform modifications to the building, dated 10/2019. There is no evidence that the one-year completion date was met, only that drip trays were installed as a temporary fix. In addition, this issue was screened out of the PER process without recording the reason or the system to which it was screened.
2019-2061	(Trend Only) This item reported that the limiting condition for operation (LCO) 3.11, Action C.1 cannot be met since the sample assemblies are not installed in the DSTs. WRPS concluded that this does not represent a technical safety requirement (TSR) compliance issue since Action D would then be implemented. WRPS decided that it would be prudent to make preparations to implement Action D, and these CAs are identified. However: <ul style="list-style-type: none"> • There was no acknowledgement that only performing Action D is less effective, i.e., taking actions to limit flammable gas increase (via Action D) without actually measuring the flammable gas level (via Action C) is a less effective method of controlling flammable gas levels. • The issue further reveals a weakness in the TSR implementation process. This issue should have been identified during the implementation verification review process before operations began or during annual reviews of TSR implementation, indicating the potential for major systemic breakdowns in these processes that warrant more rigorous investigation and resolution. • The inability to complete a TSR action statement was incorrectly screened as a process improvement, rather than a SIG or RES (Level A or B issue in iCAS).
2020-0134	(TUF) This item reported that the design of the Annulus High Level Alarm System in each DST Farm needs review and documentation. This CR was closed by referencing an action in CR 2019-1135; however, this action was not completed. Several additional assessments and actions were subsequently identified related to this issue, but none adequately documented the as-built condition of this system credited in the safety basis.

2020-0135	(TUF) This item reported that CRs for LCO 3.11 were under-categorized as TUFs, instead of RES (or Level B issues in iCAS). Actions taken included distributing required reading to ensure that similar issues were appropriately categorized. However, the required reading is not an effective CA as evidenced by AR 2021-3326 being screened as Level C a year later, indicating that the screening committee continues not to categorize “Failures, malfunctions, deficiencies, deviations, or defects associated with safety significant systems, structures, and components (SSCs)” as RES (or Level B) issues as required by this criterion in TFC-CHARTER-76. This faulty logic also led to inoperable, credited SSCs not being reported as required.
2020-0243	(RES) This item reported As Low as Reasonably Achievable Work Management Sheet Deficiencies. The causal analysis was thorough. However, an action to disseminate lessons learned through a “Rad Happenings” was forwarded by email, but the attachment was not captured by iCAS as closure evidence.
2020-0986	(TUF) This item reported a systemic lack of nuclear chemical operator proficiencies for all shift routines operations. A path forward was determined on 10/5/2020. However, this issue was under-categorized. Based on the significance of this systemic issue, it should have been categorized as a RES (Level B in iCAS) to ensure that the path forward included actions to resolve the causes of this systemic issue. Additionally, the CAs are proceeding slowly for such an important issue.
2020-1152 2019-2271	(TUF) This item reported an ORP adverse condition being closed without action. The action to review and resolve the concern is open and overdue. A related ORP concern documented in CR 2019-2271 was that a WRPS subcontractor audit did not report non-compliant conditions as an adverse-to-quality finding, but as an OFI requiring no CA by the subcontractor. WRPS performed a review (surveillance) and concluded that an adverse condition did not exist but linked three newer CRs to the record related to the concern.
2020-1188	(TUF) This item reported that management needs to assess the efficacy of the continuing training program, specifically TSR training. The issue was raised in August 2019 following the DOE Operating Experience summary OE3:2019-02 and a WRPS assessment. Lines of inquiry were developed covering the implementation of the defined continuing training program requirements. This assessment was completed, identifying one finding on self-assessments of the continuing training program. However, it did not evaluate the effectiveness of the TSR continuing training, therefore not addressing the identified issue.
2020-1315	(RES) This item reported an unexpected shutdown of the ETF Cooling Tower. Three causes resulted in eight CAs. However, documentation for two actions to develop a training needs analysis and revise the qualification card was forwarded by email but not attached and no documentation is attached to the record indicating that currently qualified personnel were retrained/requalified based on the revise qualification card. Numerous CONOPS issues were addressed by five CAs comprised of less effective required reading and lessons learned. No record of briefing the lessons learned was attached to the record. The engineering action to determine system operability was attached data that was not supported by a conclusion. The actions did not address the inadequately trained Control Room Operator identified in the causal analysis.

2020-1498	(RES) This item reported an unplanned shutdown of area AP primary tank ventilation. A CA appropriately installed E-Stop protective covers, but it is not clear that any of the three CAs resolved the cause “Design output not correct.”
2020-1906 2020-1818	(RES) This item reported an unplanned shutdown of AW Farm primary tank ventilation B Train during a routine exhauster swap. No CAs were added based on this CR, instead referring to actions for CR 2020-1818, a similar event at the AP Farm. An action was added on 3/1/2021 to CR 2020-1818 to additionally address the AN, AW, and SY Farm work controls and procedures.
2021-1876	(Level C) This item reported the failure to enter ETF-AOP-85B-003, <i>Response to Loss of Electrical Power</i> , when required and evaluated a work instruction to determine whether a modification is required. Two CAs were completed to address these issues. However, the iCAS record is confusing because the actions are numbered 4 and 5, with no record of actions 1-3.
2021-1907	(Level C) This item reported the unplanned entry into LCO 3.11.A due to the AP-106 annulus high-level alarm caused by communication issues. The issue was reportable under DOE Order 232.2A, <i>Occurrence Reporting and Processing of Operations Information</i> , as a safety class system inoperable (not functional), even though the communication system is not credited. It was also incorrectly screened as Level C (see 2021-3326 discussion).
2021-1908	(Level C) This item reported the unplanned entry into time monitoring for LCO 3.11.A due to an AP-106 annulus high-level alarm caused by communication issues. A work package was used to reset power and restore communications, but no action was taken to prevent future communication issues with this safety significant SSC credited in the safety basis. Per TFC-CHARTER-76, “Failures, malfunctions, deficiencies, deviations, or defects associated with safety significant systems, structures, and components (SSCs)” are categorized as Level B to determine the cause(s) and actions to prevent recurrence.
2021-1911	(Level B) This item reported the removal of a barrier using a crane without the attendant required by the justification for continued operation for the nuclear safety basis. One identified apparent cause for this issue was that roles and responsibilities were not clearly communicated to or received by the employees involved. The sole CA assigned to this cause was to assess communication of roles and responsibilities at a future pre-job brief. Performance of an assessment without additional actions will not effectively correct a deficient condition.
2021-1937	(Level C) This item reported a worker’s concern that entry conditions for TF-AOP-020, <i>Response for Placing Personnel and Equipment in a Safe Condition</i> , were met but not used to guide action. The CA of emailing the Central Shift Managers to reinforce expectations is not an enduring (long-lasting) CA.
2021-1938	(Level B) This item reported a “focus area” due to a significant number of issues related to radioactive material areas over a three-year period. A common cause evaluation determined that two of the three apparent causes were related to work not being performed in accordance with established processes. Most CAs involved one-time communications to personnel, with no rosters, sign-off sheets, or other methods to

	verify that the communication had been received by the target audience. One-time communications are likely to be inadequate to sustainably change personnel behaviors.
2021-2014	(Level B) This item documents an unplanned system shutdown during maintenance due to inadequate maintenance instructions. A cause analysis was submitted for issues management review on 3/18/2021 and was returned for rework (further evaluation/investigation) on 3/23/2021. As of the conclusion of the EA assessment, the CR's status remained "cause analysis/action plan" with all documented actions overdue.
2021-2152	(Level B) This item reported that while performing a work package to remove a ventilation duct at C-111, an unexpected interference was encountered: a pipe was found in the ventilation duct. This issue indicates that the check of the worksite was inadequate, but CAs only identified "lessons learned" rather than taking more enduring (long-lasting) action.
2021-2214	(Level C) This item reported the misalignment of a valve found during heatup of the ETF evaporator. While an event investigation was initiated, it was curtailed because "further investigation is not likely to result in new information that establishes with certainty when the valve was closed or by whom." This was also the basis for re-screening from Level B to C and closure.
2021-2286	(Level B) This item documents an unexpected tank pressurization alarm during an in-tank activity. The apparent cause analysis determined that management had not anticipated the need to establish a pressure watch during an evolution that could result in tank pressurization with only one operable exhauster. The sole CA was to implement a daily review during the plan-of-the-day meeting to determine work that requires a pressure watch; there is no indication or objective evidence that this daily review is controlled or will be sustained by any documented process or how this review will help management anticipate evolutions that may require a pressure watch.
2021-2543	(Level C) This item reported an assessment finding that of 27 courses sampled, 16 were found to have missing or incomplete documentation, and included a recommendation to verify that DOE training requirements are met for other active courses and to prevent recurrence of these documentation lapses. However, the responsible manager chose to assign action to only fix the 16 courses identified to have inadequate documentation and to use the periodic review process to correct the overall vulnerability. Following questioning by the EA assessment team, an action was added to conduct an extent-of-condition review.
2021-2611	(Level B) This item reported identification of an unexpected power source due to inadequate work planning. A barrier cause analysis found that planning for this work was inadequate and addressed this with five actions issuing a "lessons learned" report. The CR stated that the extent of condition was limited to this event, because "it was a result of less than adequate performance." However, the inadequacies in the work planning process (which is common throughout WRPS) were only addressed with a "lessons learned" report rather than more enduring (effective) corrective actions.
2021-3014 2020-1426	(Level B) This item reported an unplanned shutdown of the ETF vessel off-gas ventilation during installation of lock-outs and tag-outs (LOTOs), since it was not recognized that a circuit being isolated also supplied control power for several ventilation components. Action was taken to restore the power and correct the LOTO.

	<p>This issue is a recurrence of a previously recognized problem in the common cause analysis 2020-1426. In response to 2020-1426, the lessons learned were disseminated as required reading, but the currently qualified individuals were not qualified at that time and were not assigned the required reading. An action to decide whether the lessons learned should be included in the training is still open. This action is an example of how ineffective the required reading of a lesson learned is as a CA.</p>
<p>2021-3121 2020-0883</p>	<p>(Level B) This item reported the joint determination by ORP and WRPS on 4/29/2021, that underground SST 241-B-109 at the Hanford Site is likely leaking to the soil. The decreasing level had previously been identified by 2020-0883 (Level C) on 6/10/2020 and was determined to be non-reportable. An action from this first issue was to complete a leak assessment and issue a report. The deliverable was completed in June 2021, RPP-ASMT-64349, but the action is not closed. It was extended from 1/19/21 to 9/30/21 without documenting the reason.</p> <p>The 2021-3121 CR reflects “evaluate” status with “The specific cause of the liquid level decrease in tank B-109 has not been determined” and no new actions. While not discussed in the CR, compensatory actions and CAs since interim stabilization (pumped down to about 20%) of the tank in 1985, consisted of crediting monitoring wells, as well as pump and treat systems put in place to mitigate known SST leakage.</p> <p>During the April 2021 Executive Safety Review Board (ESRB) meeting, the ESRB considered categorizing CR 2021-3121 as a Level A issue, but it was categorized as a Level B issue because there is no increased health or safety risk and a pump and treatment system for pre-existing contaminants in the soil near tank B-109 will mitigate the effect of this leakage on groundwater and the Columbia River. However, CR 2021-3121 meets the Level A criteria in TFC-CHARTER-76 of having a “high potential or actual consequence, or ... serious effect on the environment ...” (e.g., potentially significantly adding to the contamination of the soil beneath tank B-109).</p>
<p>2021-3184</p>	<p>(Level C) This item reported that during the performance of the draining sequence of procedure TO-260-440, the procedure directed the positioning of valve APVP-WT-V 609 to the open position. However, the valve was locked and tagged. Two CAs are in process to determine whether an affected line segment is drained and provide freeze protection if appropriate. However, no action was taken to correct the processes that developed the procedure that was inconsistent with the system configuration.</p>
<p>2021-3268</p>	<p>(Level B) This item reported a valve inspection that noted that insulation was trapped between the funnel base plate and the valve stop when the valve was in the closed position. Four other valves had the same problem. This was not a criterion of the inspection and was a “good catch.” Following an engineering and safety basis analysis, WRPS declared a potential inadequacy in the safety analysis following the established processes. Since 5/24/2021, WRPS has prohibited use of and reliance on the four valves using its “Red Arrow” process.</p>
<p>2021-3326 See Also: 2020-0837, 2020-1056, 2020-1058, 2020-1747,</p>	<p>(Level C) This item reported an unplanned LCO 3.11.B and 3.11.D entry on 6/9/2021 for AW Farm due to the generator supplying power to the Annulus High Level alarm and minimum ventilation flow systems running out of fuel, resulting in inoperability. The generator was refueled two hours later, and systems were restored to operation. This issue was screened at Level C with no action. However, the inoperability of the safety significant-level monitoring function is a reportable event per DOE Order 232.2A (i.e., this event is required to be reported as a low-level report per Criterion 4A(1),</p>

<p>2020-0874, 2020-0873, 2019-0761, 2019-1135, 2019-1258, 2019-1602, 2019-1736, 2019-2039</p>	<p>“Performance degradation of ... any support system that is required for safety operation of the SC or SS SSCs, which prevents satisfactory performance of its design function when it is required to be operable”). Additionally, per paragraph 4.b of the contractor requirements document in DOE Order 232.2A, Facility Managers are to “Determine causes and generic implications, and implement corrective actions and closeout activities for reportable occurrences.”</p> <p>During interviews, WRPS personnel stated that it is a common practice to not report unplanned LCO entries when the non-credited instrument support systems were at fault. For example, 2020-0837 and 2020-1056 were deemed reportable when the actual instruments failed, but 2020-1058, 2020-1747, 2020-0874, 2020-0873, 2019-0761, 2019-1135, 2019-1258, 2019-1602, 2019-1736, and 2019-2039 were not reported when the alarm was inoperable because of power or communication system failures.</p>
<p>2021-3328</p>	<p>This item reported that the AX-103 high resolution resistivity electrode was connected to the wrong riser. The AR stated that the issues would be closed as a “Level C with no action” because an email would be attached providing evidence of actions already taken to correct the issue. However, the evidence was not attached.</p>
<p>2020-0227</p>	<p>(Level C) This item reported a problem with work being performed on safety significant equipment without work authorization. The issue was discovered 1/27/2020, and the CA was extended twice until 7/27/2021 without reasons provided, and twice due to COVID-19 complications. The CA is to “Determine extent of [alarm response procedures (ARPs)] required to be revised for resetting upon loss of communication alarms and provide feasibility for revision to the ARPs to add resetting alarm step to the ARPs” which does not correct the issue of work being performed without authorization. Additionally, given the operational need to respond correctly to alarms, taking 18 months to determine a path forward (i.e., to determine CAs) is not timely. Also, the date of the occurrence, 1/27/20, was not entered into iCAS when this issue was transferred from PERS/E-STAR, instead reflecting the data migration date of 12/17/2020.</p>

<p style="text-align: center;">Industrial Hygiene CRs</p>	
<p>PER/CR Number</p>	<p>Comment</p>
<p>2020-0812</p>	<p>(TUF) This item reported that the Site Wide Industrial Hygiene Database contained errors in a dropdown menu. The CA consisted of determining whether the menu required correction or clarification. However, no action was performed, and no explanation was provided as to why the issue did not require action.</p>
<p>2020-0141</p>	<p>(TUF) This item reported that Conex boxes in the Grout Loop area in 200E were not properly labeled in accordance with DOE-0342, <i>Hanford Site Chronic Beryllium Disease Prevention Program</i>. The CA consisted of evaluating a process to ensure the inclusion of Industrial Hygiene personnel so that new facilities, including Conex boxes brought on site, have a beryllium assessment completed. However, the CA was closed concluding that “at this present time there appear to be no method of tracking a few (... 5-7 connexs (sic) annually) that come onto site.” This issue was not resolved.</p>

2019-1272	(PIE/CIM) This item reported that the ergonomics program has not been periodically assessed as required per TFC-ESHQ-IH-STD-16. Contrary to the PER procedure, this issue is categorized as PIE/CIM despite a potential non-compliance with WRPS requirements. Finally, the item is closed to a statement that contradicts procedure requirements.
2019-0660	(TUF) This item reported that contrary to TFC-ESHQ-IH-STD-11, WRPS personnel or subcontractors who plan to introduce a new material are not gaining approval from Industrial Hygiene. The CA consisted of removing the requirement for Industrial Hygiene’s approval. However, the CA does not address the issue of how Industrial Hygiene will control new materials being introduced to the site.
2018-1129	(TUF) This item reported that cooling equipment for worker cooldown areas is not provided in a timely manner. The issue was closed based on a promise to create a new CR that specifically addressed the issue. However, a new CR was not created, and the issue was not resolved.
2019-1101	(PIE/CIM) This item reported a Standard Threshold Shift that was identified by the site occupational medical contractor that had not been investigated by Industrial Hygiene as required by TFC-ESHQ-IH-STD-18. Contrary to the PER procedure, this issue is categorized as PIE/CIM despite a potential non-compliance with WRPS requirements. Finally, the item is closed to a promise of completing investigations.
2020-1923, 2021-3196, 2021-2962, 2021-3159, and 2021-3081	(Level C) These five CRs are associated with AOP-015 vapor events, and each was initially categorized as Significance Level B or as “RES” but later downgraded to Level C when the event investigation determined that additional investigation was not warranted. However, the categorization of these CRs was downgraded without documenting the justification for the lower significance level (i.e., without documenting “how the CR meets the proposed significance level, using examples in TFC-CHARTER-76 and Attachment B” as required by Section 4.14 of the PER procedure).
2014-0602	(Level A) This CR is a rollup of vapor and odor CRs issued (i.e., 14 from 2014, 9 from 2015, 13 from 2016, and 7 from 2017). Several immediate CAs were initiated. A root cause analysis that relied heavily upon the earlier Tank Vapor Assessment Team report was prepared. Although this analysis adequately identified root causes and actions to improve the trust between WRPS management and its workers and the monitoring and characterization of tank vapors, the record does not state how these root causes cover the scope of the stated problem, namely that “The purpose of the [root cause analysis] is to determine the cause of the significant increase in odor events in 2014.” However, CR 2014-0602 included actions to improve ventilation systems, which did reduce the number of vapor events in 2015, 2016, and 2017. An effectiveness review of the CAs was completed on 4/29/2021, and the CR was closed 6/17/2021.
2019-1174	(TUF) CAs identified in the Event Investigation Report (EIR) for this CR were not picked up or tracked in PERS/E-STAR. The CR identified one CA, which was to “work with MSA to identify plans for septic/sewer tie-in to avoid potential odors from Septic Tank #12.” MSA email on 11/6/19 states that “sewer consolidation tie-ins are not completed. It will still be a couple of weeks,” and the CR was closed on 11/17/2019 without evidence of tie-in completion.

2021-3159	<p>(Level C) On 5/6/2021, two workers were performing electrical work in the AP Tank Farm, when one of the worker's ToxiRAE personal ammonia monitor alarmed at 6 parts per million (ppm). Work was stopped, and the workers evacuated the area. The resultant EIR states that "when the IHIR [industrial hygiene investigation report] is released, all pertinent IH [industrial hygiene] information will be included in the report through revision." The CR was closed on 5/24/2021 without revision to the EIR or indication that the IHIR was complete. As discussed above, this CR was downgraded to a Level C issue without documenting "how the CR meets the proposed significance level, using examples in TFC-CHARTER-76 and Attachment B" as required by Section 4.14 of the PER procedure).</p>
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